



CALL NO. 350

CONTRACT ID. 181214

HARDIN COUNTY

FED/STATE PROJECT NUMBER JP02 047 0313 010-015

DESCRIPTION JOE PRATHER HIGHWAY (KY 313)

WORK TYPE ASPHALT SURFACE WITH GRADE & DRAIN

PRIMARY COMPLETION DATE 10/15/2019

LETTING DATE: May 25,2018

Sealed Bids will be received electronically through the Bid Express bidding service until 10:00 AM EASTERN DAYLIGHT TIME May 25,2018. Bids will be publicly announced at 10:00 AM EASTERN DAYLIGHT TIME.

PLANS AVAILABLE FOR THIS PROJECT.

REQUIRED BID PROPOSAL GUARANTY: Not less than 5% of the total bid.

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PART I
SCOPE OF WORK

ADMINISTRATIVE DISTRICT - 04

CONTRACT ID - 181214

JP02 047 0313 010-015

COUNTY - HARDIN

PCN - DE04703131814

JP02 047 0313 010-015

JOE PRATHER HIGHWAY (KY 313) WIDEN KY 313 TO 4 LANES BETWEEN PATRIOT PARKWAY AND BULLION BOULEVARD CONNECTOR, A DISTANCE OF 04.46 MILES.ASPHALT SURFACE WITH GRADE & DRAIN SYP NO. 04-00170.00.

GEOGRAPHIC COORDINATES LATITUDE 37:48:42.00 LONGITUDE 85:57:06.00

COMPLETION DATE(S):

COMPLETED BY 10/15/2019

APPLIES TO ENTIRE CONTRACT

CONTRACT NOTES

PROPOSAL ADDENDA

All addenda to this proposal must be applied when calculating bid and certified in the bid packet submitted to the Kentucky Department of Highways. Failure to use the correct and most recent addenda may result in the bid being rejected.

BID SUBMITTAL

Bidder must use the Department's electronic bidding software. The Bidder must download the bid file located on the Bid Express website (www.bidx.com) to prepare a bid packet for submission to the Department. The bidder must submit electronically using Bid Express.

JOINT VENTURE BIDDING

Joint venture bidding is permissible. All companies in the joint venture must be prequalified in one of the work types in the Qualifications for Bidders for the project. The bidders must get a vendor ID for the joint venture from the Division of Construction Procurement and register the joint venture as a bidder on the project. Also, the joint venture must obtain a digital ID from Bid Express to submit a bid. A joint bid bond of 5% may be submitted for both companies or each company may submit a separate bond of 5%.

UNDERGROUND FACILITY DAMAGE PROTECTION

The contractor shall make every effort to protect underground facilities from damage as prescribed in the Underground Facility Damage Protection Act of 1994, Kentucky Revised Statute KRS 367.4901 to 367.4917. It is the contractor's responsibility to determine and take steps necessary to be in compliance with federal and state damage prevention directives. When prescribed in said directives, the contractor shall submit Excavation Locate Requests to the Kentucky Contact Center (KY811) via web ticket entry. The submission of this request does not relieve the contractor from the responsibility of contacting non-member facility owners, whom shall be contacted through their individual Protection Notification Center. Non-compliance with these directives can result in the enforcement of penalties.

REGISTRATION WITH THE SECRETARY OF STATE BY A FOREIGN ENTITY

Pursuant to KRS 176.085(1)(b), an agency, department, office, or political subdivision of the Commonwealth of Kentucky shall not award a state contract to a person that is a foreign entity required by [KRS 14A.9-010](#) to obtain a certificate of authority to transact business in the Commonwealth ("certificate") from the Secretary of State under [KRS 14A.9-030](#) unless the person produces the certificate within fourteen (14) days of the bid or proposal opening. If the foreign entity is not required to obtain a certificate as provided in [KRS 14A.9-010](#), the foreign entity should identify the applicable exception. Foreign entity is defined within [KRS 14A.1-070](#).

For all foreign entities required to obtain a certificate of authority to transact business in the Commonwealth, if a copy of the certificate is not received by the contracting agency within the time frame identified above, the foreign entity's solicitation response shall be deemed non-responsive or the awarded contract shall be cancelled.

Businesses can register with the Secretary of State at <https://secure.kentucky.gov/sos/ftbr/welcome.aspx>.

SPECIAL NOTE FOR PROJECT QUESTIONS DURING ADVERTISEMENT

Questions about projects during the advertisement should be submitted in writing to the Division of Construction Procurement. This may be done by fax (502) 564-7299 or email to kytc.projectquestions@ky.gov. The Department will attempt to answer all submitted questions. The Department reserves the right not to answer if the question is not pertinent or does not aid in clarifying the project intent.

The deadline for posting answers will be 3:00 pm Eastern Daylight Time, the day preceding the Letting. Questions may be submitted until this deadline with the understanding that the later a question is submitted, the less likely an answer will be able to be provided.

The questions and answers will be posted for each Letting under the heading "Questions & Answers" on the Construction Procurement website (www.transportation.ky.gov/contract). The answers provided shall be considered part of this Special Note and, in case of a discrepancy, will govern over all other bidding documents.

HARDWOOD REMOVAL RESTRICTIONS

The US Department of Agriculture has imposed a quarantine in Kentucky and several surrounding states, to prevent the spread of an invasive insect, the emerald ash borer. Hardwood cut in conjunction with the project may not be removed from the state. Chipping or burning on site is the preferred method of disposal.

INSTRUCTIONS FOR EXCESS MATERIAL SITES AND BORROW SITES

Identification of excess material sites and borrow sites shall be the responsibility of the Contractor. The Contractor shall be responsible for compliance with all applicable state and federal laws and may wish to consult with the US Fish and Wildlife Service to seek protection under Section 10 of the Endangered Species Act for these activities.

ACCESS TO RECORDS

The contractor, as defined in KRS 45A.030 (9) agrees that the contracting agency, the Finance and Administration Cabinet, the Auditor of Public Accounts, and the Legislative Research Commission, or their duly authorized representatives, shall have access to any books, documents, papers, records, or other evidence, which are directly pertinent to this contract for the purpose of financial audit or program review. Records and other prequalification information confidentially

disclosed as part of the bid process shall not be deemed as directly pertinent to the contract and shall be exempt from disclosure as provided in KRS 61.878(1)(c). The contractor also recognizes that any books, documents, papers, records, or other evidence, received during a financial audit or program review shall be subject to the Kentucky Open Records Act, KRS 61.870 to 61.884.

In the event of a dispute between the contractor and the contracting agency, Attorney General, or the Auditor of Public Accounts over documents that are eligible for production and review, the Finance and Administration Cabinet shall review the dispute and issue a determination, in accordance with Secretary's Order 11-004.

April 30, 2018

SPECIAL NOTE FOR RECIPROCAL PREFERENCE

RECIPROCAL PREFERENCE TO BE GIVEN BY PUBLIC AGENCIES TO RESIDENT BIDDERS

By reference, KRS 45A.490 to 45A.494 are incorporated herein and in compliance regarding the bidders residency. Bidders who want to claim resident bidder status should complete the Affidavit for Claiming Resident Bidder Status along with their bid in the electronic bidding software. Submittal of the Affidavit should be done along the bid in Bid Express.

April 30, 2018

ASPHALT MIXTURE

Unless otherwise noted, the Department estimates the rate of application for all asphalt mixtures to be 110 lbs/sy per inch of depth.

INCIDENTAL SURFACING

The Department has included in the quantities of asphalt mixtures established in the proposal estimated quantities required for resurfacing or surfacing mailbox turnouts, farm field entrances, residential and commercial entrances, curve widening, ramp gores and tapers, and road and street approaches, as applicable. Pave these areas to the limits as shown on Standard Drawing RPM-110-06 or as directed by the Engineer. In the event signal detectors are present in the intersecting streets or roads, pave the crossroads to the right of way limit or back of the signal detector, whichever is the farthest back of the mainline. Surface or resurface these areas as directed by the Engineer. The Department will not measure placing and compacting for separate payment but shall be incidental to the Contract unit price for the asphalt mixtures.

ASPHALT PAVEMENT RIDE QUALITY CATEGORY B

The Department will apply Pavement Rideability Requirements on this project in accordance with Section 410, Category B.

FUEL AND ASPHALT PAY ADJUSTMENT

The Department has included the Contract items Asphalt Adjustment and Fuel Adjustment for possible future payments at an established Contract unit price of \$1.00. The Department will calculate actual adjustment quantities after work is completed. If existing Contract amount is insufficient to pay all items on the contract with the adjustments, the Department will establish additional monies with a change order.

OPTION A

Be advised that the Department will accept compaction of asphalt mixtures furnished for driving lanes and ramps, at 1 inch (25mm) or greater, on this project according to OPTION A in accordance with Section 402 and Section 403 of the current Standard Specifications. The Department will require joint cores as described in Section 402.03.02 for surface mixtures only. The Department will accept compaction of all other asphalt mixtures according to OPTION B.

MATERIAL TRANSFER VEHICLE (MTV)

Provide and use a MTV in accordance with Sections 403.02.10 and 403.03.05.

January 26, 2017

SPECIAL NOTE FOR FIBER REINFORCEMENT OF ASPHALT

PART 1 – GENERAL

1.1 DESCRIPTION

This Section includes specifications for furnishing all materials, equipment, labor, and incidentals for mixing aramid fiber reinforcements to hot mix asphalt.

1.2 DEFINITIONS

- A. HMA - hot mix asphalt, without aramid fiber.
- B. WMA- warm mix asphalt, without aramid fiber.
- C. Reinforced HMA - hot mix asphalt including aramid fibers properly proportioned, uniformly mixed and coated with asphalt.
- D. Aramid fiber - pure aramid fiber meeting the material properties of this specification, without additive materials.
- E. Delivery material(s) - the material(s) combined with the pure aramid fiber to facilitate Aramid fiber and HMA/WMA proportioning, uniform mixing with the HMA/WMA, and asphalt coating of the aramid fibers.
- F. Aramid product - the aramid supplier's mixture of pure aramid fiber and delivery material(s).
- G. Manufacturer - the company that produces the aramid fiber from raw materials.
- H. Supplier - the company that offers an aramid product.

PART 2 – PRODUCT

2.1 MATERIALS

Meet the following aramid fiber properties.

Property	Measure	Standard
Material	Aramid	ASTM D276
Form	Monofilament fibers	Manufacturer Certification
Length	0.75 inches (+/- 10%)	Manufacturer Cert.
Specific Gravity	1.44	ASTM D276
Minimum Tensile Strength	400,000 psi	ASTM D3379
Maximum Tensile Elongation	1.8 %	ASTM D3379
Degradation Temperature	800 degrees F	ASTM D276
Acid and Alkali Resistance	Inert	Manufacturer Cert.

2.2 SUBMITTALS

Submit the following.

- A. Identify the mixing plant.
- B. Provide a specification sheet from the aramid fiber manufacturer.
- C. Provide the following from the aramid product supplier at least three weeks prior

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to HMA/WMA production.

1. The supplier's specified mix rate for the aramid product.
2. Certification that the amount of aramid fiber in the aramid product will be between 2.1 and 4.0 ounces of pure aramid fiber for each ton of hot mix asphalt.
3. Evidence showing how many times, if any, the supplier's fiber product has been successfully produced at the asphalt plant to be used for the project.
4. Proven method of introducing the aramid fibers into the hot mix asphalt which will not cause the aramid fibers to become airborne.

2.3 JOB MIX FORMULA

When aramid fiber is required as a mixture ingredient, modification to the job mix formula is not required.

PART 3 – EXECUTION

3.1 CONSTRUCTION REQUIREMENTS

Store aramid product in a dry environment and do not allow them to be in contact with moisture.

Mix 3.0 ounces (+/- 1.0 ounces) of aramid fibers per ton of asphalt. The weight applied is for pure aramid fibers only, weight of any delivery materials is not considered.

Have a fiber supplier's representative on site during the first day of production mixing. This requirement can be waived if fiber supplier and HMA/WMA producer can supply evidence of supplier's brand of fiber product being successfully produced by the HMA/WMA producer. The fiber supplier's representative may be on site for additional days as requested by the Engineer.

Introduce the aramid product as follows:

1. Batch Plant

When a batch type plant is used, add the aramid product dosage to the aggregate in the weigh hopper. This may be done with loose fibers and a fiber metering device, or may be done by using manual dosing equipment. If necessary, increase the batch dry mixing time to ensure the aramid fibers are uniformly distributed prior to the injection of asphalt cement into the mixer.

2. Drum Plant

When a continuous or drier-drum type plant is used, add the aramid product to the RAP material to uniformly disperse with the aggregate and injected asphalt. Use a separate aramid product metering device feed system to proportion by weight of total mix,

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the required percentage of fiber reinforcement into the mixture. Control the aramid product metering system with a proportioning device to meet the dosing requirements.

When a continuous or drier-drum type plant is used for limited production volumes, the addition of the aramid product may be done by using manual measuring tools or equipment and adding them directly onto the RAP belt or into the RAP opening on the plant. Because this is not an automated process, a written protocol must be supplied by the producer to demonstrate how they will attain the dosage requirement, and documentation must be supplied by the material manufacturer assuring this method will produce the desired uniform aramid fiber distribution.

Mix the aramid fiber with the aggregate longer, if needed, to allow thorough distribution of aramid fibers at the end of the mixing process and to promote asphalt coating of individual strands of aramid fiber. At the start of any fiber mixing, visually observe the reinforced HMA/WMA at the plant and in first three trucks at the point of discharge and prior to delivery to the job site. Observation shall include using a shovel or other device. Look for proper distribution of aramid fibers and make mixing adjustments if needed.

WMA: Use of a feeder system will be required for both Drum and Batch plants when producing Warm Mix Asphalt to ensure correct distribution and coating of the aramid fibers. This requirement maybe waved if the asphalt producer can demonstrate complete melting of the delivery material and proper incorporation of the aramid fibers into the WMA.

3.2 ACCEPTANCE

Acceptance of the reinforced HMA/WMA will include the following factors:

1. Aramid fiber is properly proportioned based on documentation comparing fiber feed to HMA/WMA mix production. A log of the total amount of aramid fibers applied certified by fiber manufacturer/supplier shall be required daily.
2. By visual inspection at the end of the mixing process, there is no clumping of aramid fiber or aramid delivery product and the aramid fibers are uniformly distributed.
3. All other mixture and density requirement of the asphalt as detailed in the Standard Specifications, current edition, shall apply.

PART 4 - MEASUREMENT AND PAYMENT

The Department will measure the quantity of Fiber Reinforcement for HMA/WMA as ton of asphalt placed with fibers. Each ton of asphalt placed with the aramid fibers according to this special note will be measured and paid for at the contract unit bid price per ton, and shall include full compensation for furnishing all labor, tools, equipment, and incidentals for doing all the work involved in

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adding the fibers to HMA/WMA.

<u>Code</u>	<u>Pay Item</u>	<u>Pay Unit</u>
24785EC	Fiber Reinforcement for HMA	Tons

SPECIAL NOTE FOR PIPELINE INSPECTION

1.0 DESCRIPTION. The Department will perform visual inspections on all pipe on the project. A video inspection will be required on projects having more than 250 linear feet of storm sewer and/or culvert pipe and on routes with an ADT of greater than 1,000 vehicles. Conduct video inspections on all pipe located under the roadway and 50 percent of the remaining pipe not under the roadway. Storm sewer runs and outfall pipes not under the roadway take precedence over rural entrance pipes. Contractors performing this item of work must be prequalified with the Department in the work type J51 (Video Pipe Inspection and Cleaning). Deflection testing shall be completed using a mandrel in accordance with the procedure outlined below or by physical measurement for pipes greater than 36 inches in diameter. Mandrel testing for deflection must be completed prior to the video inspection testing. Unless otherwise noted, Section references herein are to the Department's 2012 Standard Specifications for Road and Bridge Construction.

2.0 VIDEO INSPECTION. Ensure pipe is clear of water, debris or obstructions. Complete the video inspection and any necessary measurement prior to placing the final surface over any pipe. When paving will not be delayed, take measurements 30 days or more after the completion of earthwork to within 1 foot of the finished subgrade. Notify the Engineer a minimum of 24 hours in advance of inspection and notify the Engineer immediately if distresses or locations of improper installation are logged.

2.1 INSPECTION FOR DEFECTS AND DISTRESSES

A) Begin at the outlet end and proceed through to the inlet at a speed less than or equal to 30 ft/minute. Remove blockages that will prohibit a continuous operation.

B) Document locations of all observed defects and distresses including but not limited to: cracking, spalling, slabbing, exposed reinforcing steel, sags, joint offsets, joint separations, deflections, improper joints/connections, blockages, leaks, rips, tears, buckling, deviation from line and grade, damaged coatings/paved inverts, and other anomalies not consistent with a properly installed pipe.

C) During the video inspection provide a continuous 360 degree pan of every pipe joint.

D) Identify and measure all cracks greater than 0.1" and joint separations greater than 0.5".

E) Video Inspections are conducted from junction to junction which defines a pipe run. A junction is defined as a headwall, drop box inlet, curb box inlet, manhole, buried junction, or other structure that disturbs the continuity of the pipe. Multiple pipe inspections may be conducted from a single set up location, but each pipe run must be on a separate video file and all locations are to be referenced from nearest junction relative to that pipe run.

F) Record and submit all data on the TC 64-765 and TC 64-766 forms.

3.0 MANDREL TESTING. Mandrel testing will be used for deflection testing. For use on Corrugated Metal Pipe, High Density Polyethylene Pipe, and Polyvinyl Chloride Pipe,

use a mandrel device with an odd number of legs (9 minimum) having a length not less than the outside diameter of the mandrel. The diameter of the mandrel at any point shall not be less than the diameter specified in Section 3.6. Mandrels can be a fixed size or a variable size.

3.1 Use a proving ring or other method recommended by the mandrel manufacturer to verify mandrel diameter prior to inspection. Provide verification documentation for each size mandrel to the Engineer.

3.2 All deflection measurements are to be based off of the AASHTO Nominal Diameters. Refer to the chart in section 3.6.

3.3 Begin by using a mandrel set to the 5.0% deflection limit. Place the mandrel in the inlet end of the pipe and pull through to the outlet end. If resistance is met prior to completing the entire run, record the maximum distance achieved from the inlet side, then remove the mandrel and continue the inspection from the outlet end of the pipe toward the inlet end. Record the maximum distance achieved from the outlet side.

3.4 If no resistance is met at 5.0% then the inspection is complete. If resistance occurred at 5.0% then repeat 3.1 and 3.2 with the mandrel set to the 10.0% deflection limit. If the deflection of entire pipe run cannot be verified with the mandrel then immediately notify the Engineer.

3.5 Care must be taken when using a mandrel in all pipe material types and lining/coating scenarios. Pipe damaged during the mandrel inspection will be video inspected to determine the extent of the damage. If the damaged pipe was video inspected prior to mandrel inspection then a new video inspection is warranted and supersedes the first video inspection. Immediately notify the Engineer of any damages incurred during the mandrel inspection and submit a revised video inspection report.

3.6 AASHTO Nominal Diameters and Maximum Deflection Limits.

Base Pipe Diameter (inches)	AASHTO Nominal Diameter (inches)	Max. Deflection Limit (inches)	
		5.0%	10.0%
15	14.76	14.02	13.28
18	17.72	16.83	15.95
24	23.62	22.44	21.26
30	29.53	28.05	26.58
36	35.43	33.66	31.89
42	41.34	39.27	37.21
48	47.24	44.88	42.52
54	53.15	50.49	47.84
60	59.06	56.11	53.15

4.0 PHYSICAL MEASUREMENT OF PIPE DEFLECTION. Alternate method for deflection testing when there is available access or the pipe is greater than 36 inches in diameter, as per 4.1. Use a contact or non-contact distance instrument. A leveling device is recommended for establishing or verifying vertical and horizontal control.

4.1 Physical measurements may be taken after installation and compared to the AASHTO Nominal Diameter of the pipe as per Section 3.6. When this method is used, determine the smallest interior diameter of the pipe as measured through the center point of the pipe (D2). All measurements are to be taken from the inside crest of the corrugation. Take the D2 measurements at the most deflected portion of the pipe run in question and at intervals no greater than ten (10) feet through the run. Calculate the deflection as follows:

$$\% \text{ Deflection} = [(AASHTO \text{ Nominal Diameter} - D2) / AASHTO \text{ Nominal Diameter}] \times 100\%$$

Note: The Engineer may require that preset monitoring points be established in the culvert prior to backfilling. For these points the pre-installation measured diameter (D1) is measured and recorded. Deflection may then be calculated from the following formula:

$$\% \text{ Deflection} = [(D1 - D2) / D1] (100\%)$$

4.2 Record and submit all data.

5.0 DEDUCTION SCHEDULE. All pipe deductions shall be handled in accordance with the tables shown below.

FLEXIBLE PIPE DEFLECTION	
Amount of Deflection (%)	Payment
0.0 to 5.0	100% of the Unit Bid Price
5.1 to 9.9	50% of the Unit Bid Price ⁽¹⁾
10 or greater	Remove and Replace ⁽²⁾

⁽¹⁾ Provide Structural Analysis for HDPE and metal pipe. Based on the structural analysis, pipe may be allowed to remain in place at the reduced unit price. ⁽²⁾ The Department may allow the pipe to remain in place with no pay to the Contractor in instances where it is in the best interest to the public and where the structural analysis demonstrates that the pipe should function adequately.

RIGID PIPE REMEDIATION TABLE PIPE	
Crack Width (inches)	Payment
• 0.1	100% of the Unit Bid Price
Greater than 0.1	Remediate or Replace ⁽¹⁾

⁽¹⁾ Provide the Department in writing a method for repairing the observed cracking. Do not begin work until the method has been approved.

6.0 PAYMENT. The Department will measure the quantity in linear feet of pipe to inspect. The Department will make payment for the completed and accepted quantities under the following:

<u>Code</u>	<u>Pay Item</u>	<u>Pay Unit</u>
24814EC	Pipeline Inspection	Linear Foot
10065NS	Pipe Deflection Deduction	Dollars

SPECIAL NOTE

For Tree Removal

**Hardin County
KY 313 Widening
Item No. 4-170**

**NO CLEARING OF TREES 5 INCHES OR GREATER (DIAMETER
BREAST HEIGHT) FROM JUNE 1- JULY 31**

**If there are any questions regarding this note, please contact Division of
Environmental Analysis, 200 Mero Street, Frankfort, KY 40601, Phone: (502) 564-
7250.**

Special Note for Bridge Demolition, Renovation and Asbestos Abatement

If the project includes any bridge demolition or renovation, the successful bidder is required to notify Kentucky Division for Air Quality (KDAQ) via filing of form (DEP 7036) a minimum of 10 days prior to commencement of any bridge demolition or renovation work.

Any available information regarding possible asbestos containing materials (ACM) on or within bridges to be affected by the project has been included in the bid documents. These are to be included with the Contractor's notification filed with the KDAQ. If not included in the bid documents, the Department will provide that information to the successful bidder for inclusion in the KDAQ notice as soon as possible. If there are no documents stating otherwise, the bidders should assume there are no asbestos containing materials that will in any way affect the work.



Matthew G. Bevin
Governor

COMMONWEALTH OF KENTUCKY
TRANSPORTATION CABINET
Frankfort, Kentucky 40622
www.transportation.ky.gov/

Greg Thomas
Secretary

Asbestos Inspection Report

To: Robert Hoagland

District: Central Office

Date: April 24, 2018

Conducted By: O'Dail Lawson

Report Prepared By: O'Dail Lawson

Project and Structure Identification

Project Number: Hardin 04-0170.00

Structure ID: 047B00158

Structure Location: KY 313 over P&L Railroad

Sample Description: The samples collected were negative for asbestos.

Inspection Date: April 19, 2018

Results and Recommendations

The results of the samples collected were negative for the presence of asbestos above 1%.
No abatement is required at this time.

It is recommended that this report accompany the 10-Day Notice of Intent for Demolition ([DEP7036 Form](#)) which is to be submitted to the Kentucky Division of Air Quality prior to abatement, demolition, or renovation of any building or structure in the Commonwealth.



ENVIRONMENTAL TRAINING CONCEPTS, INC
P.O Box 99603 Louisville, KY 40269
(502)640-2951

Certification Number: ETC-AIR-061317-00518

O'Dail Lawson

has on 06-13-2017, attended and successfully completed the requirements and passed the examination with a score of 70% of better on the entitled course.

ASBESTOS INSPECTOR REFRESHER

Training was in accordance with 40 CFR Part 763 (AHERA) approved by the Commonwealth of Kentucky, the Indiana Department of Environmental Management and Tennessee Department of Environment & Conservation The above student received requisite training for Asbestos Accreditation under Title II of the Toxic Substance Act (TSCA).

Conducted at: 1220 Kentucky Mills Drive, Louisville, KY


Name - Training Manager

Expiration Date: 06-13-2018


Name - Instructor



KENTUCKY TRANSPORTATION CABINET
Department of Highways
DIVISION OF RIGHT OF WAY & UTILITIES

TC 62-226
Rev. 01/2016
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RIGHT OF WAY CERTIFICATION

<input checked="" type="checkbox"/> Original	<input type="checkbox"/> Re-Certification	RIGHT OF WAY CERTIFICATION	
ITEM #	COUNTY	PROJECT # (STATE)	PROJECT # (FEDERAL)
04-170.00	Hardin	13HC JP02 047 92858 01R	
PROJECT DESCRIPTION			
Widen KY 313 to 4 lane from patriot Parkway to Bullion Blvd Connector.			
<input type="checkbox"/> No Additional Right of Way Required			
Construction will be within the limits of the existing right of way. The right of way was acquired in accordance to FHWA regulations under the Uniform Relocation Assistance and Real Property Acquisitions Policy Act of 1970, as amended. No additional right of way or relocation assistance were required for this project.			
<input checked="" type="checkbox"/> Condition # 1 (Additional Right of Way Required and Cleared)			
All necessary right of way, including control of access rights when applicable, have been acquired including legal and physical possession. Trial or appeal of cases may be pending in court but legal possession has been obtained. There may be some improvements remaining on the right-of-way, but all occupants have vacated the lands and improvements, and KYTC has physical possession and the rights to remove, salvage, or demolish all improvements and enter on all land. Just Compensation has been paid or deposited with the court. All relocations have been relocated to decent, safe, and sanitary housing or that KYTC has made available to displaced persons adequate replacement housing in accordance with the provisions of the current FHWA directive.			
<input type="checkbox"/> Condition # 2 (Additional Right of Way Required with Exception)			
The right of way has not been fully acquired, the right to occupy and to use all rights-of-way required for the proper execution of the project has been acquired. Some parcels may be pending in court and on other parcels full legal possession has not been obtained, but right of entry has been obtained, the occupants of all lands and improvements have vacated, and KYTC has physical possession and right to remove, salvage, or demolish all improvements. Just Compensation has been paid or deposited with the court for most parcels. Just Compensation for all pending parcels will be paid or deposited with the court prior to AWARD of construction contract			
<input type="checkbox"/> Condition # 3 (Additional Right of Way Required with Exception)			
The acquisition or right of occupancy and use of a few remaining parcels are not complete and/or some parcels still have occupants. All remaining occupants have had replacement housing made available to them in accordance with 49 CFR 24.204. KYTC is hereby requesting authorization to advertise this project for bids and to proceed with bid letting even though the necessary right of way will not be fully acquired, and/or some occupants will not be relocated, and/or the just compensation will not be paid or deposited with the court for some parcels until after bid letting. KYTC will fully meet all the requirements outlined in 23 CFR 635.309(c)(3) and 49 CFR 24.102(j) and will expedite completion of all acquisitions, relocations, and full payments after bid letting and prior to AWARD of the construction contract or force account construction.			
Total Number of Parcels on Project	2	EXCEPTION (S) Parcel #	ANTICIPATED DATE OF POSSESSION WITH EXPLANATION
Number of Parcels That Have Been Acquired			
Signed Deed	2		
Condemnation	0		
Signed ROE	0		
LPA RW Project Manager		Right of Way Supervisor	
Printed Name		Printed Name	Michael H. Price
Signature		Signature	<i>Michael H. Price</i>
Date		Date	4/05/2018
<i>Asst.</i> Right of Way Director		FHWA	
Printed Name	<i>Kelly R. Divine</i>	Printed Name	
Signature	<i>Kelly R. Divine</i>	Signature	
Date	4/9/18	Date	

UTILITIES AND RAIL CERTIFICATION NOTE

**HARDIN COUNTY,
JP02 047 92858
KY 313 WIDENING PROJECT
4-170.00**

GENERAL PROJECT NOTE ON UTILITY PROTECTION

Overhead facilities from station 290+00 to 305+00 LT contain poles near or within the disturb limits of the project. Caution must be taken to avoid disturbing utilities through this area. Poles in this area are owned by BRANDENBURG TELEPHONE, WINDSTREAM, and NOLIN RECC. If the poles need to be stabilized or safeguarded in any way, the utility that owns the pole will be given a notice of one week before work is done. Work pertaining to these utility facilities and other utility facilities throughout the project is defined in the bid package and is to be carried out as instructed by the Kentucky Transportation Cabinet. The contractor will be responsible for any coordination or adjustments that are discussed or quantified in the proposal.

NOTE: DO NOT DISTURB THE FOLLOWING UTILITIES LOCATED WITHIN THE PROJECT DISTURB LIMITS

COMCAST, P&L RAILROAD, WINDSTREAM, CITY OF ELIZABETHTOWN, LG&E GAS, KU, NOLIN RECC, BRANDENBURG TELEPHONE, CITY OF VINE GROVE WATER AND SEWER, HARDIN COUNTY WATER DISTRICT NO. 1 WATER AND SEWER

The Contractor is fully responsible for protection of all utilities listed above

THE FOLLOWING COMPANIES ARE RELOCATING/ADJUSTING THEIR UTILITIES WITHIN THE PROJECT LIMITS AND WILL BE COMPLETE PRIOR TO CONSTRUCTION

BRANDENBURG TELEPHONE, NOLIN RECC, CITY OF ELIZABETHTOWN GAS, COMCAST

THE FOLLOWING COMPANIES HAVE FACILITIES TO BE RELOCATED/ADJUSTED BY THE COMPANY OR THE COMPANY'S SUBCONTRACTOR AND IS TO BE COORDINATED WITH THE ROAD CONTRACT

LG&E has facilities to relocate at the following approximate locations: station 180+00 to station 182+00 LT, station 261+09 to 261+75 LT, station 330+86, and station 349+56. LG&E's relocation will be done by August 15, 2018.

Windstream has facilities to relocate from 295+00 to 305+00 LT. Windstream's relocation will be done by July 1, 2018.

The Department will consider submission of a bid as the Contractor's agreement to not make any claims for additional compensation due to delays or other conditions created by the operations of (Utility Company(s) Name). Working days will not be charged for those days on which work on (Utility Company(s) Name) facilities is delayed, as provided in the current edition of the KY Standard Specifications for Road and Bridge Construction. Should a difference of opinion arise as to the rights of the Contractor and others

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working within the limits of, or adjacent to the project, the KYTC Resident Engineer will decide as to the respective rights of the various parties involved in order to assure the completion of the Department’s work in general harmony and in a satisfactory manner, and his decision shall be final and binding upon the Contractor.

THE FOLLOWING COMPANIES HAVE FACILITIES TO BE RELOCATED/ADJUSTED BY THE ROAD CONTRACTOR AS INCLUDED IN THIS CONTRACT

CITY OF VINE GROVE AND HARDIN COUNTY WATER DISTRICT NO. 1. The highway contractor is responsible for relocation of water and sewer facilities as indicated in the general summary and utility plan sheets per the specifications and guidelines of HARDIN COUNTY WATER DISTRICT NO. 1. These companies will be conducting inspections of the work done to their utilities. The highway contractor shall coordinate with HARDIN COUNTY WATER DISTRICT NO. 1 AND CITY OF VINE GROVE through any work related to their facilities AND shall give these facilities one week’s notice to review: material submittals, staking, adjustments to plans and profiles, disinfection of facilities, interruption of services, pressure testing, tie-ins, bypass pumping or plugging, record drawings, and backfilling over facilities. The contractor shall give these companies a notice of 2 working days before performing any work on specified utilities.

THE FOLLOWING RAIL COMPANIES HAVE FACILITIES IN CONJUNCTION WITH THIS PROJECT AS NOTED

No Rail Involved Minimal Rail Involved (See Below) Rail Involved (See Below)
P & L RAILROAD

UNDERGROUND FACILITY DAMAGE PROTECTION – BEFORE YOU DIG

The contractor shall make every effort to protect underground facilities from damage as prescribed in the Underground Facility Damage Protection Act of 1994, Kentucky Revised Statute KRS 367.4901 to 367.4917. It is the contractor’s responsibility to determine and take steps necessary

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to be in compliance with federal and state damage prevention directives. The contractor is instructed to contact KY 811 for the location of existing underground utilities. Contact shall be made a minimum of two (2) and no more than ten (10) business days prior to excavation.

The contractor shall submit Excavation Locate Requests to the Kentucky Contact Center (KY 811) via web ticket entry. The submission of this request does not relieve the contractor from the responsibility of contacting non-member facility owners, whom are to be contacted through their individual Protection Notification Center. It may be necessary for the contractor to contact the County Court Clerk to determine what utility companies have facilities in the area. Non-compliance with these directives can result in the enforcement of penalties.

SPECIAL CAUTION NOTE – PROTECTION OF UTILITIES

The contractor will be responsible for contacting all utility facility owners on the subject project to coordinate his activities. The contractor will coordinate his activities to minimize and, where possible, avoid conflicts with utility facilities. Due to the nature of the work proposed, it is unlikely to conflict with the existing utilities beyond minor facility adjustments. Where conflicts with utility facilities are unavoidable, the contractor will coordinate any necessary relocation work with the facility owner and Resident Engineer. The Kentucky Transportation Cabinet maintains the right to remove or alter portions of this contract if a utility conflict occurs.

The utility facilities as noted in the previous section(s) have been determined using data garnered by varied means and with varying degrees of accuracy: from the facility owners, a result of S.U.E., field inspections, and/or reviews of record drawings. The facilities defined may not be inclusive of all utilities in the project scope and are not Level A quality, unless specified as such. It is the contractor’s responsibility to verify all utilities and their respective locations before excavating.

Please Note: The information presented in this Utility Note is informational in nature and the information contained herein is not guaranteed.

AREA UTILITIES CONTACT LIST

<u>Utility Company/Agency</u>	<u>Contact Name</u>	<u>Contact Information</u>
KENTUCKY UTILITIES	BRAD KEOWN	270-765-8616
COMCAST	STEVE GADDIE	270-706-0326

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<u>NOLIN RECC</u>	<u>PAUL BAKER</u>	<u>270-765-6153</u>
<u>BRANDENBURG TELEPHONE</u>	<u>BRENT GERKINS</u>	<u>270-351-4466</u>
<u>WINDSTREAM</u>	<u>JIM GALVIN</u>	<u>270-765-1818</u>
<u>HARDIN COUNTY WATER DISTRICT NO. 1</u>	<u>JUSTIN METZ</u>	<u>270-351-3222</u>
<u>CITY OF VINE GROVE</u>	<u>BURLIN MARTIN</u>	<u>270-877-2713</u>
<u>CITY OF ELIZABETHTOWN</u>	<u>MATTHEW HOBBS</u>	<u>270-765-6121</u>
<u>LG&E</u>	<u>TODD EISERT</u>	<u>502-364-8458</u>
<u>P&L RAILROAD</u>	<u>STONY BISHOP</u>	<u>270-444-4300</u>



SPECIAL NOTES FOR PROTECTION OF RAILROAD INTEREST

Paducah and Louisville Railway, Inc.

I. AUTHORITY OF RAILROAD ENGINEER AND STATE ENGINEER:

- A. *The authorized representative of the Railroad Company, hereinafter referred to as Railroad Engineer, shall have final authority in all matters affecting the safe maintenance of Railroad traffic of his Company including the adequacy of the foundations and structures supporting the Railroad tracks.*
- B. *The authorized representative of the State, hereinafter referred to as the Engineer, shall have authority over all other matters as prescribed herein and in the Project Specifications.*

II. NOTICE OF STARTING WORK:

- A. *The Contractor shall not commence any work on Railroad rights of way until he has complied with the following conditions:*
 - 1. Given the Railroad written notice, with copy to the Engineer who has been designated to be in charge of the work, **at least ten (10) days in advance** of the date he proposes to begin work on Railroad rights of way. **If flagging service is required, such notice shall be submitted at least thirty (30) days in advance** of the date scheduled to commence work. The Railroad's Contact information is on the Summary Sheet.
 - 2. Obtain written authorization from the Railroad to begin work on Railroad rights of way, such authorization to include an outline of specific conditions with which he must comply.
 - 3. Obtain written approval from the Railroad of Railroad Protective Insurance Liability coverage as required by paragraph 14 herein.
 - 4. Furnish a schedule for all work within the Railroad rights of way as required by paragraph 7, B, 1.
- B. *The Railroad's written authorization to proceed with the work shall include the names, addresses, and telephone numbers of the Railroad's representatives who are to be notified as hereinafter required. Where more than one representative is*

designated, the area of responsibility of each representative shall be specified.

III. INTERFERENCE WITH RAILROAD OPERATIONS:

- A. *The Contractor shall so arrange and conduct his work that there will be no interference with Railroad operations, including train, signal, telephone and telegraphic services, or damage to the property of the Railroad Company or to poles, wires, and other facilities of tenants on the rights of way of the Railroad Company. Whenever work is liable to affect the operations or safety of trains, the method of doing such work shall first be submitted to the Railroad Engineer for approval, but such approval shall not relieve the Contractor from liability. Any work to be performed by the Contractor which requires flagging service or inspection service (watchman) shall be deferred by the Contractor until the flagging protection required by the Railroad is available at the job site.*
- B. *Whenever work within Railroad rights of way is of such a nature that impediment to Railroad operations such as use of runaround tracks or necessity for reduced speed is unavoidable, the Contractor shall schedule and conduct his operations so that such impediment is reduced to the absolute minimum.*
- C. *Should conditions arising from, or in connection with the work, require that immediate and unusual provisions be made to protect operations and property of the Railroad, the Contractor shall make such provisions. If in the judgment of the Railroad Engineer, or in his absence, the Engineer, such provisions are insufficient, either may require or provide such provisions, as he deems necessary. In any event, such unusual provisions shall be at the Contractor's expense and without cost and/or time to the Railroad or the State.*

IV. TRACK CLEARANCES

- A. *The minimum track clearances to be maintained by the Contractor during construction are shown on the Project Plans. However, before undertaking any work within Railroad rights of way, or before placing any obstruction over any track, the Contractor shall:*
 - 1. Notify the Railroad's representative **at least 72 hours in advance** of the work.
 - 2. Receive assurance from the Railroad's representative that arrangements have been made for flagging service as necessary.
 - 3. Receive permission from the Railroad's representative to proceed with the work.
 - 4. Ascertain that the Engineer has received copies of notice to the Railroad and

of the Railroad's response thereto.

V. CONSTRUCTION PROCEDURES

A. *General:*

1. Construction work on Railroad property shall be:
 - a) Subject to the inspection and approval of the Railroad.
 - b) In accord with the Railroad's written outline of specific conditions.
 - c) In accord with the Railroad's general rules, regulations and requirements including those relating to safety, fall protection and personal protective equipment.
 - d) In accord with all Special Notes, Summaries, and Addendums.
2. The Railroad requires a submission of construction procedure that meets the requirements of these Special Notes and attachments. The Railroad's **submittal review period is thirty (30) days. Resubmissions will be reviewed within 2 weeks.**

B. *Excavation and shoring:*

1. The sub grade of an operated track shall be **maintained with edge of berm at least 10'0" from centerline of track and not more than 24 inches below top of rail.** Contractor will not be required to make existing section meet this specification if substandard, in which case the existing section will be maintained.
2. The Contractor will be required to take special precaution and care in connection with excavating and shoring pits, and in driving piles, or sheeting for footings adjacent to tracks to provide adequate lateral support for the tracks and the loads which they carry, without disturbance of track alignment and surface, and to avoid obstructing track clearances with working equipment, tools or other material. The procedure for doing such work, including need of and plans for shoring, shall first be approved by the Engineer and the Railroad Engineer, but such approval shall not relieve the Contractor from liability.
3. The Contractor shall submit a detailed procedure for the installing of sheeting/shoring adjacent to Railroad Tracks.
4. Shoring protection shall be provided when excavating adjacent to an active track or railroad facility or as determined by the Railroad. Shoring will be provided in accordance with AREMA *Manual for Railway Engineering*

Chapter 8, part 28; except as noted below.

5. Shoring may not be required if all of the following conditions are satisfied:
 - a. Excavation does not encroach upon a 1½ horizontal: 1 vertical theoretical slope line starting 1'-6" below top of rail and at 12'-0" minimum from centerline of the track (live load influence zone).
 - b. Track is on level ground or in a cut section and on stable soil.
 - c. Excavation does not adversely impact the stability of a Railroad facility (i.e. signal bungalow, drainage facility, undergrade bridge, building, etc.)
 - d. Shoring is not required by any governing construction code.
6. When the track is on an embankment, excavating the toe of the embankment without shoring may affect the stability of the embankment. Therefore, excavation of the embankment toe without shoring will not be permitted.
7. Trench boxes are prohibited for use on Railroad property within the theoretical live load influence zone.
8. The required protection is the cofferdam type that completely encloses the excavation. Where dictated by conditions, partial cofferdams with opened sides away from the track may be used. Cofferdams shall be constructed using steel piling, or when approved by the engineer, steel soldier piles with timber lagging. Wales and struts shall be provided and designed as needed. The following shall be considered when designing cofferdams:
 - a. Shoring shall be designed to resist a vertical live load surcharge of 1,880 lbs. per square foot, in addition to active earth pressure. The surcharge shall be assumed to act on a continuous strip, 8'6" wide. Lateral pressures due to surcharge shall be computed using the strip load formula shown in *AREMA Manual for Railway Engineering*, Chapter 8, Part 20.
 - b. Allowable stresses in materials shall be in accordance with *AREMA Manual for Railway Engineering*, Chapter 7, 8, and 15.
 - c. A construction procedure for temporary shoring shall be shown on the drawing.
 - d. All shoring systems on or adjacent to Railroad right-of-way shall be equipped with railings or other approved fall protection.
 - e. A minimum horizontal clearance of 10'-0" from centerline of the track to face of nearest point of shoring shall be maintained provided a 12'-0" roadbed is maintained with a temporary walkway and handrail system.

9. The Contractor shall submit the following drawings and calculations (all shall be signed/sealed by a Professional Engineer) for the Railroad's review and approval.
 - a. Six (6) sets of detailed drawings of the shoring systems showing sizes of all structural members, details of connections, and distances from centerline of track to face of shoring. Drawing shall show a section showing height of shoring and track elevation in relation to bottom of excavation.
 - b. Six (6) sets of calculations of the shoring design. The drawings and calculations shall be prepared by a Licensed Professional Engineer and shall bear the Engineer's seal and signature. Shoring plans shall be approved by the Railroad's construction engineering and inspection representative.
 - c. For sheeting and shoring within 18'-0" of the centerline of the track, the live load influence zone, and in slopes, the Contractor shall use interlocked steel sheeting (sheet pile).
 - d. Sheet pile installed in slopes or within 18'-0" of the centerline shall not be removed.
 - e. Sheet pile shall be cut off a minimum of 3'-0" below the finished grade, ditch line invert, or as directed by the Engineer. The ground shall be backfilled and compacted immediately after sheet pile is cut off.
 - f. A procedure for cutting off the sheet pile and restoring the embankment shall be submitted to the Engineer for review and acceptance.

C. Demolition Procedure:

1. Railroad tracks and other railroad property, including signals, structures, and other facilities, must be protected from damage during the procedure. No crane or equipment may be set on the rails or track structure and no material may be dropped on Railroad property.
2. The Contractor is required to submit a plan showing the location of cranes, horizontally and vertically, operating radii, with delivery or disposal locations shown. The location of all tracks and other railroad facilities as well as all obstructions such as wire lines, poles, adjacent structures, etc. must also be shown.
3. Crane rating sheets showing cranes to be adequate for **150% of the actual weight of the pick.** A complete set of crane charts, including crane,

counterweight, and boom nomenclature is to be submitted.

4. Plans and computations showing the weight of the pick must be submitted. Calculations shall be made from plans of the existing and/or proposed structure showing complete and sufficient details with supporting data for the demolition or erection of the structure. If plans do not exist, lifting weights must be calculated from field measurements. If possible, field measurements shall be taken with a Railroad representative present.
5. A data sheet must be submitted listing the types, size, and arrangements of all rigging and connection equipment. The safe working load capacity of all rigging and connecting equipment shall be 150% above the calculated weight of the pick.
6. A complete procedure is to be submitted, including the order of lifts, time required for each lift, and any repositioning or re-hitching of the crane or cranes.
7. All erection or demolition plans, procedures, data sheets, etc. submitted must be prepared, signed and sealed by a Registered Professional Engineer.
8. The Railroad's representative must be present at the site during the entire demolition and erection procedure period.
9. All procedures, plans and calculations shall first be approved by the Engineer and the Railroad Engineer, but such approval does not relieve the Contractor from liability.
10. Loads shall not be supported while any trains are passing if that piece of equipment has the capacity to foul a 50' envelope.
11. The names and experience of the key Contractor personnel involved in the operation shall be included in the Contractor's means and methods submission.
12. Existing, obsolete, bridge piers shall be removed to a minimum of 3'-0" below the finished grade, final ditch line invert, or as directed by the Engineer.
13. A minimum quantity of 25 tons of Railroad approved track ballast may be required to be furnished and stockpiled on site by the Contractor, or as directed by the Engineer.
14. On-track or ground debris shields such as crane mats are prohibited.
15. Overhead Demolition Debris Shield – Shall be installed prior to the

demolition of a bridge deck or other relevant portions of the superstructure.

- a. The demolition debris shield shall be erected from the underside of the bridge over the track area to catch all falling debris.
 - b. The Contractor shall include the demolition debris shield installation/removal means and methods as part of the proposed Controlled Demolition procedure submission.
 - c. The demolition debris shield shall provide 23'-0" minimum vertical clearance if the existing clearance is less than 23'-0" as approved by the Railroad. Horizontal clearance to the centerline of the track should not be reduced unless approved by the Engineer.
 - d. The vertical clearance ATR (above top of rail) is measured from the top of rail to the lowest point on the overhead shielding system measured within a distance of 6'-0" out from each side of the track centerline.
 - e. The demolition debris shield design and supporting calculations, all signed/sealed by a Professional Engineer, shall be submitted for review and acceptance.
 - f. The demolition debris shield shall have a **minimum** design load of 50 pounds per square foot **plus** the weight of the equipment, debris, personnel, and other loads to be carried.
 - g. The Contractor shall include the proposed bridge deck removal procedure in its demolition means and methods and shall verify that the size and quantity of the demolition debris generated by the procedure does not exceed the shield design loads.
 - h. The contractor shall clean the demolition debris shield daily or more frequently as dictated either by the approved design parameters or as directed by the Engineer.
16. Vertical Demolition Shield – This type of shield may be required for substructure removals in close proximity to track and other facilities, as determined by the Engineer.
- a. Prior to commencing the demolition activity, the Contractor shall install a ballast protection system consisting of geotextile to keep the railroad ballast from becoming fouled with construction or demolition debris and fines. The geotextile ballast protection system shall be installed and maintained by the Contractor for the project duration in accordance with the attached plan, or with additional

measures as directed by the Engineer.

- b. The Contractor shall submit detailed plans, with detailed calculations, prepared and submitted by a Professional Engineer of the protection shield and ballast protection systems for approval prior to the start of demolition.
 - c. Blasting will not be permitted to demolish a structure over or within Railroad right-of-way.
17. The Controlled Demolition procedure must be approved by the Engineer prior to undertaking work on the project.
 18. The Contractor shall provide timely communication to the Engineer when scheduling the demolition related work so that the Engineer may be present during the entire demolition procedure.
 19. At any time during demolition activities, the Engineer may require revisions to the previously approved procedures to address weather, site conditions or other circumstances which may create a potential hazard to rail operations or Railroad facilities. Such revisions may require immediate interruption or termination of ongoing activities until such time the issue is resolved to the Engineer's satisfaction. The Railroad shall not be responsible for any additional costs or time claims associated with such revisions.

D. Erection Procedure:

The Contractor shall submit a detailed procedure for performing erection on/about Railroad property.

1. The Contractor shall submit six (6) copies of the detailed procedure for erection of the proposed structures over or adjacent to the tracks or right-of-way. This procedure shall include a plan showing the locations of cranes, horizontally and vertically, operating radii, with staging locations shown, including beam placement on ground or truck unloading staging plan. Plan should also include the location of all tracks, other railroad facilities; wires, poles, adjacent structures, or buried utilities that could be affected, showing that the proposed lifts are clear of these obstructions should be shown. No crane or equipment may be set on the rails or track structure.
2. Also included with this submittal the following information:

- a. As-Built Bridge Seat Elevations - All as-built bridge seats and top of rail elevations shall be furnished to the Engineer for review and verification at least 30 days in advance of construction or erection, to ensure that minimum vertical clearances as approved in the plans will be achieved.
 - b. Computations showing weight of picks must be submitted. Computations shall be made from plans of the structure beams being erected and those plans or sections thereof shall also be included in the submittal; the weight shall include the weight of concrete or other materials including lifting rigging.
 - c. Crane rating sheets showing cranes to be adequate for 150% of the actual weight of the pick. A complete set of crane charts, including crane, counterweight, maximum boom angle, and boom nomenclature is to be submitted. Safety factors that may have been “built in” to the crane charts are not to be considered when determining the 150% Factor of Safety.
 - d. A data sheet shall be prepared listing the type, size and arrangements of slings, shackles, or other connecting equipment. Include copies of a catalog or information sheets for specialized equipment. All specific components proposed for use shall be clearly identified and highlighted in the submitted documents. The safe working load capacity of the connecting equipment shall be 150% above the calculated weight of the pick.
 - e. A complete written procedure is to be included that describes the sequence of events, indicating the order of lifts and any repositioning or rehitching of the crane or cranes.
 - f. A time schedule for each of the various stages must be shown as well as a schedule for the entire lifting procedure. The proposed time frames for all critical sub tasks (i.e., performing aerial splices, installing temporary bracing, etc.) shall be furnished so that the potential impact(s) to Railroad operations may be assessed and eliminated or minimized.
 - g. The names and experience of the key Contractor personnel involved in the operation shall be included in the Contractor’s means and methods submission.
 - h. Design and supporting calculations prepared by the Professional Engineer for items including the temporary support of components or intermediate stages shall be submitted for review. A guardrail will be required to be installed in a track where a temporary bent is located within twelve (12) feet from the centerline of that track.
3. The proposed Erection procedure must be approved by the Engineer prior to

undertaking work on the project.

4. The Contractor shall provide timely communication to the Engineer when scheduling the erection related work so that the Engineer may be present during the entire erection procedure.
5. At any time during construction activities, the Engineer may require revisions to the previously approved procedures to address weather, site conditions or other circumstances which may create a potential hazard to rail operations or Railroad facilities. Such revisions may require immediate interruption or termination of ongoing activities until such time the issue is resolved to the Engineer's satisfaction. The Railroad shall not be responsible for any additional costs or time claims associated with such revisions.

E. Blasting:

1. The Contractor shall obtain advance approval of the Railroad Engineer and the Engineer for use of explosive on or adjacent to Railroad property. The request for permission to use explosives shall include a detailed blasting plan. If permission for use of explosives is granted, the Contractor will be required to comply with the following:
 - a) Blasting shall be done with light charges under the direct supervision of a responsible officer or employee of the Contractor and a licensed blaster.
 - b) Electric detonating fuses shall not be used because of the possibility of premature explosions resulting from operation of two-way train radios.
 - c) No blasting shall be done without the presence of an authorized representative of the Railroad. **At least 10 days advance notice** to the person designated in the Railroad's notice of authorization to proceed (see paragraph 2B above) will be required to arrange for the presence of an authorized Railroad representative and such flagging as the Railroad may require.
 - d) Have at the job site adequate equipment, labor and materials and allow sufficient time to clean up debris resulting from the blasting without delay to trains, as well as correcting at his expense any track misalignment or other damage to Railroad property resulting from the blasting as directed by the Railway's authorized representative. If his actions result in delay of trains, the Contractor shall bear the entire cost thereof.
 - e) Explosives shall not be stored on Railroad Property.
 - f) At any time during the blasting activities, the Engineer may require

revisions to the previously approved procedures to address weather, site conditions, or other circumstance which may create a potential hazard to rail operations or Railroad facilities. Such revisions may require immediate interruption or termination of ongoing activities until such time the issue is resolved to the Engineer's satisfaction. The Railroad shall not be responsible for any additional costs or time claims associated with such revisions.

2. The Railroad representative will:
 - a) Determine the approximate location of trains and advise the Contractor the approximate amount of time available for the blasting operation and clean-up.
 - b) Have the authority to order discontinuance of blasting if, in his opinion, blasting is too hazardous or is not in accord with these Special Notes.

F. Track Monitoring:

The Contractor shall submit for Railroad review and approval, a detailed track monitoring program to detect both horizontal and vertical movement of the track and roadbed, a minimum of 30-days in advance of start of work.

1. For the installation of temporary or permanent shoring systems, including but not limited to soldier piles and lagging, and interlocked steel sheeting on or adjacent to the Railroad's right-of-way, the contractor may be required to submit a detailed track monitoring program for the Railroad's approval prior to performing any work near the Railroad's right-of-way.
2. The program shall specify the survey locations, the distance between the location points, and frequency of monitoring before, during, and after construction. The Railroad reserves the right to modify the survey locations and monitoring frequency as necessary during the project.
3. The survey data shall be collected in accordance with the approved frequency and immediately furnished to the Engineer for analysis.
4. If any movement has occurred as determined by the Engineer, the Railroad will be immediately notified. The Railroad, at its sole discretion, shall have the right to immediately require all contractor operations to be ceased, have the excavated area immediately backfilled and/or determine what corrective action is required. Any corrective action required by the Railroad or performed by the Railroad including monitoring of corrective action of the contractor will be at project expense.

G. Maintenance of Railroad Facilities:

1. The Contractor will be required to maintain all ditches and drainage structures free of silt or other obstructions which may result from his operations and provide and maintain any erosion control measures as required. The Contractor shall provide erosion control measures during construction and use methods that accord with applicable state standard specifications for road and bridge construction, including either (1) silt fence; (2) berm or temporary ditches; (3) sediment basin; (4) aggregate checks; and (5) channel lining. The Contractor will promptly repair eroded areas with Railroad rights of way and to repair any other damage to the property of the Railroad or its tenants at the Contractor's expense.
2. All maintenance and repair of damages due to the Contractor's operations shall be done at the Contractor's expense.

H. Storage of Materials and Equipment:

1. Materials and equipment shall not be stored where they will interfere with Railroad operations, nor on the rights of way of the Railroad Company without first having obtained permission from the Railroad Engineer, and such permission will be with the understanding that the Railroad Company will not be liable for damage to such material and equipment from any cause and that the Railroad Engineer may move or require the Contractor to move, at the Contractor's expense, such material and equipment.
2. All grading or construction machinery that is left parked near the track unattended by a watchman shall be effectively immobilized so that it cannot be moved by unauthorized persons. The Contractor shall protect, defend, indemnify and save Railroad, and any associated, controlled or affiliated corporation, harmless from and against all losses, costs, expenses, claim or liability for loss or damage to property or the loss of life or personal injury, arising out of or incident to the Contractor's failure to immobilize grading or construction machinery.

I. Cleanup:

1. Upon completion of the work, the Contractor shall remove from within the limits of the Railroad rights of way, all machinery, equipment, surplus materials, falsework, rubbish or temporary buildings of the Contractor, and leave said rights of way in a neat condition satisfactory to the Chief Engineer of the Railroad or his authorized representative.

VI. DAMAGES:

- A. *The Contractor shall assume all liability for any and all damages to his/her work, employees, equipment and materials caused by Railroad traffic.*
- B. *Any cost incurred by the Railroad for repairing damages to its property or to property of its tenants, caused by or resulting from the operations of the Contractor, shall be paid directly to the Railroad by the Contractor.*

VII. FLAGGING SERVICES:

- A. *When Required:*
 - 1. Flagging services will not be provided until the contractor's insurance has been reviewed & approved by the Railroad.
 - 2. Under the terms of the agreement between the Department and the Railroad, the **Railroad has sole authority to determine the need for flagging** required to protect its operations. In general, the requirements of such services will be whenever the Contractor's personnel or equipment are likely to be, working on the Railroad's rights of way, or across, over, adjacent to, or under a track, or when such work has disturbed or is likely to disturb a railroad structure or the railroad roadbed or surface and alignment of any track to such extent that the movement of trains must be controlled by flagging. If any element (workers, equipment, tools, scaffolding, etc.) may exist or fall within 25-feet of the edge of track, a flagman is necessary.
 - 3. Normally, the Railroad will assign one flagman to a project; but in some cases, more than one may be necessary, such as yard limits where three- (3) flagmen may be required. However, if the Contractor works within distances that violate instructions given by the Railroad's authorized representative or performs work that has not been scheduled with the Railroad's authorized representative, a flagman or flagmen may be required until the project has been completed.
- B. *Scheduling and Notification:*
 - 1. Not later than the time that approval is initially requested to begin work on Railroad rights of way, Contractor shall furnish to the Railroad and the Department a schedule for all work required to complete the portion of the project within Railroad rights of way and arrange for a job site meeting between the Contractor, the Department, and the Railroad's authorized representative. Flagman or Flagmen may not be provided until the job site meeting has been conducted and the Contractor's work scheduled.
 - 2. The Contractor will be required to give the Railroad representative **at least**

10 working days of advance written notice of intent to begin work within Railroad rights of way. If it is necessary for the Railroad to advertise a flagging job for bid, it **may take up to 90-days to obtain service**. Once begun, when work is suspended at any time for any reason, the Contractor will be required to give the Railroad representative **at least 3 working days of notice** before resuming work on Railroad rights of way. Such notice shall include sufficient details of the proposed work to enable the Railroad representative to determine if flagging will be required. If such notice is in writing, the Contractor shall furnish the Engineer a copy; if notice is given verbally it shall be confirmed in writing with copy to the Engineer. If flagging is required, no work shall be undertaken until the flagman, or flagmen is present at the job site. It **may take up to 30 days to obtain flagging initially** from the Railroad. When flagging begins the flagman is usually assigned by the Railroad to work at the project site on a continual basis until no longer needed and may be unable to be called for on a spot basis. If flagging becomes unnecessary and is suspended, it **may take up to 10 days to again obtain flagging services** from the Railroad. Due to labor agreements, it is necessary to give **5 working days notice before flagging service may be discontinued** and responsibility for payment stopped.

3. If, after the flagman is assigned to the project site, emergencies arise which require the flagman's presence elsewhere, and then the Contractor shall delay work on Railroad rights of way until such time as the flagman is again available. Any additional costs resulting from such delay shall be borne by the Contractor and not the Department or Railroad.
4. When demobilizing, the Contractor shall contact the flagman to avoid unnecessary flagging charges. This communication shall be documented.

C. *Payment:*

1. **The Cabinet will be responsible for paying the Railroad directly for any and all costs of flagging**, which may be required to accomplish the construction. **The Contractor shall adhere to the Special Note for Railroad Flagging, if applicable, and may be charged for flagging in excess of the allowable days, per said Special Note.**
2. The estimated cost of flagging is listed on the Summary Sheet. The charge to the Cabinet by the Railroad will be the actual cost based on the rate of pay for the Railroad's employees who are available for flagging service at the time the service is required.

3. Railroad work involved in preparing and handling bills will also be charged to the Cabinet. Charges to the Cabinet by the Railroad shall be in accordance with applicable provisions of 23 CRF 140, Subpart I and 23 CRF 646, Subpart B. Flagging costs are subject to change. The above estimates of flagging cost are provided for information only and are not binding in any way.

D. Verification:

1. The Contractor and Department will review and sign the Railroad flagman's time sheet, attesting that the flagman was present during the time recorded. Flagman may be removed by Railroad if form is not signed. If flagman is removed, the Contractor will not be allowed to re-enter the Railroad rights of way until the issue is resolved. Any complaints concerning flagman or flagmen must be resolved in a timely manner. If need for flagman or flagmen is questioned, please contact the Railroad's Representative listed on the Project Summary Sheet. All verbal complaints must be confirmed in writing by the Contractor within 5 working days with copy to the Highway Engineer. All written correspondence should be addressed to the Railroad's Representative listed on the Project Summary Sheet.
2. The Railroad flagman assigned to the project will be responsible for notifying the Project Engineer upon arrival at the job site on the first day (or as soon thereafter as possible) that flagging services begin and on the last day that he performs such services for each separate period that services are provided. The Project Engineer will document such notification in the project records. When requested, the Project Engineer will also sign the flagman's diary showing daily time spent and activity at the project site.

VIII. HAUL ACROSS RAILROAD:

- A. Where the plans show or imply that materials of any nature must be hauled across a Railroad, unless the plans clearly show that the State has included arrangements for such haul in its agreement with the Railroad, the Contractor will be required to make all necessary arrangements with the Railroad regarding means of transporting such materials across the Railroad. The Contractor will be required to bear all costs incidental, including flagging, to such crossings whether services are performed by his own forces or by Railroad personnel.*
- B. No crossing may be established for use of the Contractor for transporting materials or equipment across the tracks of the Railroad Company unless specific authority for is installation, maintenance, necessary watching and flagging thereof and removal, all at the expense of the Contractor, is first obtained from the Railroad Engineer. **The approval process for an agreement normally takes 90-days.***

IX. WORK FOR THE BENEFIT OF THE CONTRACTOR:

- A. *All temporary or permanent changes in wire lines or other facilities which are considered necessary to the project are shown on the plans; included in the force account agreement between the State and the Railroad or will be covered by appropriate revisions to same which will be initiated and approved by the State and/or the Railroad.*
- B. *Should the Contractor desire any changes in addition to the above, then he shall make separate arrangements with the Railroad for same to be accomplished at the Contractor's expense.*

X. COOPERATION AND DELAYS:

- A. *It shall be the Contractor's responsibility to arrange a schedule with the Railroad for accomplishing stage construction involving work by the Railroad or tenants of the Railroad. In arranging his schedule he shall ascertain, from the Railroad, the lead time required for assembling crews and materials and shall make due allowance therefore.*
- B. *Train schedules cannot be provided to the Contractor. It is the Contractor's responsibility to contact the Railroad in order to arrange "Track Time." This "Track Time" will be an agreed upon prearranged time period that the Railroad will, without undue burden, schedule no train traffic to facilitate the Contractor's work on or near Railroad right-of-way. This track time must be arranged **at least 48 hours prior to the date of need.***
- C. *No charge or claims of the Contractor against either the Department or the Railroad will be allowed for hindrance or delay on account of railroad traffic; any work done by the Railroad or other delay incident to or necessary for safe maintenance of Railroad traffic or for any delays due to compliance with these Special Notes.*
- D. *The Contractor shall cooperate with others participating in the construction of the Project to the end that all work may be carried on to the best advantage.*
- E. *The Railroad does not assume any responsibility for work performed by others in connection with the Project. No claims of the Contractor against the Railroad for any inconvenience, delay, or additional cost incurred by the Contractor on account of operations by others.*

XI. TRAINMAN'S WALKWAYS:

- A. *Along the outer side of each exterior track of multiple operated track, and on each side of single operated track, an unobstructed continuous space suitable for*

*trainman's use in walking along trains, extending to a line not less than 10 feet from centerline of track, shall be maintained. Any temporary impediments to walkways and track drainage encroachments or obstructions allowed during work hours while Railroad's protective service is provided shall be removed before the close of each day. If there is any excavation near the walkway, a handrail, with **10'-0"** **minimum clearance from centerline of track**, shall be placed.*

XII. GUIDELINES FOR PERSONNEL ON RAILROAD RIGHTS OF WAY:

- A. *All persons shall wear hard hats. Appropriate eye and hearing protection must be used. Working in shorts is prohibited. Shirts must cover shoulders, back and abdomen. Working in tennis or jogging shoes, sandals, boots with high heels, cowboy and other slip on type boots is prohibited. Hard-sole, lace-up footwear, zippered boots cinched with straps which fit snugly about the ankle are adequate. Safety boots are strongly recommended.*
- B. *No one is allowed within **25' of the centerline of the track** without specific authorization from the flagman.*
- C. *All persons working near track when train is passing are to look out for dragging bands, chains and protruding or shifting cargo.*
- D. *No one is allowed to cross tracks without specific authorization from the flagman.*
- E. *All welders and cutting torches working within **25' of track must stop when train is passing.***
- F. *No steel tape or chain will be allowed to cross or touch rails without permission.*

XIII. GUIDELINES FOR EQUIPMENT ON RAILROAD RIGHTS OF WAY:

- A. *No crane or boom equipment will be allowed to set up to work or park within **boom distance plus 15' of centerline of track** without specific permission from railroad official and flagman.*
- B. *No crane or boom equipment will be allowed to foul track or lift a load over the track without flag protection and track time.*
- C. *All employees will stay with their machines when crane or boom equipment is pointed toward track.*
- D. *All cranes and boom equipment under load will stop work while a train is passing*

(including pile driving).

- E. Swinging loads must be secured to prevent movement while train is passing.*
- F. No loads will be suspended above a moving train.*
- G. No equipment will be allowed within **25' of centerline of track** without specific authorization of the flagman.*
- H. Trucks, tractors or any equipment will not touch ballast line without specific permission from railroad official and flagman.*
- I. No equipment or load movement **within 25' or above a standing train or other equipment** without specific authorization of the flagman.*
- J. All operating equipment within **25' of track must halt operations when a train is passing**. All other operating equipment may be halted by the flagman if the flagman views the operation to be dangerous to the passing train.*
- K. All equipment, loads and cables are prohibited from touching rails.*
- L. While clearing and grubbing, no vegetation will be removed from railroad embankment with heavy equipment without specific permission from the Railroad Engineer and flagman.*
- M. No equipment or materials will be parked or stored on Railroad's property unless specific permission is granted from the Railroad Engineer.*
- N. All unattended equipment that is left parked on Railroad property shall be effectively immobilized so that it can not be moved by unauthorized persons.*
- O. All cranes and boom equipment will be turned away from track after each work day or whenever unattended by an operator.*

XIV. INSURANCE:

- A. In addition to any other forms of insurance or bonds required under the terms of the contract and specifications, the Contractor will be required to carry insurance of the following kinds:*
 - 1. Statutory Workers' Compensation and Employer's Liability insurance.*
 - 2. An Occurrence Form Railroad Protective Policy with limits of not less than Five Million (\$5,000,000.00) Dollars per occurrence for Bodily Injury Liability, Property Damage Liability and Physical Damage to Property, with Ten Million (\$10,000,000.00) Dollars aggregate for the term of the policy with respect to Bodily Injury, Liability, Property Damage Liability and*

Physical Damage to Property.

3. Automobile Liability in an amount not less than One Million (\$1,000,000.00) Dollars combined single limit.
4. Comprehensive General Liability in an amount not less than Five Million (\$5,000,000.00) Dollars combined single limit. In the event the policy is a Claims Made Policy, coverage shall include an aggregate of Ten Million (\$10,000,000.00) Dollars. Limits may be accomplished by use of underlying coverage with an umbrella as long as the umbrella follows form.

Each policy shall name P&L as a named insured and shall provide for not less than ten (10) days prior written notice to P&L of cancellation of, or any material change in the policies. The policies shall not contain any exclusions related to doing business on, near, or adjacent to Railroad facilities.

Applicant shall provide P&L with a Certificate of Insurance evidencing such coverage and, upon request, shall deliver a certified, true and complete copy of the policy or policies to P&L.

It is understood that, so long as this Agreement shall remain in force, P&L shall have the right, from time to time, to revise the amount or form of insurance coverage's provided in this exhibit as circumstances or changing economic conditions may require. P&L shall give Applicant written notice of any such requested change at least thirty (30) days prior to the date of expiration of the then existing policy or policies and Applicant shall provide P&L with such revised policy or policies therefore or otherwise agree to modify the Agreement to remove the limitation of indemnification to Applicant's limits of insurance.

All insurance provided must be primary and shall not be reduced or limited by any insurance procured by P&L.

XV. FAILURE TO COMPLY:

- A. *These Special Notes are supplemental and amendatory to the current edition of the Kentucky Department of Highways' Standard Specifications for Road and Bridge Construction and amendments thereof, and where in conflict therewith, these Special Notes shall govern.*
- B. *In the event the Contractor violates or fails to comply with any of the requirements of these Special Notes:*
 1. The Railroad Engineer may require that the Contractor vacate Railroad property.
 2. The Engineer may withhold all monies due the Contractor on monthly

statements.

3. Any such orders shall remain in effect until the Contractor has remedied the situation to the satisfaction of the Railroad Engineer and the Engineer.

XVI. PAYMENT FOR COST OF COMPLIANCE:

- A. *No separate payment will be made for any extra cost incurred on account of compliance with these Special Notes. All such cost shall be included in prices bid for other items of the work as specified in the payment items.*



Kentucky Transportation Cabinet
Division of Right of Way & Utilities

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08/2010
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SUMMARY FOR KYTC PROJECTS THAT INVOLVE A RAILROAD

Date: 4/20/2018 (enter using M/d/yyyy format)

This project actively involves the below listed railroad company. This Project Summary provides an abbreviated listing of project specific railroad data. The detailed needs of the specified railroad company are included in the Special Notes for Protection of Railroad Interest in the proposal package. By submitting a bid, the contractor attests that they have dutifully considered and accepted the provisions as defined in both documents.

GENERAL ROAD PROJECT INFORMATION (This section must be provided by KYTC)

County: Hardin
Federal Number: N/A
State Number: JP02 047 92858 01D; JP02 047 92858 01C
Route: KY 313
Project Description: Widen KY 313 to 4 Lanes
Item Number: 04-170.00 **Highway Milepost:** _____

GENERAL RAIL INFORMATION (The below sections must be provided by Railroad Company)

Rail Company Name: Paducah and Louisville Railway
AAR-DOT# (if applicable): 925 619B **Railroad Milepost:** J-35.50
Train Count (6am to 6pm): 5 **Train Count (6pm to 6am):** 5 **Train Count (24 hr total):** 10
Maximum Train Speed: 30 mph

(This information is necessary to acquire the necessary insurances when working with Railroad Right of Way)

INSURANCE REQUIREMENTS

The named insured, description of the work and designation of the job site to be shown on the Policy are as follows:

- (a) Named Insured: Paducah and Louisville
- (b) The project description should be as indicated in the General Road Project Information section.
- (c) The designation of the jobsite is the route, Milepost, and AAR-DOT# listed above.

FLAGGING INFORMATION

Flagging Estimate:

Flagging will be paid to the RR by KYTC. Contractor shall adhere to the Special Note for Railroad Flagging if applicable.

Hourly Rate:

\$92.62 per hour based on a 8 hour day effective as of the date of this document.

Work by a flagman in excess of 8 hours per day or 40 hours per week, but not more than 12 hours a day will result in overtime pay at 1 ½ times the appropriate rate. Work by a flagman in excess of 12 hours per day will result in overtime pay at 2 times the appropriate rate. If work is performed on a holiday, the flagging rate is 2 ½ times the normal rate.

Forecasted Rate Increases:

Rates will increase to \$0.00 per hour based on a 8 hour day effective _____ (enter using M/d/yyyy format).

RAILROAD CONTACTS

(to be provided by Railroad Company)

General Railroad Contact:

Stony Bishop
Paducah and Louisville Railway, Inc.

200 Clark Street
Paducah, Kentucky 42003
(Phone) 270-444-4386
(Email) sbishop@palrr.com

Regional Representative (Roadmaster):

Stony Bishop
Paducah and Louisville Railway, Inc.

200 Clark Street
Paducah, Kentucky 42003
(Phone) 270-444-4386
(Email) sbishop@palrr.com

Insurance contact:

Stony Bishop
Paducah and Louisville Railway, Inc.

200 Clark Street
Paducah, Kentucky 42003
(Phone) 270-444-4386
(Email) sbishop@palrr.com

Railroad Designer Contact:

Contractor or In-House Employee? In-House

Stony Bishop
Paducah and Louisville Railway, Inc.

200 Clark Street
Paducah, Kentucky 42003
(Phone) 270-444-4386
(Email) sbishop@palrr.com

Railroad Construction Contact:

Contractor or In-House Employee? In-House

Stony Bishop
Paducah and Louisville Railway, Inc.

200 Clark Street
Paducah, Kentucky 42003
(Phone) 270-444-4386
(Email) sbishop@palrr.com

KENTUCKY TRANSPORTATION CABINET CONTACTS

(to be provided by KYTC)

KYTC Railroad Coordinator:

Allen Rust, PE
Div. of Right of Way & Utilities
Kentucky Transportation Cabinet
200 Mero Street, 5th Floor East
Frankfort, Kentucky 40622
(Phone) 502-782-4950
(Email) allen.rust@ky.gov

KYTC Construction Procurement Director:

Rachel Mills, Director
Div. of Construction Procurement
Kentucky Transportation Cabinet
200 Mero Street, 3rd Floor West
Frankfort, Kentucky 40622
(Phone) 502-564-3500
(Email) Rachel.Mills@ky.gov

KYTC Construction Director:

Ryan Griffith, Director
Div. of Construction
Kentucky Transportation Cabinet
200 Mero Street, 3rd Floor West
Frankfort, Kentucky 40622
(Phone) 502-564-4780
(Email) ryan.griffith@ky.gov



The project specific information provided herein is valid as of the date indicated. However, the specific information may be subject to change due to the normal business operations of all parties. The terms and conditions defined here, and in the bid proposal in its entirety, are inclusive and constant.

SPECIAL NOTE FOR RAILROAD FLAGGING

Unless otherwise noted, Section references herein are to the Department's Standard Specifications for Road and Bridge Construction. All applicable portions of the Department's Standard Specifications apply unless specifically modified herein.

1. DESCRIPTION. It is estimated this project will require 120 days of railroad flagging. Guidelines for determining when flagging protection will be needed are included in the Special Provisions for Protection of Railroad Interest. The Daily Rate for this project will be \$1,000.00

2. DEFINITION OF FLAGGING. The particular Railroad(s) involved in this project will define when flagging is required (see Summary for KYTC Projects That Involve a Railroad and Special Provisions for Protection of Railroad Interest) and the number of flaggers needed. At least 2 weeks notice is required before flagging will be provided, but it could take up to 30 days. It will remain the Contractor's responsibility to schedule work including any down time (such as winter) so as to minimize the use of flagging services. The Department retains no responsibility for coordinating flagging services between the Railroad and the Contractor.

3. REDUCTION AND EXTENSION OF RAILROAD FLAGGING TIME. Based upon the Kentucky Standard Specifications, any changes in contract time for this project will be by change order. If the nature of the work in the change order necessitates additional use of railroad flagging services, then that shall be identified in that change order and the number of calendar days for railroad flagging services shall be increased. By signing the change order, the contractor waives all rights to any future request to change the number of days of railroad flagging associated with the work in that change order. Since the number of days involves the cost to the Department and not the Contractor, the number of days of railroad flagging shall not be reduced.

4. MEASUREMENT. The Department will keep track of calendar days that railroad flagging is performed. This will include any day that any railroad flagger charges a minimum of 5 hours of onsite flagging. Except that from April 1st thru November 30th this will not include days where the Contractor cannot perform at least 5 hours of the work that necessitates railroad flagging due to weather, seasonal, or temperature limitations of the Specifications, or other conditions beyond the control of the Contractor as judged by the Engineer. From Dec 1st thru March 30th any day that any railroad flagger charges a minimum of 5 hours of onsite flagging then a calendar day of railroad flagging will be counted; without regard to weather, seasonal or temperature limitations of the Specifications. The Engineer will furnish the Contractor bi-weekly statements showing the number of railroad flagging days charged for the period. The Contractor acknowledges acceptance of, and agreement with, all bi-weekly statements unless the Contractor submits a written protest containing supporting evidence for a change within 14 calendar days of receiving the bi-weekly statement.

If the number of calendar days of railroad flagging has exceeded 120 days, then the Contractor will be charged for each day that additional flagging is needed multiplied by the Daily Rate. This will be in addition to any liquidated damages or other reimbursements that the contract or the Kentucky Standard Specifications may require. This charge will continue, based upon actual flagging use, until Formal Acceptance.

If upon Formal Acceptance the total number of calendar days that railroad flagging is performed is less than 120 days no additional monies will be given to the Contractor.

Special Note for Railroad Involvement

Before the contractor may begin work on or above Railroad ROW, he shall complete the attached, partially filled, Application for Temporary Entry Permit and submit it to the address listed on the document. **There will be an application fee of \$1,250.00 for which the contractor will be responsible.** The details for the permit have been pre-arranged between KYTC and the RR/their consultant.



Application for Temporary Entry Permit

Applicant Information

Legal Name of Company:			
Municipal Ownership, if any:		State of incorporation:	
If not a corporation, name(s) of owners or partners:			
Contact Name:		Phone:	
Fax:		Email Address:	
Business Address:			

Corporate Information

Same as above

Legal Name of Company:			
Municipal Ownership, if any:		State of incorporation:	
If not a corporation, name(s) of owners or partners:			
Contact Name:		Phone:	
Fax:		Email Address:	
Business Address:			

Location

Name of Railroad:	Paducah and Louisville	City:	Vine Grove	State:	KY	County:	Hardin
Distance and direction from nearest Railroad milepost:	Milepost J-35.50						
Distance and direction from centerline of nearest road crossing:	At KY 313 over P&L; DOT# 925 619B						
Dimensions of affected Railroad property (attached plan showing exact location relative to any landmarks, structures, roads, mileposts, track (railroad or otherwise), etc.):	Approximately 225' total along the width of the RR ROW, 175' north of the centerline of the existing structure and 50' south of the centerline						
Purpose of proposed entry:	Construction of new Highway overpass structure						
What buildings or structures are currently on site?	Highway overpass structure						
Will any buildings or structures be placed on site? If yes, list buildings/structures and estimated cost:	New highway overpass structure to be added North of existing struc.						

GENERAL UTILITY NOTES AND INSTRUCTIONS APPLICABLE TO ALL UTILITY WORK MADE A PART OF THE ROAD CONSTRUCTION CONTRACT

The contractor should be aware the following utility notes and KYTC Utility Bid Item Descriptions shall supersede, replace and take precedence over any and all conflicting information that may be contained in utility owner supplied specifications contained in the contract, on plans supplied by the utility owner, or any utility owner specifications or information externally referenced in this contract.

Where information may have been omitted from these notes, bid item descriptions, utility owner supplied specifications or plans; the KYTC Standard Specifications for Road and Bridge Construction shall be referenced.

PROTECTION OF EXISTING UTILITIES

The existing utilities shown on the plans are shown as best known at the time the plans were developed and are to be used as a guide only by the Contractor. The Contractor shall use all means at his disposal to accurately locate all existing utilities, whether shown on the plans or not, prior to excavation. The contractor shall protect these utilities during construction. Any damage to existing utilities during construction that are shown or not shown on the plans shall be repaired at the Contractor's expense.

PREQUALIFIED UTILITY CONTRACTORS

Some utility owners may require contractors that perform relocation work on their respective facilities as a part of the road contract be prequalified or preapproved by the utility owner. Those utility owners with a prequalification or preapproval requirement are as follows:

All Contractors and subcontractors must be prequalified with KYTC to perform any work on this project.

The bidding contractor needs to review the above list and choose from the list of approved subcontractors at the end of these general notes as identified above before bidding. When the list of approved subcontractors is provided, only subcontractors shown on the following list(s) will be allowed to work on that utility as a part of this contract.

When the list of approved subcontractors for the utility work is not provided in these general notes, the utility work can be completed by the prime contractor. If the prime contractor chooses to subcontract the work, the subcontractor shall be prequalified with the KYTC Division of Construction Procurement in the

work type of “Utilities” (I33). Those who would like to become prequalified may contact the Division of Construction Procurement at (502) 564-3500. Please note: it could take up to 30 calendar days for prequalification to be approved. The prequalification does not have to be approved prior to the bid, but must be approved before the subcontract will be approved by KYTC and the work can be performed.

CONTRACT ADMINISTRATION RELATIVE TO UTILITY WORK

All utility work is being performed as a part of a contract administered by KYTC; there is not a direct contract between the utility contractor and utility owner. The KYTC Section Engineer is ultimately responsible for the administration of the road contract and any utility work included in the contract.

SUBMITTALS AND CORRESPONDENCE

All submittals and correspondence of any kind relative to utility work included in the road contract shall be directed to the KYTC Section Engineer, a copy of which will also be supplied to the utility owner by the contractor to expedite handling of items like material approvals and shop drawings. All approvals and correspondence generated by the utility owner shall be directed to the KYTC Section Engineer and Hardin County Water District No. 1 and the City of Vine Grove. The KYTC Section Engineer will coordinate all approvals or correspondence to the utility contractor. At no time shall any direct communication between the utility owner and utility contractor without the communication flowing through the KYTC Section Engineer be considered official and binding under the contract.

ENGINEER

Where the word “Engineer” appears in any utility owner specifications included in this proposal, utility owner specifications included as a part of this contract by reference or on the utility relocation plans, it shall be understood the “Engineer” is the Kentucky Transportation Cabinet (KYTC) Section Engineer or designated representative and the utility owner engineer or designated representative jointly. Both engineers must mutually agree upon all decisions made with regard to the utility construction. The Transportation Cabinet, Section Engineer shall make all final decisions in all disputes.

INSPECTOR OR RESIDENT PROJECT REPRESENTATIVE

Where the word “Inspector” or “Resident Project Representative” appears in the utility specifications included in this proposal, utility owner specifications included as a part of this contract by reference or on the utility relocation plans, it shall be understood the “Inspector” or “Resident Project Representative” is the utility owner inspector and KYTC inspector jointly. The Transportation Cabinet, Section Engineer shall make all final decisions in all disputes.

NOTICE TO UTILITY OWNERS OF THE START OF WORK

One month before construction is to start on a utility, the utility contractor shall make notice to the KYTC Section Engineer and the utility owner of when work on a utility is anticipated to start. The utility contractor shall again make confirmation notice to the KYTC Section Engineer and the utility owner one week before utility work is to actually start.

UTILITY SHUTDOWNS

The Contractor shall not shut down any active and in-service mains, utility lines or services for any reason unless specifically given permission to do so by the utility owner. The opening and closing of valves and operating of other active utility facilities for main, utility line or utility service shut downs are to be performed by the utility owner unless specific permission is given to the contractor by the owner to make shutdowns. If and when the utility owner gives the contractor permission to shutdown mains, utility lines or utility services, the contractor shall do so following the rules, procedures and regulations of the utility owner. Any permission given by the utility owner to the contractor to shutdown active and in-service mains, utility lines or services shall be communicated to the KYTC Section Engineer by the utility owner that such permission has been given.

Notice to customers of utility shut downs is sometimes required to be performed by the utility contractor. The contractor may be required; but, is not limited to, making notice to utility customers in a certain minimum amount of time in advance of the shut down and by whatever means of communication specified by the utility owner. The means of communication to the customer may be; but is not limited to, a door hanger, notice by newspaper ad, telephone contact, or any combination of communication methods deemed necessary, customary and appropriate by the utility owner. The contractor should refer to the utility owner specifications for requirements on customer notice.

Any procedure the utility owner may require the contractor to perform by specification or plan note and any expense the contractor may incur to comply with the utility owner’s shut down procedure and notice to customers shall be considered an incidental expense to the utility construction.

CUSTOMER SERVICE AND LATERAL ABANDONMENTS When temporary or permanent abandonment of customer water, gas, or sewer services or laterals are necessary during relocation of utilities included in the contract, the utility contractor shall perform these abandonments as part of the contract as incidental work. No separate payment will be made for service line and lateral abandonments. The contractor shall provide all labor, equipment and materials to accomplish the temporary or permanent abandonment in accordance with the plans, specifications and/or as directed by the engineer. Abandonment may include, but is not limited to, digging down on a water or gas main at the tap to turn

off the tap valve or corporation stop and/or capping or plugging the tap, digging down on a sewer tap at the main and plugging or capping the tap, digging down on a service line or lateral at a location shown on the plans or agreeable to the engineer and capping or plugging, or performing any other work necessary to abandon the service or lateral to satisfactorily accomplish the final utility relocation.

STATIONS AND DISTANCES

All stations and distances, when indicated for utility placement in utility relocation plans or specifications, are approximate; therefore, some minor adjustment may have to be made during construction to fit actual field conditions. Any changes in excess of 6 inches of plan location shall be reviewed and approved jointly by the KYTC Section Engineer or designated representative and utility owner engineer or designated representative. Changes in location without prior approval shall be remedied by the contractor at his own expense if the unauthorized change creates an unacceptable conflict or condition.

RESTORATION

Temporary and permanent restoration of paved or stone areas due to utility construction shall be considered incidental to the utility work. No separate payment will be made for this work. Temporary restoration shall be as directed by the KYTC Section Engineer. Permanent restoration shall be "in-kind" as existing.

Restoration of seed and sod areas will be measured and paid under the appropriate seeding and sodding bid items established in the contract for roadway work.

BELOW ARE NOTES FOR WHEN "INST" ITEMS ARE IN THE CONTRACT MEANING THE UTILITY COMPANY IS PROVIDING CERTAIN MATERIALS FOR UTILITY RELOCATION

MATERIAL

Contrary to Utility Bid Item Descriptions, those bid items that have the text "**Inst**" at the end of the bid item will have the major components of the bid item provided by the utility owner. No direct payment will be made for the major material component(s) supplied by the utility company. All remaining materials required to construct the bid item as detailed in utility bid item descriptions, in utility specifications and utility plans that are made a part of this contract will be supplied by the contractor. The contractor's bid price should reflect the difference in cost due to the provided materials.

The following utility owners have elected to provide the following materials for work under this contract:

*Hardin County Water District No. 1 or the City of Vine Grove **will not** provide any materials. All materials will be provided by the Contractor as specified in the plans.*

SECURITY OF SUPPLIED MATERIALS

If any utility materials are to be supplied by the utility owner, it will be the responsibility of the utility contractor to secure all utility owner supplied materials after delivery to the project site. The utility contractor shall coordinate directly with the utility owner and their suppliers for delivery and security of the supplied materials. Any materials supplied by the utility owner and delivered to the construction site that are subsequently stolen, damaged or vandalized and deemed unusable shall be replaced with like materials at the contractor's expense.

Standard Water Bid Item Descriptions

W AIR RELEASE VALVE This bid item description shall apply to all air release valve installations of every size except those defined as “Special”. This item shall include the air release valve, main to valve connecting line or piping, manhole, vault, structure, access casting or doors, tapping the main, labor, equipment, excavation, proper backfill and restoration required to install the air release valve at the location shown on the plans or as directed in accordance with the specifications and standard drawings complete and ready for use. All air release/vacuum valves on a project shall be paid under one bid item regardless of size. No separate pay items will be established for size variations. Only in the case of the uniqueness of a particular air release valve would a separate bid item be established. Please refer to the Utility Company’s Specifications. If the Company does not have specifications, KYTC’s Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

BOLLARDS This item is for payment for furnishing and installing protective guard posts at above ground utility installations. A bollard may consist of, but not limited to, a steel post set in concrete or any other substantial post material. This item shall include all labor, equipment, and materials needed for complete installation of the bollard as specified by the utility owner specifications and plans. If the Company does not have specifications, KYTC’s Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

NOTE: A bid code for this item has been established in standard roadway bid items and shall be used for payment of this item. The bid code is 21341ND

W CAP EXISTING MAIN This item shall include the specified cap, concrete blocking and/or mechanical anchoring, labor, equipment, excavation, backfill, and restoration required to install the cap at the location shown on the plans or as directed in accordance with the specifications. This item is not to be paid on new main installations. This pay item is only to be paid to cap existing mains. Caps on new mains are incidental to the new main. Any and all caps on existing mains shall be paid under one bid item included in the contract regardless of size. No separate bid items will be established for size variations. Please refer to the Utility Company’s Specifications. If the Company does not have specifications, KYTC’s Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

W DIRECTIONAL BORE Payment under this item is made whenever the plans or specifications specifically show directional boring is to be utilized in order to minimize the impact of open cut for the installation of water main under streets, creeks, and etc. Payment under this item shall include the specified bore pipe, labor, and equipment. No separate payment shall be made for bore pipe installed in the bore whether used as a carrier pipe or an encasement of a separate carrier pipe. This item shall also include pipe anchors at each end of the bore when specified to prevent the creep or contraction of the bore pipe. Carrier pipe installed within a bore pipe shall be paid separately under pipe items. Payment under this item shall not be size specific and no separate bid items will be established for size variations. The bore pipe sizes to be included under this item shall be as shown on the plans and/or in the specifications. Any and all directional bores in each contract shall be paid under one directional bore bid item included in the contract regardless of size. Please refer to the Utility Company’s Specifications. If the Company does not have specifications, KYTC’s Specifications shall be referenced. This item shall be paid LINEAR FEET (LF) when complete.

W ENCASEMENT CONCRETE Includes all labor, equipment, excavation, concrete, reinforcing steel, backfill, restoration, and etc., to construct the concrete encasement of the water main as shown on the plans, and in accordance with the specifications and standard drawings. Payment under this item shall be in addition to the carrier pipe as paid under separate bid items. Carrier pipe is not included in this bid item. Any and all concrete encasement shall be paid under one bid item included in the contract regardless of the size of the carrier pipe or the volume of concrete or steel reinforcement as specified in the plans and specifications. No separate bid items will be established for size variations. Measurement of pay quantity shall be from end of concrete to end of concrete. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LINEAR FEET (LF) when complete.

W ENCASEMENT STEEL BORED This item shall include the steel encasement pipe size as specified on the plans and in the specifications, casing spacers, end seals, labor, and equipment to bore and install the encasement in accordance with the plans and specifications, complete and ready for use. The size shall be the measured internal diameter of the encasement pipe. The sizes of encasement to be paid under the size ranges specified in the bid items shall be as follows:

- Range 1 = All encasement sizes greater than 2 inches to and including 6 inches
- Range 2 = All encasement sizes greater than 6 inches to and including 10 inches
- Range 3 = All encasement sizes greater than 10 inches to and including 14 inches
- Range 4 = All encasement sizes greater than 14 inches to and including 18 inches
- Range 5 = All encasement sizes greater than 18 inches to and including 24 inches
- Range 6 = All encasement sizes greater than 24 inches

(Encasement sizes of 2 inches internal diameter or less shall not be paid separately; but, shall be considered incidental to the carrier pipe.) Payment under this bid item shall not include the carrier pipe. Carrier pipe shall be paid under a separate bid item. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LINEAR FEET (LF) when complete.

W ENCASEMENT STEEL OPEN CUT This item shall include the steel encasement pipe size as specified on the plans and in the specifications, casing spacers, end seals, labor, and equipment to open cut and install the encasement in accordance with the plans and specifications, complete and ready for use. The size shall be the measured internal diameter of the encasement pipe. The size encasement to be paid under the size ranges specified in the bid items shall be as follows:

- Range 1 = All encasement sizes greater than 2 inches to and including 6 inches
- Range 2 = All encasement sizes greater than 6 inches to and including 10 inches
- Range 3 = All encasement sizes greater than 10 inches to and including 14 inches
- Range 4 = All encasement sizes greater than 14 inches to and including 18 inches
- Range 5 = All encasement sizes greater than 18 inches to and including 24 inches
- Range 6 = All encasement sizes greater than 24 inches

(Encasement sizes of 2 inches internal diameter or less shall not be paid separately; but, shall be considered incidental to the carrier pipe.) Payment under this bid item shall not include the carrier pipe. Carrier pipe shall be paid under a separate bid item. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LINEAR FEET (LF) when complete.

W FIRE HYDRANT ADJUST Includes all labor, equipment, excavation, materials, and backfill to adjust the existing fire hydrant using the fire hydrant manufacturer's extension kit for adjustments of 18" or less. Adjustments greater than 18" require anchoring couplings and vertical bends to adjust to grade. The Contractor will supply and install all anchor couplings, bends, fire hydrant extension, concrete blocking, restoration, granular drainage material, etc, needed to adjust the fire hydrant complete and ready for use as shown on the plans, and in accordance with the specifications and standard drawings. This also includes allowing for the utility owner inspector to inspect the existing fire hydrant prior to adjusting, contractor returning unusable fire hydrants to the utility owner warehouse and picking up a replacement hydrant. No additional payment will be made for rock excavation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete and ready for use.

W FIRE HYDRANT ASSEMBLY Includes all labor, equipment, new fire hydrant, isolating valve and valve box, concrete pad around valve box (when specified in specifications or plans), piping, anchoring tee, anchoring couplings, fire hydrant extension, excavation, concrete blocking, granular drainage material, backfill, and restoration, to install a new fire hydrant assembly as indicated on plans and on standard drawings complete and ready for use. No additional payment will be made for rock excavation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

W FIRE HYDRANT RELOCATE This item includes all labor and equipment to remove the existing fire hydrant from its existing location and reinstalling at a new location. This item shall include a new isolating valve and valve box, concrete pad around valve box (when required in specifications or plans), new piping, new anchoring tee, anchoring couplings, fire hydrant extensions, concrete blocking, restoration, granular drainage material, excavation, and backfill as indicated on plans, specifications, and on standard drawings complete and ready for use. This item shall also include allowing for utility owner inspector to inspect the existing fire hydrant prior to reuse, contractor returning unusable fire hydrants to the utility owner warehouse and picking up a replacement hydrant for use, if the existing fire hydrant is determined unfit for reuse. No additional payment will be made for rock excavation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

W FIRE HYDRANT REMOVE This bid item includes removal of an abandoned fire hydrant, isolating valve, and valve box to the satisfaction of the engineer. The removed fire hydrant, isolating valve and valve box shall become the property of the contractor for his disposal as salvage or scrap. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

W FLUSH HYDRANT ASSEMBLY This item shall include the flushing hydrant assembly, service line, tapping the main, labor, equipment, excavation, backfill, and restoration required to install the flush hydrant at the location shown on the plans and in accordance with the specifications and standard drawings, complete and ready for use. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

W FLUSHING ASSEMBLY This item shall include the flushing device assembly, service line, meter box and lid, tapping the main, labor, equipment, excavation, backfill, and restoration required to install the

flushing device at the location shown on the plans and in accordance with the specifications and standard drawings, complete and ready for use. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

W LEAK DETECTION METER This item is for payment for installation of a water meter at main valve locations where shown on the plans for detection of water main leaks. The meter shall be of the size and type specified in the plans or specifications. This item shall include all labor, equipment, meter, meter box or vault, connecting pipes between main and meter, main taps, tapping saddles, casting, yoke, and any other associated material needed for installation of a functioning water meter in accordance with the plans and specifications, complete and ready for use. No separate payment will be made under any other contract item for connecting pipe or main taps. Any and all leak detection meters shall be paid under one bid item included in the contract regardless of size. No separate bid items will be established for size variations. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete and ready for use.

W LINE MARKER This item is for payment for furnishing and installing a water utility line marker as specified by the utility owner specifications and plans. A line marker may consist of a post or monument of whatever materials specified and shall include markings and/or signage on same as specified by plans or specifications. This item shall include all labor, equipment, and materials needed for complete installation of the marker. This item shall be paid EACH (EA) when complete.

W MAIN POINT RELOCATE This item is intended for payment for horizontal and/or vertical relocation of a short length of an existing main at the locations shown on the plans. This bid item is to be used to relocate an existing water main at point locations such as to clear a conflict at a proposed drainage structure, pipe or any other similar short relocation situation, and where the existing pipe material is to be reused. The contractor shall provide any additional pipe or fitting material needed to complete the work as shown on the plans and specifications. The materials provided shall be of the same type and specification as those that exist. Substitution of alternative materials shall be approved by the engineer in advance on a case by case basis. New polyethylene wrap is to be provided (if wrap exists or is specified in the specifications to be used). If it is necessary that the pipe be disassembled for relay, payment under this item shall also include replacement of joint gaskets as needed. Bedding and backfill shall be provided and performed the same as with any other pipe installation as detailed in the plans and specifications. Payment under this item shall be for each location requiring an existing main to be relocated horizontally or vertically regardless of pipe size or relocation length. No separate pay items will be established for pipe size variations or relocation segment length variations. Water Main Relocate shall not be paid on a linear feet basis; but, shall be Paid EACH (EA) at each location when complete and placed in service. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced.

W METER This item is for payment for installation of all standard water meters of all sizes 2 inches ID or less as specified on the plans. This item shall include all labor, equipment, meter, meter box, casting, yoke, and any other associated material needed for installation of a functioning water meter in accordance with the plans and specifications, complete and ready for use. This item shall include connections to the new or existing water service line. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

W METER ADJUST This item includes all labor, equipment, excavation, materials, backfill, restoration, and etc., to adjust the meter casting to finished grade (whatever size exists) at the location shown on the plans or as directed in accordance with the specifications and standard drawings complete and ready for use. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

W METER RELOCATE This item includes all labor, equipment, excavation, additional fittings, disinfection, testing, restoration, and etc., to relocate the existing water meter (whatever size exists), meter yoke, meter box, casting, and etc., from its old location to the location shown on the plans or as directed, in accordance with the specifications and standard drawings complete and ready for use. The new service pipe (if required) will be paid under short side or long side service bid items. Any and all meter relocations of 2 inches or less shall be paid under one bid item included in the contract regardless of size. Each individual relocation shall be paid individually under this item; however, no separate bid items will be established for meter size variations of 2 inches ID or less. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

W METER VAULT SIZE RANGE 1 OR 2 This item is for payment for installation of an underground structure for housing of a larger water meter, fittings, and valves as required by the plans and specifications. This item shall include all labor, equipment, excavation, concrete, manhole castings or access doors, the specified meter(s) valve(s), all piping, and fitting materials associated with installing a functioning meter and vault in accordance with the plans, standard drawings, and specifications, complete and ready for use. The size shall be the measured internal diameter of the meter and piping to be installed. The size meter vault to be paid under size 1 or 2 shall be as follows:

Size Range 1 = All meter and piping sizes greater than 2 inches up to and including 6 inches
Size Range 2 = All meter and piping sizes greater than 6 inches

This item shall be paid EACH (EA) when complete. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced.

W METER/FIRE SERVICE COMBO VAULT This item is for payment for installation of an underground structure for housing of a water meter and fire service piping, fittings, and valves as required by the plans and specifications. This item shall include all labor, equipment, excavation, concrete, manhole castings or access doors, the specified meter(s), valve(s), all piping, and fitting materials associated with installing a functioning meter and fire service vault in accordance with the plans and specifications, complete and ready for use. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

W METER WITH PRESSURE REDUCING VALVE (PRV) This item is for payment for installation of all standard water meters with pressure reducing valves (PRV) of all sizes 2 inches ID or less as specified on the plans. This item shall include all labor, equipment, meter, PRV, meter box, casting, yoke, and any other associated material needed for installation of a functioning water meter with PRV in accordance with the plans and specifications, complete and ready for use. This item shall include connections to the new or existing water service line. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced.

This item shall be paid EACH (EA) when complete.

W PIPE This description shall apply to all PVC, ductile iron, and polyethylene/plastic pipe bid items of every size and type to be used as water main, except those bid items defined as “Special”. This item includes the pipe specified by the plans and specifications, all fittings (including, but not limited to, bends, tees, reducers, plugs, and caps), tracing wire with test boxes (if required by specification), polyethylene wrap (when specified), labor, equipment, excavation, bedding, restoration, testing, sanitizing, backfill, and etc., required to install the specified new pipe and new fittings at the locations shown on the plans, or as directed, in accordance with the specifications and standard drawings complete and ready for use. No additional payment will be made for rock excavation. This bid item includes material and placement of flowable fill under existing and proposed pavement, and wherever else specified on the plans or in the specifications. **This item shall include all temporary and permanent materials and equipment required to pressure test and sanitize mains including, but not limited to, pressurization pumps, hoses, tubing, gauges, main taps, saddles, temporary main end caps or plugs and blocking, main end taps for flushing, chlorine liquids or tablets for sanitizing, water for testing/sanitizing and flushing (when not supplied by the utility), chlorine neutralization equipment and materials, and any other items needed to accomplish pressure testing and sanitizing the main installation.** This item shall also include pipe anchors, at each end of polyethylene pipe runs when specified to prevent the creep or contraction of the pipe. Measurement of quantities under this item shall be through fittings, encasements, and directional bores (only when a separate carrier pipe is specified within the directional bore pipe). Measurements shall be further defined to be to the center of tie-in where new pipe contacts existing pipe at the center of connecting fittings, to the outside face of vault or structure walls, or to the point of main termination at dead ends. No separate payment will be made under pipe items when the directional bore pipe is the carrier pipe. Please refer to the Utility Company’s Specifications. If the Company does not have specifications, KYTC’s Specifications shall be referenced. This item shall be paid LINEAR FEET (LF) when complete.

W PLUG EXISTING MAIN This item shall include the specified plug, concrete blocking and/or anchoring, labor, equipment, excavation, backfill, and restoration required to install the plug in an existing in-service main that is to remain at the location shown on the plans or as directed in accordance with the specifications. Any and all plugs on all existing in-service mains shall be paid under one bid item included in the contract regardless of size. No separate bid items will be established for size variations. Please refer to the Utility Company’s Specifications. If the Company does not have specifications, KYTC’s Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

NOTE: This utility bid item is not to be paid on new main installations or abandoned mains. This pay item is to plug existing in-service mains only. Plugs on new mains are incidental to the new main just like all other fittings.

NOTE: Plugging of existing abandon mains shall be performed and paid in accordance with Section 708.03.05 of KYTC Standard Specifications For Road And Bridge Construction and paid using Bid Code 01314 Plug Pipe.

W PRESSURE REDUCING VALVE This description shall apply to all pressure reducing valves (PRV) of every size required in the plans and specifications except those bid items defined as “Special”. Payment under this description is to be for PRVs being installed with new main. This item includes the PRV as specified in the plans and specifications, polyethylene wrap (if required by specification), labor, equipment, excavation, anchoring (if any), pit or vault, backfill, restoration, testing, disinfection, and etc., required to install the specified PRV at the location shown on the plans in accordance with the specifications and standard drawings complete and ready for use. If required on plans and/or proposed adjoining DIP is restrained, PRVs shall be restrained. PRV restraint shall be considered incidental to the

PRV and adjoining pipe. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

W PUMP STATION This item is for payment for installation of pumps and an above or below ground structure for housing of the pumps. This item shall include all pumps, piping, fittings, valves, electrical components, building materials, concrete, any other appurtenances, labor, equipment, excavation, and backfill, to complete the pump station installation as required by the plans, standard drawings, and specifications, complete and ready for use. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LUMP SUM (LS) when complete.

W REMOVE TRANSITE (AC) PIPE This item shall include all labor, equipment, and materials needed for removal and disposal of the pipe as hazardous material. All work shall be performed by trained and certified personnel in accordance with all environmental laws and regulations. Any and all transite AC pipe removed shall be paid under one bid item included in the contract regardless of size. No separate bid items will be established for size variations. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LINEAR FEET (LF) when complete.

W SERVICE LONG SIDE This bid item description shall apply to all service line installations of every size bid up to and including 2 inch inside diameter, except those service bid items defined as "Special". This item includes the specified piping material, main tap, tapping saddle (if required), and corporation stop materials, coupling for connecting the new piping to the surviving existing piping, encasement of 2 inches or less internal diameter (if required by plan or specification), labor, equipment, excavation, backfill, testing, disinfection, and restoration, at the locations shown on the plans or as directed, in accordance with the specifications and standard drawings, complete and ready for use. This bid item is to pay for service installations where the ends of the service connection are on opposite sides of the public roadway and the service line crosses the centerline of the public roadway as shown on the plans. The length of the service line is not to be specified. Payment under this item shall not be restricted by a minimum or maximum length. The contractor shall draw his own conclusions as to the length of piping that may be needed. Payment under this item shall include boring, jacking, or excavating across the public roadway for placement. Placement of a service across a private residential or commercial entrance alone shall not be reason to make payment under this item. Private or commercial entrances shall not be considered a public roadway in defining payment under this item. This pay item does not include installation or relocation of meters. Meters will be paid separately. No additional payment will be made for rock excavation or for special bedding required in rock excavation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

W SERVICE SHORT SIDE This bid item description shall apply to all service line installations of every size up to and including 2 inch internal diameter, except those service bid items defined as "Special". This item includes installation of the specified piping material of the size specified on plans, encasement of 2 inches or less internal diameter (if required by plan or specification), main tap, tapping saddle (if required), corporation stop, coupling for connecting the new piping to the surviving existing piping, labor, equipment, excavation, backfill, testing, disinfection, and restoration, at the locations shown on the plans or as directed, in accordance with the specifications and standard drawings, complete and

ready for use. This bid item is to pay for service installations where both ends of the service connection are on the same side of the public roadway, or when an existing service crossing a public roadway will remain and is being extended, reconnected, or relocated with all work on one side of the public roadway centerline as shown on the plans. The length of the service line is not to be specified and shall not be restricted to any minimum or maximum length. Payment shall be made under this item even if the service crosses a private residential or commercial entrance; but, not a public roadway. Private or commercial entrances shall not be considered a public roadway in defining payment under this item. The contractor shall draw his own conclusions as to the length of piping that may be needed. This pay item does not include installation or relocation of meters. Meters will be paid separately. No additional payment will be made for rock excavation or for bedding required in rock excavation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

W SERVICE RELOCATE This item is for the relocation of an existing water service line where a meter is not involved, and where an existing service line can easily be adjusted by excavating alongside and moving the line horizontally and/or vertically a short distance without cutting the service line to avoid conflicts with road construction. This item shall include excavation, labor, equipment, bedding, and backfill to relocate the line in accordance with the plans and specifications complete and ready for use. Payment under this item shall be for each location requiring relocation. Payment shall be made under this item regardless of service size or relocation length. No separate pay items will be established for size or length variation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

W STRUCTURE ABANDONMENT This item is to be used to pay for abandonment of larger above or below ground water structures such as meter vaults, fire pits, pump stations, tanks, and etc. Payment under this item shall not be limited to size or scope; however structures with connecting pipes of 2 inches or less shall not be paid under this item; but, shall be considered incidental to water construction, (i.e., abandonment of standard water meters up to and including 2 inches would not be paid under this item). Payment under this item shall include all labor, equipment, and compacted fill or flowable fill for abandonment of the structure in place and restoration complete. No separate bid items will be established for size or structure variations. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

W STRUCTURE REMOVAL This item is to be used to pay for removal of larger above or below ground water structures such as meter vaults, fire pits, pump stations, tanks, and etc. Payment under this item shall not be limited to size or scope; however structures with connecting pipes of 2 inches or less shall not be paid under this item; but, shall be considered incidental to water construction, (i.e., removal of standard water meters up to and including 2 inches would not be paid under this item). Payment under this item shall include all labor, equipment, and compacted backfill for removal of the structure and restoration complete. No separate bid items will be established for size or structure variations. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

W TAPPING SLEVE AND VALVE SIZE 1 OR 2 This item shall include the specified tapping sleeve, valve, valve box, concrete pad around valve box (when required in specifications or plans), labor, and equipment to install the specified tapping sleeve and valve, complete and ready for use in accordance with

the plans and specifications. The size shall be the measured internal diameter of the live pipe to be tapped. The size tapping sleeve and valve to be paid under sizes 1 or 2 shall be as follows:

Size 1 = All live tapped main sizes up to and including 8 inches

Size 2 = All live tapped main sizes greater than 8 inches

Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

W TIE-IN This bid description shall be used for all main tie-in bid items of every size except those defined as "Special". This item includes all labor, equipment, excavation, fittings, sleeves, reducers, couplings, blocking, anchoring, restoration, disinfection, testing and backfill required to make the water main tie-in as shown on the plans, and in accordance with the specifications complete and ready for use. Pipe for tie-ins shall be paid under separate bid items. This item shall be paid EACH (EA) when complete.

W VALVE This description shall apply to all valves of every size required in the plans and specifications except those bid items defined as "Special". Payment under this description is to be for gate or butterfly valves being installed with new main. This item includes the valve as specified in the plans and specifications, polyethylene wrap (if required by specification), labor, equipment, excavation, anchoring (if any), valve box and valve stem extensions, backfill, concrete pad around valve box (if required by specification), restoration, testing, disinfection, and etc., required to install the specified valve at the location shown on the plans in accordance with the specifications and standard drawings complete and ready for use. If required on plans and/or proposed adjoining DIP is restrained, valves shall be restrained. Valve restraint shall be considered incidental to the valve and adjoining pipe. This description does not apply to cut-in valves. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

W VALVE ANCHOR EXISTING This bid item is intended to pay for installation of restraint hardware on an existing valve where no restraint exists to hold the valve in place to facilitate tie-ins and other procedures where restraint is prudent. This work shall be performed in accordance with water specifications and plans. This bid item shall include all labor equipment, excavation, materials and backfill to complete restraint of the designated valve, regardless of size, at the location shown on the plans, complete and ready for use. Materials to be provided may include, but is not limited to, retainer glands, lugs, threaded rod, concrete, reinforcing steel or any other material needed to complete the restraint. Should the associated valve box require removal to complete the restraint, the contractor shall reinstall the existing valve box, the cost of which shall be considered incidental to this bid item. No separate bid items are being provided for size variations. All sizes shall be paid under one bid item. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

W VALVE BOX ADJUST Includes all labor, equipment, valve box and valve stem extensions (if required), excavation, backfill, concrete pad around valve box (when specified in specifications or plans), restoration, and etc., to adjust the top of the box to finished grade complete and ready for use. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

W VALVE CUT-IN This bid description is for new cut-in valve installations of all sizes where installation is accomplished by cutting out a section of existing main. This item shall include cutting the existing pipe, supplying the specified valve, couplings or sleeves, valve box, concrete pad around valve box (when required in specifications or plans), labor, equipment, and materials to install the valve at the locations shown on the plans, or as directed by the engineer, complete and ready for use. Any pipe required for installation shall be cut from that pipe removed or supplied new by the contractor. No separate payment will be made for pipe required for cut-in valve installation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

W VALVE VAULT This item is for payment for installation of an underground structure for housing of specific valve(s) as required by the plans and specifications. This item shall include all labor, equipment, excavation, concrete, manhole castings or doors, the specified valve(s), all piping, and fitting materials associated with installing a functioning valve vault in accordance with the plans, standard drawing, and specifications, complete and ready for use. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

General Specifications

Hardin County Water District 1
Radcliff, KY

Radcliff Wastewater System
Radcliff, KY

Ft Knox Wastewater System
Fort Knox, Kentucky

Ft Knox Stormwater System
Fort Knox, Kentucky

Fort Knox Water System
Fort Knox, Kentucky



Prepared by:

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**TECHNICAL SPECIFICATIONS
 HARDIN COUNTY WATER DISTRICT NO. 1**

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**STANDARD SPECIFICATIONS AND DRAWINGS
HARDIN COUNTY WATER DISTRICT NO. 1**

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SECTION 01010 - SUMMARY OF WORK

PART 1 - GENERAL

1.01 WORK INCLUDED

A. The following major Work items are included in the Contract:

1. _____.
2. _____.
3. _____.

B. The Contractor shall provide all materials, labor and equipment necessary for completion of the Project, including installation and testing prior to transfer to the District. The Contract Documents are intended to provide the basis for proper completion of the work suitable for the intended use of HCWD1. Anything not expressly set forth but which is reasonably implied or necessary for proper performance of the Project shall be included.

C. The Contractor shall maintain the existing system in continuous operations. The Contractor shall not operate District hydrants or valves, but shall coordinate with the District when this is required.

D. See Section 02600 - "Maintaining Wastewater Flow" and Section 01535 - "Protection of Installed Work" for more details on sanitary sewer requirements.

1.02 PERMITS

The Contractor shall obtain any permits related to or required by, the Work in this Contract. HCWD1 has obtained the following permit(s) for this Project:

1. Kentucky Division of Water
2. _____.
3. _____.

1.03 CODES

Comply with applicable codes and regulations of authorities having jurisdiction. Submit copies of inspection reports, notices, citations and similar communications, to the HCWD1.

1.04 EXISTING CONDITIONS AND DIMENSIONS

- A. The Work in this Contract will primarily be performed in or around existing facilities of which a portion must remain functional. The Contractor must maintain the required items and/or systems functional without additional effort by the HCWD1's personnel and at no extra costs to the HCWD1.
- B. The Contractor is responsible for verifying all existing conditions, elevations, benchmarks, and survey data, dimensions, etc., and providing his finished work to facilitate existing conditions.

END OF SECTION 01010

SECTION 01025 - MEASUREMENT AND PAYMENT
(UNIT PRICE BID PROJECTS)

PART 1 - GENERAL

1.01 WORK INCLUDED

The Contractor shall furnish all necessary labor, machinery, tools, apparatus, equipment, materials, services and other necessary supplies and perform all work shown on the Drawings and/or described in the Specifications and Contract Documents at the unit or lump sum prices for the items enumerated in Part 2 of this Section.

PART 2 - PRODUCTS

2.01 MOBILIZATION

Payment for the Contractor's mobilization will be made at the Contract lump sum price and shall include all costs incurred for moving equipment onto the Project area and any pertinent costs related thereto.

2.02 BONDS AND INSURANCE

Payment for bonds and insurance will be made at the Contract lump sum price, and shall include the costs of the Performance and Payment Bonds provided under the Contract, and the premiums for insurance required under the Contract.

2.03 GENERAL REQUIREMENTS

Payment for general requirements will be made at the Contract lump sum price distributed over the initial term of the Contract and shall include field supervision and support staff, office supervision and support staff, costs associated with maintaining the field operation, and other items required by the general requirements and conditions of the Contract.

{Specifier shall edit the following work items for each Project, add or delete work items to cover all scope of work}

2.04 FORCE MAIN

- A. Payment for force main will be made at the Contract unit price per linear foot in place, which shall include compensation for furnishing pipe, fittings, friction type restraint glands, thrust blocking, trenching (including rock excavation), bedding, laying, jointing, shoring, sheeting and bracing, initial backfill, connection to existing lines or structures, and all other appurtenances required but not specifically delineated herein.

- B. The quantity of piping to be paid for shall be the length of pipe measured along the centerline of the completed pipe line without deducting the length of fittings.
- C. Payment for final backfill shall be included in this pay item except for bituminous and concrete material required in restoration of paved areas and defined in Sections 02510 and 02520. Bituminous and concrete material shall be included in the pay item "Bituminous Pavement Replacement" and "Concrete Pavement Replacement". DGA material required in the restoration of gravel roadways and drives shall be included in this pay item and is not a separate pay item.
- D. Rock excavation unclassified and is included in this pay item and will not be paid for separately.
- E. Testing of the completed force main and any electric, gas or other utility relocation, if necessary, is included in this pay item. However, no payment for the labor portion of this unit item shall be made until the line has been tested and accepted by the Engineer.
- F. Payment for seeding and final clean-up (including furnishing and placing topsoil, finish grading, seeding, mulching and erosion control, removal of construction materials and debris, cleaning, and site restoration) is included in this pay item. However, HCWD1 will not pay eight percent (X%) per foot of the line unit cost until final clean-up and seeding has been performed to the satisfaction of HCWD1. The eight percent (X%) per foot of the line unit cost shall be shown as a subsidiary line item on the payment request, which shall also be subject to retainage.

2.05 WATER LINE

- A. Payment for water line will be made at the Contract unit price per linear foot in place, which shall include compensation for furnishing pipe, trenching, bedding, laying, jointing, shoring, sheeting and bracing, initial backfill, and all other appurtenances required but not specifically delineated herein. Ductile iron fittings (including thrust blocking) and friction type restraint glands are included in this pay item.
- B. The quantity of piping to be paid for shall be the length of pipe measured along the centerline of the completed pipe line without deducting the length of fittings.
- C. Payment for final backfill shall be included in this pay item except for asphalt material and concrete required in restoration of paved areas as defined in Sections 02510 and 02520. Bituminous binder and concrete shall be included in the pay item "Bituminous Pavement Replacement", or "Concrete Pavement Replacement". DGA and/or crushed stone paving required in the restoration of gravel roadways and drives shall be included in this pay item.

- D. All excavation is unclassified and is included in this pay item and will not be paid for separately.
- E. Testing of the completed water line and any electric, gas or other utility relocation, if necessary, is included in this pay item. However, no payment for the labor portion of this unit item shall be made until the line has been tested and accepted by the Engineer. Testing shall include but not be limited to hydrostatic pressure, disinfecting and flushing and Bac-T.
- F. Payment for seeding and final clean-up (including furnishing and placing topsoil, finish grading, seeding, mulching and erosion control, removal of construction materials and debris, cleaning, and site restoration) is included in this pay item. However, HCWD1 will not pay eight percent (8%) per foot of the line unit cost until final clean-up and seeding has been performed to the satisfaction of HCWD1. The eight percent (8%) per foot of the line unit cost shall be shown as a subsidiary line item on the payment request, which shall also be subject to retainage.
- G. Fence repair/replacement incidental to water line construction is included in this pay item and will not be paid for separately.

2.06 GRAVITY SEWER LINES

- A. Payment for gravity sewer lines will be made at the Contract unit price per linear foot in place, which shall include compensation for furnishing pipe, trenching (including rock excavation), crushed stone bedding material, laying, jointing, temporary trench shoring, sheeting and bracing, initial backfill of crushed stone material over top of pipe, connection to exist lines or structures, and all other appurtenances required but not specifically delineated herein.
- B. The quantity of sewer to be paid for shall be the length of pipe measured along the centerline of the completed pipeline without deducting the length of branches and fittings. The inside diameter of each manhole shall **not** be included in the measurement of the pipe.
- C. Payment for final backfill shall be included in this pay item except for bituminous and concrete material required in restoration of paved areas and defined in Sections 02510 and 02520. Bituminous and concrete material shall be included in the pay item "Bituminous Pavement Replacement" and "Concrete Pavement Replacement". Class II material (DGA) required in the restoration of gravel roadways and drives shall be included in this pay item and is not a separate pay item.
- D. Rock excavation is included in this pay item and will not be paid for separately.
- E. Testing of the completed gravity sewer and any electric, gas or other utility relocation, if necessary, is included in this pay item. However, no payment for the

labor portion of this unit item shall be made until the line has been tested and accepted by the Engineer.

- F. Payment for seeding and final clean-up (including furnishing and placing topsoil, finish grading, seeding, mulching and erosion control, removal of construction materials and debris, cleaning, and site restoration) is included in this pay item. However, HCWD1 will not pay eight percent (8%) per foot of the line unit cost until final clean-up and seeding has been performed to the satisfaction of HCWD1. The eight percent (8%) per foot of the line unit cost shall be shown as a subsidiary line item on the payment request, which shall also be subject to retainage.

2.07 CLEANOUTS

Payment for cleanouts will be made at the Contract unit price each which shall include excavation, backfill, installation, brass cap, concrete pad, wye (if shown on plans), reducer (if necessary), pipe stub, cap or plug for connection to lateral, and all fittings and other appurtenances necessary to complete the work.

2.08 VALVES

Payment for valves will be made at the Contract unit price each which shall include valves, friction type restraint glands, thrust blocking, valve box, concrete pad, and all appurtenances necessary for a complete installation. Valves related to fire hydrants are not included in this pay item.

2.09 TAPPING VALVE AND SLEEVE

Payment for tapping valve and sleeve connections from the new water line to the existing water system will be made at the Contract unit price each which includes excavation, backfill, valve, valve box, sleeve, gaskets and fittings required to complete the connections.

2.10 FIRE HYDRANT ASSEMBLY

Payment for fire hydrants will be made at the Contract unit price each which shall include fittings, anchor tees, pipe, hydrants, valve, friction type restraint glands, thrust blocking, drainage pits and all appurtenances necessary for a complete installation.

2.11 AIR/VACUUM RELEASE VALVE

Payment for an air/vacuum release valve will be made at the Contract unit price each, complete in place, including all excavation, material, valve box, saddles, fittings, backfilling, and labor necessary to complete the installation.

2.12 METER SETTINGS

Payment for meter settings will be made at the Contract unit price each which includes installation of 10 feet of service pipe, excavation, backfilling, cleanup, installation of meter, meter setter, meter box, meter box lid, lock, corporation stop, service saddle and all appurtenances required for a complete installation. Service pipe beyond the 10 feet will be paid for separately under item **2.13**.

2.13 COPPER SERVICE PIPE

- A. Payment for service pipe and fittings will be made per linear foot in place, with attendant work completed. Excavation is unclassified and included in this pay item.
- B. All meter settings across the road from the water line shall be pushed under the road. The work of pushing is included in this pay item and will not be paid for separately.

2.14 ENCASEMENT PIPE, OPEN CUT

Payment for force main, water line and gravity sewer line crossings as shown on the Drawings shall include the respective encasement pipe open cut across the roadway, creek or utility and will be paid for at the Contract unit price per linear foot of encasement pipe for the size and type. This work shall include the encasement pipe, complete in place with fittings, blocking, spacers, and all items necessary for its construction and installation. Carrier pipe is paid separately under Items **X.XX**.

2.15 ENCASEMENT PIPE, BORE AND JACK

Payment for force main, water line, and gravity sewer lines crossing under roadways or railroads as shown on the Drawings shall include the respective encasement pipe bored under the roadway or railroad and will be paid for at the Contract unit price per linear foot of encasement pipe for the size and type. This work shall include the encasement pipe, complete in place with fittings, blocking, spacers, and all items necessary for its construction and installation. Carrier pipe is paid separately under Items **X.XX**_____.

2.16 STANDARD MANHOLES, 6- FEET OR LESS IN DEPTH

Manholes as described in Section 02735 will be paid for at the Contract unit price each and shall include the furnishing and installation of the precast concrete base, barrels, eccentric cone top section, stops, flexible pipe to manhole gasket, internal mechanical chimney seal, polyethylene manhole insert, and cast iron frame and cover. Also included is excavation (including rock excavation), earth backfill, and all other materials not specifically delineated herein, but necessary to complete the construction of the manhole as shown on the Drawings. Crushed stone backfill placed around the manhole in Case II backfill situations is included in this pay item.

Bituminous material in restoration of paved areas shall be included in the pay item "Bituminous Pavement Replacement". DGA material in restoration of gravel drives and roadways shall be included in this pay item and is not a separate pay item.

2.17 MANHOLE BARREL EXTENSIONS

For manholes greater than 6 feet in depth, the additional manhole barrel measured as set out in Section 02735, Article 1.03, will be paid for at the Contract unit price per vertical foot of additional depth, in place.

2.18 MANHOLE DROP CONNECTION

Payment for manhole drop connection will be made at the Contract unit price each, complete in place, and shall include all fittings, piping, excavation, concrete, connection to manhole and all materials and labor to complete the installation.

2.19 CONCRETE ENCASEMENT

Payment for concrete encasement will be made at the Contract unit price per linear foot in place, which shall include compensation for excavation (including rock excavation), concrete and all items necessary to completely encase the force main, water line and gravity sewer line in concrete the full trench width to 6-inches above the pipe.

2.20 CONCRETE CAP

Payment for concrete cap will be made at the contract unit price per linear foot in place, which shall include compensation for excavation (including rock excavation), concrete and all items necessary to cover the force main, water line and gravity sewer line in concrete the full trench width to 6-inches above the pipe.

2.21 BITUMINOUS PAVEMENT REPLACEMENT

Payment for bituminous pavement replacement will be paid for at the Contract unit price per linear foot which shall include base, placement of bituminous material, compaction and all appurtenances necessary for a complete installation.

2.22 CONCRETE PAVEMENT REPLACEMENT

Payment for concrete pavement replacement will be made at the Contract unit price per linear foot which shall include base, placing concrete, finishing and all appurtenances necessary for a complete installation.

2.23 CONCRETE SIDEWALK AND CURB REPLACEMENT

Payment for concrete sidewalk and curb replacement will be paid for at the Contract unit price per linear foot which shall include base, forms, reinforcement, placement of concrete, finishing and all appurtenances necessary for a complete installation.

2.24 CONNECTION TO EXISTING PIPE

Payment for connections of the new water line to the existing water system will be made at the Contract unit price each which includes the excavation, backfill, cutting the existing pipe, and fittings required to complete the connections. Valves and sleeves for wet taps are not included in this pay item and will be paid for separately under item X.XX .

2.25 TIE-IN TO EXISTING MANHOLES OR STRUCTURES

Payment for tie-in or connection to existing manholes or structures will be made at the Contract unit price each and shall include installation and all other appurtenances necessary to complete the Work. Bypass pumping, if required, shall be included in the unit price and shall not be a separate pay item.

2.26 TIE-IN TO EXISTING GRAVITY SEWER OR FORCE MAIN

Payment for tie-in or connection to existing gravity sewer or force main will be made at the Contract unit price each and shall include installation and all other appurtenances necessary to complete the Work. Bypass pumping, if required, shall be included in the unit price and shall not be a separate pay item.

2.27 TRAFFIC CONTROL

Payment for traffic control will be made at the Contract lump sum price. Payment shall include all signs, traffic control devices and other materials, flaggers and other labor required, and all items necessary to provide traffic control for the duration of the project, in accordance with the local agency having jurisdiction over the roadway impacted, the specifications, and the Kentucky Department of Highways encroachment permit.

2.28 EROSION PREVENTION AND SEDIMENT CONTROL

Payment for the erosion prevention and sediment control will be made at the contract lump sum price and shall include all necessary labor, equipment and materials to install and maintain erosion and sediment control measures including silt fences, stone bag check dams, stabilized construction entrances, and temporary seeding to prevent the erosion of exposed soil and transportation of sediment offsite.

2.29 DEMOBILIZATION

Payment for the Contractor's demobilization upon completion of the Project will be made at the Contract lump sum price and shall include all costs incurred for removing equipment and materials from the Project area and any pertinent costs related thereto.

PART 3 - EXECUTION

3.01 PAY ITEMS

- A. The pay items listed hereinbefore refer to the items listed in the Bid Schedule and cover all of the pay items for this Contract.
- B. Any and all other items of Work listed in the Specifications or shown on the Drawings for this Contract shall be considered incidental to and included in those pay items.

3.02 ESTIMATED QUANTITIES OF WORK

Wherever the estimated quantities of work to be done and materials to be furnished under this Contract are shown in any of the documents, including the Bid Proposal, they are given for use in comparing bids and the right is specifically reserved, except as otherwise limited by the Contract Documents, to increase or diminish them as may be deemed reasonably necessary or desirable by HCWD1 to complete the Work contemplated by this Contract. Such increase or diminution shall be accompanied by an adjustment in the Contract Amount in accordance with the Contract Conditions, and shall not give cause for claims or liability for damages against HCWD1 or the Engineer, due to such increase or diminution.

END OF SECTION 01025

SECTION 01025 - MEASUREMENT AND PAYMENT
(LUMP SUM BID PROJECTS)

PART 1 - GENERAL

1.01 WORK INCLUDED

The Contractor shall furnish all necessary labor, machinery, tools, apparatus, equipment, materials, services and other necessary supplies and perform all work shown on the Drawings and/or described in the Specifications and Contract Documents at the lump sum bid price.

1.02 PERIODIC ESTIMATE FORMS

- A. The Contractor shall prepare and submit a periodic estimate on the form provided by the Engineer. The estimate form will depict the Contractor's cost for completing the Contract requirements and show by major unit of the project work the Contractor's dollar value for the material and the labor (two separate amounts) to be used as a basis for the periodic payments. The Contractor's periodic estimate breakdown must be approved by HCWD1 before any payments will be made on this Contract.

The following items will be included in the breakdown for all lump sum projects:

1. Mobilization: Payment for the Contractor's mobilization shall include all costs incurred for moving equipment onto the project area and any pertinent costs related thereto.
2. Bonds and Insurance: Payment for bonds and insurance shall include the costs of the Performance and Payment Bonds provided under the Contract, and the premiums for insurance required under the Contract.
3. General Requirements: Payment for General Conditions will be distributed over the initial term of the Contract and shall include field supervision and support staff, office supervision and support staff, costs associated with maintaining the field operation, and other items required by the general requirements and conditions of the Contract.
4. Demobilization: Payment for the Contractor's demobilization upon completion of the Project shall include all costs incurred for removing equipment and materials from the Project area and any pertinent costs related thereto.

END OF SECTION 01025

SECTION 01040 - COORDINATION

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. The Contractor shall coordinate the Work of all crafts, trades and subcontractors engaged on the Work, and he shall have final responsibility in regards to the schedule, workmanship and completeness of each and all parts of the Work.
- B. All crafts, trades and subcontractors shall be made to cooperate with each other and with others as they may be involved in the installation of work which adjoins, incorporates, precedes or follows the work of another. It shall be the Contractor's responsibility to point out areas of cooperation prior to execution of subcontract agreements and the assignment of the parts of the Work. Each craft, trade and subcontractor shall be made responsible to the Contractor, for furnishing embedded items, giving directions for doing all cutting and fitting, making all provisions for accommodating the Work, and for protecting, patching, repairing and cleaning as required to satisfactorily perform the Work.
- C. The Contractor shall be responsible for all cutting, digging and other actions of his subcontractors and workmen. Where such action impairs the safety or function of any structure or component of the Project, the Contractor shall make such repairs, alterations and additions as will, in the opinion of the Engineer, bring said structure or component back to its original design condition at no additional cost to HCWD1.
- D. Each subcontractor is expected to be familiar with the General Requirements and all Sections of the Detailed Specifications for all other trades and to study all Drawings applicable to his work to the end that complete coordination between the trades will be affected. Each subcontractor shall consult with the Contractor, who shall advise the Engineer if conflicts exist on the Drawings.
- E. Coordination shall include giving notice to HCWD1. Forty-eight (48) hours notice is required to adjust work schedules.
- F. Coordination includes local EMS (traffic) and appropriate road departments.

END OF SECTION 01040

SECTION 01090 - REFERENCES AND ABBREVIATIONS

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

A. Where any of the following abbreviations are used in the Specifications, they shall have the meaning set forth as follows:

ACI	American Concrete Institute
ANS	American National Standard
ANSI	American National Standards Institute
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWG	American or Brown and Sharpe Wire Gage
AWWA	American Water Works Association
IPS	Iron Pipe Size
MACP	Manhole Assessment and Certification Program
NBS	National Bureau of Standards
NEC	National Electrical Code; latest edition
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
NPT	National Pipe Thread
PACP	Pipeline Assessment and Certification Program
125-lb. ANS; 250-lb. ANS	American National Standard for Cast-Iron Pipe Flanges and Flanged Fittings, Designation B16.1-1975, for the appropriate class
UL	Underwriters' Laboratories

B. REFERENCE STANDARDS

1. For products or workmanship specified by association, trade or federal standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
2. The date of the standard is that in effect as of the Bid date, or the date of the Owner-Contractor Agreement when there are no bids, unless a certain date is indicated for the standard in the Contract Documents.
3. When required by an individual Specification section, the Prime Contractor shall obtain a copy of the standard. Maintain the copy at the job site, available for review by HCWD1, Engineer, Resident Representative and other appropriate parties until Substantial Completion.

END OF SECTION 01090

SECTION 01120 - ENVIRONMENTAL PROTECTION

PART 1 - GENERAL

1.01 SCOPE

For the purpose of this Specification, environmental protection is defined as the retention of the environment in Project construction and to enhance the natural appearance in its final condition. Environmental protection requires consideration of air and land and involves noise as well as other pollutants. In order to prevent, and to provide for abatement and control of, any environmental pollution arising from the construction activities in the performance of this Contract, the Contractor and his subcontractors shall comply with all applicable federal, state and local laws and regulations concerning environmental pollution control and abatement. This Section covers the furnishings of all labor, materials, equipment and performing all work required for the protection of the environment during construction operations except for those measures set forth in other Sections of these specifications.

1.02 PRECONSTRUCTION VIDEO

After the Contractor has staked or laid out the job and prior to the initiation of any construction activities, including the installation of erosion and sediment control BMPs, the entire project corridor shall be videoed in digital format on DVD. A copy of the DVD shall be provided to HCWD1.

1.03 PROTECTION OF LAND RESOURCES

The land resources within the Project boundaries and outside the limits of work performed under this Contract shall be preserved in their present condition or be restored to a condition after completion of construction that will appear to be natural and not detract from the appearance of the project.

1.04 RECORDING AND PRESERVING HISTORICAL AND ARCHAEOLOGICAL FINDS

In the event archaeological materials (arrowheads, stone tools, stone axes, prehistoric and historic pottery, bottles, foundations, Civil War artifacts, and other types of artifacts) are uncovered during the construction of this project, work is to immediately cease at the location and the Kentucky Heritage Council shall be contacted. The telephone number is (502) 564-7005. Construction shall not commence at this location until a written release is received from the Kentucky Heritage Council. Failure to report a find could

result in legal action.

1.05 PROTECTION OF LAND AREAS

Except for any work on storage areas and access routes specifically assigned for the use of the Contractor under this Contract, the land areas outside the limits of permanent work performed under this Contract shall be preserved in their present condition. Contractor shall confine his construction activities to areas defined for work on the plans or specifically assigned for his use. No other areas shall be used by the Contractor without written consent of the HCWD1.

1.06 PROTECTION OF TREES AND SHRUBS

Reasonable care shall be taken during construction to avoid damage to vegetation.

The Contractor shall not deface, injure or destroy trees or shrubs, nor remove or cut them without prior approval from HCWD1. No ropes, cables, or guys shall be fastened to or attached to any existing nearby trees for anchorage.

1.07 TREE PROTECTIVE STRUCTURES

Where, in the opinion of the Engineer, trees may possibly be defaced, bruised, injured or otherwise damaged by the Contractor's equipment or by his other operations, he may direct the Contractor to provide temporary protection of such trees by placing boards, plans, or poles around them. Ornamental shrubbery and tree branches shall be temporarily tied back, where appropriate, to minimize damage.

1.08 RESTORATION OF DAMAGED TREES

Any tree scarred or damaged by the Contractor's equipment or operations shall be restored as nearly as possible to its original condition at the Contractor's expense. Trees which receive damage to branches shall be trimmed of those branches to improve the appearance of the tree. All scars made on trees shall be coated as soon as possible with an approved tree wound dressing.

Trees that are to remain, either within or outside established clearing limits, that are damaged by the Contractor so as to be beyond saving in the opinion of the Engineer, shall be immediately removed, if so directed, and replaced with a nursery-grown tree of the same species and size.

1.09 PROTECTION OF WATER RESOURCES

The Contractor shall control the disposal of fuels, oils, bitumens, calcium chloride, acids, or harmful materials, and shall comply with applicable Federal, State, County and Municipal laws concerning pollution of rivers and streams while performing work under this Contract. Special measures shall be taken to prevent chemicals, fuels, oils, greases, bituminous materials, herbicides and insecticides from entering public waters. Water used in on-site material processing, concrete curing, foundation and concrete cleanup, and other waste waters shall not be allowed to reenter a stream if an increase in the turbidity of the stream could result therefrom.

1.10 BURNING

Air pollution restrictions applicable to this project are as follows: Materials shall not be burned on the premises. If the Contractor elects to dispose of waste materials off the premises, by burning, he shall make his own arrangements for such burning area and shall, as specified in the General Conditions, conform to all applicable regulations.

1.11 DUST CONTROL

The Contractor shall maintain all excavations, stockpiles, access roads, waste areas, and all other work free from excess dust to such reasonable degree as to avoid causing a hazard or nuisance to others. Approved temporary methods consisting of sprinkling, chemical treatment, or similar methods will be permitted to control dust. Dust control shall be performed as the work proceeds and whenever a dust nuisance or hazard occurs.

1.12 EROSION CONTROL

Surface drainage from cuts and fills within the construction limits, whether or not completed, and from borrow and waste disposal areas, shall be graded to control erosion within acceptable limits. Temporary control measures shall be provided and maintained until permanent drainage facilities are completed and operative. The area of bare soil exposed at any one time by construction operations, should be held to a minimum.

Any erosion control measures shown on the plans are considered to be minimum requirements. It is the Contractor's responsibility to provide erosion control and prevent migration of silt.

1.13 CORRECTIVE ACTION

The Contractor shall, upon receipt of a notice in writing of any noncompliance with the foregoing provisions, take immediate corrective action. If the Contractor fails or refuses to comply promptly, HCWD1 may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to any such stop orders shall be made the subject of a claim for extension of time or for excess costs of damages by the Contractor unless it was later determined that the Contractor was in compliance.

1.14 POST-CONSTRUCTION CLEANUP, REMOVAL AND RESTORATION

The Contractor shall, unless otherwise instructed in writing by the Engineer, remove all signs of temporary construction facilities such as haul roads, work areas, structures, foundations of temporary structures, stockpiles of excess or waste materials, and other vestiges of construction prior to final acceptance of the work. The disturbed areas shall be graded and filled and the entire area seeded.

END OF SECTION 01120

SECTION 01300 - SUBMITTALS

PART 1 - GENERAL

1.01 WORK INCLUDED

Shop drawings, descriptive literature, project data and samples (when samples are specifically requested) for all manufactured or fabricated items shall be submitted by the Contractor to the Engineer for examination and review in the form and in the manner required by the Engineer. All submittals shall be furnished in at least three (3) copies to be retained by the Engineer and shall be checked and reviewed by the Contractor before submission to the Engineer. The review of the submittal by the Engineer shall not be construed as a complete check, but will indicate only that the general method of construction and detailing is satisfactory. Review of such submittal will not relieve the Contractor of the responsibility for any errors which may exist as the Contractor shall be responsible for the dimensions and design of adequate connections, details, and satisfactory construction of all work. Materials or equipment for which submittals are required should not be ordered until submittals have been reviewed and approved. Ordering materials and equipment beforehand are at the Contractor's risk.

1.02 DEFINITIONS

The term "submittals" shall mean shop drawings, manufacturer's drawings, catalog sheets, brochures, descriptive literature, diagrams, schedules, calculations, material lists, performance charts, test reports, office and field samples, and items of similar nature which are normally submitted for the Engineer's review for conformance with the design concept and compliance with the Contract Documents.

1.04 CONTRACTOR'S ULTIMATE RESPONSIBILITY

Review by the Engineer of shop drawings or submittals of material and equipment shall not relieve the Contractor from the responsibilities of furnishing same of proper dimension, size, quantity, materials and all performance characteristics to efficiently perform the requirements and intent of the Contract Documents. Review shall not relieve the Contractor from responsibility for errors of any kind on the shop drawings. Review is intended only to assure conformance with the design concept of the Project and compliance with the information given in the Contract Documents. Review of shop drawings shall not be construed as releasing the Contractor from the responsibility of complying with the Specifications.

1.05 GENERAL REQUIREMENTS FOR SUBMITTALS

- A. Shop drawings are defined as original drawings prepared by the Contractor, subcontractors, suppliers, or distributors performing work under this Contract. Shop drawings illustrate some portion of the work and show fabrication, layout, setting or erection details of equipment, materials and components. The Contractor shall, except as otherwise noted, have prepared the number of reviewed copies required for his distribution plus three (3) which will be retained by the Engineer and HCWD1. Shop drawings shall be folded to an approximate size of 8-1/2 inch x 11 inch and in such manner that the title block will be located in the lower righthand corner of the exposed surface.
- B. Project data shall include manufacturer's standard schematic drawings modified to delete information which is not applicable to the Project, and shall be supplemented to provide additional information applicable to the Project. Each copy of descriptive literature shall be clearly marked to identify pertinent information as it applies to the Project.
- C. Where samples are required, they shall be adequate to illustrate materials, equipment or workmanship, and to establish standards by which completed work is judged. Provide sufficient size and quantity to clearly illustrate functional characteristics of product and material, with integrally related parts and attachment devices, along with a full range of color samples.
- D. The Contractor shall review and check submittals, and indicate his review by initials and date.
- E. If the submittals deviate from the Contract Drawings and/or Specifications, the Contractor shall advise the Engineer, in letter of transmittal of the deviation and the reasons therefore. All changes shall be clearly marked on the submittal with a bold mark other than red. Any additional costs for modifications shall be borne by the Contractor.
- F. In the event the Engineer does not specifically reject the use of material or equipment at variance to that which is shown on the Drawings or specified, the Contractor shall, at no additional expense to HCWD1, and using methods reviewed by the Engineer, make any changes to structures, piping, controls, electrical work, mechanical work, etc., that may be necessary to accommodate this equipment or material. Should equipment other than that on which design drawings are based be accepted by the Engineer, shop drawings shall be submitted detailing all modification work and equipment changes made necessary by the substituted item.

- G. Additional information on particular items, such as special drawings, schedules, calculations, performance curves, and material details, shall be provided when specifically requested in the technical Specifications.
- H. Submittals for all electrically operated items (including instrumentation and controls) shall include complete wiring diagrams showing lead, runs, number of wires, wire size, color coding, all terminations and connections, and coordination with related equipment.
- I. Equipment shop drawings shall indicate all factory or shop paint coatings applied by suppliers, manufacturers and fabricators; the Contractor shall be responsible for insuring the compatibility of such coatings with the field-applied paint products and systems.
- J. Fastener specifications of manufacturer shall be indicated on equipment shop drawings.
- K. Where manufacturer's brand names are given in the Specifications for building and construction materials and products, such as grout, bonding compounds, curing compounds, masonry cleaners, waterproofing solutions and similar products, the Contractor shall submit names and descriptive literature of such materials and products he proposes to use in this Contract.
- L. No material shall be fabricated or shipped unless the applicable drawings or submittals have been reviewed by the Engineer and returned to the Contractor.
- M. All bulletins, brochures, instructions, parts lists, and warranties packaged with and accompanying materials and products delivered to and installed in the Project shall be saved and transmitted to HCWD1 through the Engineer.

1.06 CONTRACTOR RESPONSIBILITIES

- A. Verify field measurements, benchmarks, field construction criteria, catalog numbers and similar data and coordinate each submittal with requirements of Work and Contract Documents.
- C. Notify Engineer, in writing at time of submission, of deviations in submittals from requirements of Contract Documents.
- D. Begin no work, and have no material or products fabricated or shipped which required submittals until return of submittals with Engineer's stamp and initials or signature indicating review.

END OF SECTION 01300

SECTION 01400 - QUALITY CONTROL

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Work of all crafts and trades shall be laid out to lines and elevations as established by the Contractor from the Drawings or from instructions by the Engineer.
- B. Unless otherwise shown, all work shall be plumb and level, in straight lines and true planes, parallel or square to the established lines and levels. The Work shall be accurately measured and fitted to tolerance as established by the best practices of the crafts and trades involved, and shall be as required to fit all parts of the Work carefully and neatly together.
- C. All equipment, materials and articles incorporated into the Work shall be new and of comparable quality to that specified. All workmanship shall be first-class and shall be performed by mechanics skilled at, and regularly employed in, their respective trades.
- D. The Contractor shall determine that the equipment he proposes to furnish can be brought into the facility and installed in the space available. Equipment shall be installed so that all parts are readily accessible for inspection and maintenance.

1.02 WORKMANSHIP

Comply with industry standards except when more restrictive tolerances or specified requirements indicate more rigid standards or more precise workmanship.

1.03 MANUFACTURERS' INSTRUCTIONS

Comply with manufacturers' instructions in full detail as to shipping, handling, storing, installing, start-up and operation.

1.05 TESTING SERVICES

- A. Tests, inspections and certifications of materials, of equipment, of subcontractors' work, or of completed work shall be provided by the Contractor, as required by the various sections of the Specifications, and all costs for such tests, inspections and certifications shall be included in the

Contract Price. Testing services are considered incidental to the installation of the Project. Tests shall include, but not be limited to, hydrostatic pressure, chlorine disinfecting, bacteriological, low pressure air, deflection (mandrel), vacuum, exfiltration, CCTV inspection, concrete compression strength, soil density, and compaction.

- B. The Contractor shall submit the name of testing laboratory proposed for use on the Project to HCWD1, for approval.
- C. The Contractor shall deliver written notice to the Engineer at least two (2) work days in advance of any inspections or tests to be made at the Project site. All inspections or tests to be conducted in the field shall be done in the presence of HCWD1 or his representative.
- D. Certifications by independent testing laboratories may be by properly attested copies of the data including scientific procedures and results of tests.

END OF SECTION 01400

SECTION 01535 - PROTECTION OF INSTALLED WORK

PART 1 - GENERAL

1.01 WORK INCLUDED

Protection for products, including Owner-provided products, after installation.

1.02 RELATED REQUIREMENTS

Division 1 - General Requirements.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 PROTECTION AFTER INSTALLATION

- A. Protect installed products and control traffic in immediate area to prevent damage from subsequent operations.
- B. Restrict traffic of any kind across planted lawn and landscape areas.

END OF SECTION 01535

SECTION 01560 – TEMPORARY CONTROLS AND UTILITIES

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Dust control.
- B. Erosion and sediment control.
- C. Temporary Electricity

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 DUST CONTROL

- A. Execute work by methods to minimize raising dust from construction operations.
- B. Provide positive means to minimize construction or traffic generated dust from dispersing into atmosphere.
- C. Provide spraying of construction traffic areas with water to hold dust leaving the construction site to the minimum amounts allowed by regulations.

3.02 EROSION AND SEDIMENT CONTROL

- A. Adhere to the requirements and provisions of KPDES General Permit (KYG20) for stormwater discharges to small Municipal Storm Sewer Systems (sMS4), where applicable.
- B. Adhere to the requirements and provisions of KPDES General Permit (KYR10) for stormwater discharges associated with small construction activities that disturb 1 acre or greater.
- C. At a minimum, provide the following:
 - 1. Plan and execute construction by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.
 - 2. Minimize amount of bare soil exposed at one time.

3. Provide temporary measures such as berms, dikes, drains, hay bales, gabions, etc., as directed by the Engineer so as to minimize siltation due to runoff.
4. Construct fill and waste areas by selective placement to avoid erosive exposed surface of silts or clays.
5. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.

3.03 REQUIREMENTS OF REGULATORY AGENCIES

- A. Obtain and pay for all permits not provided by HCWD1 as required by governing authorities.
- B. Obtain and pay for temporary easements required across property other than that of HCWD1.
- C. Comply with applicable codes.

3.04 REMOVAL

- A. Completely remove temporary materials, equipment, and miscellaneous items upon completion of construction and approval of the Engineer.
- B. Repair damage caused by installation and restore to specified or original condition.

3.05 TEMPORARY ELECTRICITY

Electrical services for construction needs and for lighting and heating the work area will be provided by the Contractor.

3.06 TEMPORARY WATER

Water for testing water and sanitary sewer systems will be provided by HCWD1.

END OF SECTION 01560

SECTION 01565 - EROSION AND SEDIMENT CONTROL

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. All Work shall adhere to the requirements and provisions of KPDES General Permit (KYG20) for stormwater discharges to small Municipal Storm Sewer Systems (SMS4), where applicable.
- B. All Work shall adhere to the requirements and provisions of KPDES General Permit (KYR10) for stormwater discharges associated with small construction activities that disturb 1 acre or greater.
- C. The Contractor shall do all Work and take all measures necessary to control soil erosion resulting from construction operations, shall prevent the flow of sediment from the construction site, and shall contain construction materials (including excavation and backfill) within his protected working area so as to prevent damage to the adjacent wetlands or water courses.
- D. The Contractor shall not employ any construction method that violates a rule, regulation, guideline or procedure established by Federal, State or local agencies having jurisdiction over the environmental effects of construction.
- D. Pollutants such as chemicals, fuels, lubricants, bitumen, raw sewage and other harmful waste shall not be discharged into or alongside of any body of water or into natural or man-made channels leading thereto.

PART 2 - PRODUCTS

2.01 MATERIALS

Silt checks shall be constructed of No. 1 coarse aggregate as defined by the Kentucky Transportation Cabinet. Filter fabric for sediment traps shall be of suitable materials acceptable to the Engineer. Bales may be hay or straw, and shall be reasonably clean and free of noxious weeds and deleterious materials.

PART 3 - EXECUTION

3.01 METHODS OF CONSTRUCTION

- A. The Contractor shall use any of the acceptable methods necessary to control soil erosion and prevent the flow of sediment to the maximum extent possible. These methods shall include, but not be limited to, the use of silt fences, hay bales, water diversion structures, temporary revegetation, diversion ditches and settling basins.
- B. Construction operations shall be restricted to the areas of work indicated on the Drawings and to the area which must be entered for the construction of temporary or permanent facilities. The Engineer has the authority to limit the surface area of erodible earth material exposed by clearing and grubbing, excavation, borrow and fill operations and to direct the Contractor to provide immediate permanent or temporary pollution control measures to prevent contamination of the wetlands and adjacent watercourses. Such work may involve the construction of temporary berms, dikes, dams, sediment basins, slope drains, and use of temporary mulches, mats, or other control devices or methods as necessary to control erosion.
- C. Excavated soil material shall not be placed adjacent to the wetlands or watercourses in a manner that will cause it to be washed away by high water or runoff. Earth berms or diversions shall be constructed to intercept and divert runoff water away from critical areas. Diversion outlets shall be stable or shall be stabilized by means acceptable to the Engineer. If for any reason construction materials are washed away during the course of construction, the Contractor shall remove those materials from the fouled areas as directed by the Engineer.
- D. For Work within easements or rights-of-way, all materials used in construction such as excavation, backfill, roadway, and pipe bedding and equipment shall be kept within the limits of these easements or rights-of-way.
- E. The Contractor shall not pump silt-laden water from trenches or other excavation into the wetlands, or adjacent watercourses. Instead, silt-laden water from his excavations shall be discharged within areas surrounded by baled hay or into sediment traps or ensure that only sediment-free water is returned to the watercourses. Damage to vegetation by excessive watering or silt accumulation in the discharge area shall be avoided.
- F. Prohibited construction procedures include, but are not limited to the following:
 - 1. Dumping of spoil material into any streams, wetlands, surface waters, or unspecified locations.
 - 2. Indiscriminate, arbitrary, or capricious operation of equipment in wetlands or surface waters.

3. Pumping of silt-laden water from trenches or excavations into surface waters, or wetlands.
 4. Damaging vegetation adjacent to or outside of the construction area limits.
 5. Disposal of trees, brush, debris, paints, chemicals, asphalt products, concrete curing compounds, fuels, lubricants, insecticides, washwater from concrete trucks or hydroseeders, or any other pollutant in wetlands, surface waters, or unspecified locations.
 6. Permanent or unauthorized alteration of the flow line of any stream.
 7. Open burning of debris from the construction work.
- G. Any temporary working roadways required shall be clean fill approved by the Engineer. In the event fill is used, the Contractor shall take every precaution to prevent the fill from mixing with native materials of the site. All such foreign fill materials shall be removed from the site following construction.

3.02 EROSION CHECKS

- A. The Contractor shall furnish and install baled hay or straw erosion checks surrounding the base of all deposits of stored excavated material outside of the disturbed area, and where indicated by the Engineer. Checks located surrounding stored material shall be located approximately 6 feet from that material. Bales shall be held in place with two 2 inch by 2 inch by 3 feet wooden stakes. Each bale shall be butted tightly against the adjoining bale to preclude short circuiting of the erosion check.
- B. The Contractor shall remove silt and sediment from the site as it accumulates at erosion checks and repair damaged checks during construction.

3.03 REMOVAL OF BMPs

The Contractor shall remove all erosion control materials from the site as soon as the potential for erosion has been eliminated and when approved by the Engineer. Reseed area where hay bales or silt fence has been removed.

END OF SECTION 01565

SECTION 01570 - TRAFFIC REGULATION

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Construction parking control.
- B. Flagmen.
- C. Flares and lights.
- D. Haul routes.
- E. Removal of controls.

PART 2 - PRODUCTS

2.01 SIGNS AND DEVICES

- A. Traffic Cones and Drums, Flares and Lights: As approved by local jurisdictions.
- B. Flagman Equipment: As required by local jurisdictions.

PART 3 - EXECUTION

3.01 CONSTRUCTION PARKING CONTROL

- A. Control vehicular parking to prevent interference with public traffic and parking, access by emergency vehicles and Owner's operations.
- B. Monitor parking of construction personnel's vehicles in existing facilities. Maintain vehicular access to and through parking areas.
- C. Prevent parking on or adjacent to access roads or in non-designated areas.

3.02 TRAFFIC CONTROL

- A. Whenever and wherever, in the Engineer's opinion, traffic is sufficiently congested or public safety is endangered, Contractor shall furnish uniformed

officers to direct traffic and to keep traffic off any highway area affected by construction operations.

- B. Contractor shall abide by city, county, state, and federal military regulations governing utility construction work.
- C. Traffic control shall be provided according to the Kentucky Department of Highways Manual on Uniform Traffic Control Devices for Streets and Highways.

3.03 FLAGMEN

Provide trained and equipped flagmen to regulate traffic when construction operations or traffic encroach on public traffic lanes.

3.04 FLARES AND LIGHTS

Use flares and lights during hours of low visibility to delineate traffic lanes and to guide traffic.

3.05 HAUL ROUTES

- A. Consult with authorities to establish public thoroughfares to be used for haul routes and site access.
- B. Confine construction traffic to designated haul routes.
- C. Provide traffic control at critical areas of haul routes to regulate traffic and minimize interference with public traffic.

3.06 REMOVAL OF CONTROLS

Remove equipment and devices when no longer required.

END OF SECTION 01570

SECTION 01700 - PROJECT CLOSEOUT

PART 1 - GENERAL

1.01 RELATED REQUIREMENTS

- A. Section 01720 - Project Record Documents.

1.02 SUBSTANTIAL COMPLETION

- A. The Contractor shall submit written certification to Engineer that project is substantially complete and list of major items to be completed or corrected.
- B. Engineer will make an inspection within seven days after receipt of certification, together with HCWD1's representative.
- C. Should Engineer consider that work is substantially complete:
 - 1. Contractor shall prepare, and submit to Engineer, a list of the items to be completed or corrected, as determined by on-site observation.
 - 2. Engineer will prepare and issue a Certificate of Substantial Completion, containing:
 - a. Date of Substantial Completion.
 - b. Contractor's list of items ("Punch List") to be completed or corrected, verified and amended by Engineer.
 - c. The time within which Contractor shall complete or correct work of listed items.
 - d. Time and date Owner will assume possession of work or designated portion thereof.
 - 3. Contractor: Complete work listed for completion or correction, within designated time.
- D. Should Engineer consider that work is not substantially complete:
 - 1. He shall notify Contractor, in writing, stating reasons.
 - 2. Contractor: Complete work, and send second written notice to Engineer, certifying that Project or designated portion of project is substantially complete.
 - 3. Engineer will review work again.

1.03 FINAL INSPECTION

- A. Contractor shall submit written certification that:
 - 1. Project has been inspected for compliance with Contract Documents.
 - 2. Work has been completed in accordance with Contract Documents.
 - 3. Equipment and systems have been tested in presence of Owner's representative and are operational.
 - 4. Project is completed and ready for final inspection.
- B. Engineer will make final on-site observation/review within seven (7) days after receipt of certification.
- C. Should Engineer consider that work is finally complete in accordance with requirements of Contract Documents, he shall request Contractor to make Project Closeout submittals.
- D. Should Engineer consider that work is not finally complete:
 - 1. He shall notify Contractor, in writing, stating reasons.
 - 2. Contractor shall take immediate steps to remedy the stated deficiencies, and send second written notice to Engineer certifying that work is complete.
 - 3. Engineer will review the work again.

1.04 FINAL CLEAN UP

The work will not be considered as completed and final payment made until all final clean up has been done by the Contractor in a manner satisfactory to the Engineer.

1.05 CLOSEOUT SUBMITTALS

- A. Project Record Documents: to requirements of Section 01720.
- B. Warranties and Bonds: to requirements of particular technical specifications and Section 01740.

1.06 FINAL APPLICATION FOR PAYMENT

Contractor shall submit final applications in accordance with requirements of the Contract.

END OF SECTION 01700

SECTION 01720 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.01 RELATED REQUIREMENTS

- A. Section 01300 - Submittals.

1.02 MAINTENANCE OF DOCUMENTS

- A. Maintain at job site, one copy of Contract Drawings, Specifications, Addenda, and Shop Drawings.
- B. Store documents in location, apart from documents used for construction.
- C. Maintain documents in clean, dry legible condition.
- D. Do not use record documents for construction purposes.
- E. Make documents available at all times for inspection by Engineer and HCWD1.

1.03 RECORDING

- A. Label each document "RECORD DRAWING" in 2-inch high printed letters.
- B. Keep record documents current.
- C. Do not permanently conceal any work until required information has been recorded.
- D. Contract Drawings: Legibly mark to record actual construction:
 - 1. Horizontal and vertical location of underground utilities and appurtenances referenced to permanent surface improvements.
 - 2. Location of internal utilities and appurtenances concealed in construction referenced to visible and accessible features of structure.
 - 3. Field changes of dimension and detail.
 - 4. Changes made by Change Order or Field Order.
 - 5. Details not on original Contract Drawings.
- E. Specifications and Addenda: Legibly mark up each Section to record:

1. Manufacturer, trade name, catalog number, and Supplier of each product and item of equipment actually installed.
2. Changes made by Change Order or Field Order.
3. Other matters not originally specified.

F. Shop Drawings: Maintain as record documents; legibly annotate Shop Drawings to record changes made after review.

1.04 SUBMITTAL

A. At completion of project, deliver:

1. Record drawings.
2. Spare parts, if necessary.
3. Operations and maintenance manuals.
4. Start-up reports of vendors, suppliers, subcontractors.
5. Release of Lien.

B. Prior to final payment, Contractor should deliver:

1. Request letter of certification and initiation of warranty period from Engineer.

C. Accompany submittal with transmittal letter, in duplicate, containing:

1. Date.
2. Project title and number.
3. Contractor's name and address.
4. Title and number of each record document.
5. Certification that each document as submitted is complete and accurate.
6. Signature of Contractor or his authorized representative.

END OF SECTION 01720

SECTION 02110 - SITE CLEARING

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Clear site within construction limits of trees and shrubs and other vegetation.
- B. Remove surface debris.

1.02 REGULATORY REQUIREMENTS

Conform to applicable local codes and ordinances for disposal of debris.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 EXISTING TREES AND OTHER VEGETATION

- A. The Contractor shall not cut or injure any trees or other vegetation outside right-of-way or easement lines and outside areas to be cleared, as indicated on the Drawings, without written permission from HCWD1. The Contractor shall be responsible for all damage done outside these lines.
- B. Trees shall be removed within permanent and temporary easement lines or right-of-way lines for the construction of water, sanitary sewer and storm lines and appurtenances.

3.02 CLEARING

- A. From areas to be cleared, the Contractor shall cut or otherwise remove all trees, brush, and other vegetable matter such as snags, bark and refuse. The ground shall be cleared to the width of the permanent easement or right-of-way unless otherwise directed by the Engineer.
- B. Except where clearing is done by uprooting with machinery, trees, stumps, and stubs to be cleared shall be cut as close to the ground surface as practicable, but no more than 6 inches above the ground surface for small trees and 12 inches for larger trees.

- C. Elm bark shall be either buried at least 1 foot deep or burned in suitable incinerators off site with satisfactory antipollution controls and fire prevention controls, to prevent the spread of Dutch Elm disease and as required by applicable laws.

3.03 GRUBBING

From areas to be grubbed, the Contractor shall remove completely all stumps, remove to a depth of 12 inches all roots larger than 3-inch diameter, and remove to a depth of 6 inches all roots larger than 1/2-inch diameter. Such depths shall be measured from the existing ground surface or the proposed finished grade, whichever is lower.

3.04 STRIPPING OF TOPSOIL

Prior to starting general excavation, strip topsoil to a depth of 6 inches or to depths required by the Engineer. Do not strip topsoil in a muddy condition and avoid mixture of subsoil. Stockpile the stripped topsoil within easement or right-of-way lines for use in finish grading and site restoration. Topsoil stockpiled shall be free from trash, brush, stones over 2 inches in diameter and other extraneous material.

3.05 PROTECTION

- A. Protect trees, shrubs and other plant growth if required by special provision of the easement as final landscaping.
- B. Protect bench marks and existing work from damage or displacement.
- C. Maintain designated site access for vehicle and pedestrian traffic.

3.06 REMOVAL

- A. All material resulting from clearing and grubbing and not scheduled for reuse shall become the property of the Contractor and shall be suitably disposed of off-site, unless otherwise directed by the Engineer, in accordance with all applicable laws, ordinances, rules and regulations.
- B. Such disposal shall be performed as soon as possible after removal of the material and shall not be left until the final period of cleaning up.

END OF SECTION 02110

SECTION 02150 - SHORING AND BRACING

PART 1 - GENERAL

1.01 SUMMARY

- A. Shoring and bracing of excavations shall be performed by the Contractor in compliance with Occupational Safety and Health Administration (OSHA) requirements and other applicable codes.
- B. Shore and brace sidewalls in excavations with steel sheet piles with wale systems or soldier piles with timber lagging and tie back system as required to protect existing buildings, utilities, roadways, and improvements.
- C. Maintain shoring and bracing during construction activities, and remove shoring and bracing if practical when construction and filling is complete.

1.02 SUBMITTALS

Provide copies of information on methods of the shoring and bracing system proposed for the work, design basis, calculations where applicable, and copies of shop drawings for inclusion in the project and job-site record files.

1.03 QUALITY ASSURANCE

- A. Comply with governing codes and regulations. Deliver, handle, and store materials in accordance with manufacturer's instructions.
- B. Shoring and bracing system design shall be prepared and sealed by a registered professional engineer or structural engineer. The system design shall provide the sequence and method of installation and removal. Shoring and bracing system design shall be in accordance with OSHA requirements 29 CFR Section 1926.652.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Steel Sheet Piles: Heavy-gauge steel sheet.

- B. Soldier Piles: Steel H-beams.
- C. Timber Lagging: Heavy timber. Pressure treated with wood preservative for use below water table for extended time period.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install in proper relation with adjacent construction. Coordinate with work of other sections.
- B. Locate shoring and bracing to avoid permanent construction. Anchor and brace to prevent collapse.

END OF SECTION 02150

SECTION 02221 - BLASTING

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. The Contractor shall excavate rock, if encountered, as required to perform the required work, and shall dispose of the excavated material, and shall furnish acceptable material for backfill in place of the excavated rock.
- B. In general, rock in pipe trenches shall be excavated so as to be not less than 9 inches from the pipe after it has been laid. The minimum trench width provided shall be 30 inches.
- C. All excavation including rock removal is considered unclassified and is not a separate pay item.
- D. Blasting is not allowed for work performed at the Fort Knox Military Base. Rock removal at Fort Knox shall be by mechanical means only.

1.02 REFERENCES

- A. NFPA 495 - Code for the Manufacture, Transportation, Storage and use of Explosive Materials.
- B. Commonwealth of Kentucky Department of Mines and Minerals, Laws and Regulations Governing Explosives and Blasting.

1.03 REGULATORY REQUIREMENTS

- A. Conform to Kentucky Department of Mines and Minerals code for explosive disintegration of rock.
- B. Obtain permits from local authorities having jurisdiction before explosives are brought to site or drilling is started.
- C. KRS 351.330
- D. 805 KAR Chapter 4

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Rock definition: Solid mineral material that cannot be removed with a power shovel.
- B. Explosives: Type recommended by explosives firm and required by authorities having jurisdiction.
- C. Delay devices: Type recommended by explosives firm and conforming to state regulations.
- D. Blasting mat materials: Type recommended by explosives firm and conforming to state regulations.

PART 3 - EXECUTION

3.01 EXPLOSIVES AT FORT KNOX

Explosives are not permitted for use at Fort Knox.

3.02 BLASTING PRECAUTIONS

- A. No explosives shall be used within 20 feet of:
 - 1. Building and/or structures existing, constructed or under construction.
 - 2. Underground and/or overhead utilities whether existing or partially constructed.
- B. Permission for any deviation from the restriction set forth above shall be secured from the Engineer, in writing; however, permission for any such deviations shall not relieve the Contractor from any responsibility in the event of damage to buildings, structures or utilities.
- C. All operations involving explosives shall be conducted with all possible care to avoid injury to persons and property. Blasting shall be done only with such quantities and strengths of explosives and in such a manner as will break the rock approximately to the intended lines and grades and yet will leave the rock not to be excavated in an unshattered condition. Care shall be taken to avoid excessive cracking of the rock upon or against which any structure will be built, and to prevent injury to existing pipes or other structures and property above or below ground. Rock shall be well covered with logs or mats, or both, where required. Sufficient warning shall be given to all persons in the vicinity of the Work before a charge is exploded.
- D. The Contractor shall be solely responsible for his blasting operations. The Contractor shall not hold HCWD1 and/or the Engineer liable for any damages resulting from his blasting operations on this project.

3.03 EXPLOSIVES GENERAL

- A. The Contractor shall keep explosives on the site only in such quantity as may be needed for the Work under way and only during such time as they are being used. He shall notify the Engineer, in advance, of his intention to store and use explosives. Explosives shall be stored in a secure manner and separate from all tools. Caps or detonators shall be safely stored at a point over 100 feet distance from the explosives. When the need for explosives has ended, all such materials remaining on the Work shall be promptly removed from the premises.
- B. The Contractor shall observe all state, federal and municipal laws, ordinances and regulations relating to the transportation, storage, handling and use of explosives. In the event that any of the above-mentioned laws, ordinances or regulations require a licensed blaster to perform or supervise the Work of blasting, said licensed blaster shall, at all times have his license on the Work and shall permit examination thereof by the Engineer or other officials having jurisdiction.

3.04 PREBLAST STRUCTURE SURVEY

- A. Perform a preblast survey to determine and document with pictures the condition of adjacent structures, utilities, wells, buried cables, and other features within a minimum of 400 ft. of the blast area unless otherwise required by applicable regulatory authorities. Determine safe distances to structures or other facilities according to NFPA 495, Appendix B. Where facilities are closer than these distances, and natural barriers are not present, or when the amount of explosive cannot be reduced economically, blasting mats shall be used. Provide mats to protect environmentally sensitive areas, trees within 20 feet from the blasting area, streams, and rock formations from throw rock.
- B. Purpose of survey is to document existing condition of structures prior to blasting, and is intended to be used as evidence in ascertaining whether and to what extent damage may have occurred as result of blasting.
- C. Conduct survey prior to start blasting.
- D. Record information for each structure surveyed:
 - 1. Age and type of construction.
 - 2. Location and character of cracks.
 - 3. Evidence of settlement and leakage.
 - 4. Other pertinent information.
- E. Record preblast survey information on forms prepared specifically for preblast surveys.
- F. Supplement written records with photographs or videotape recordings.

- G. Submit copies of written records and photographs or videotapes to respective property owner, as well as, OWNER and ENGINEER, prior to start of blasting.

3.05 BLAST DESIGN

- A. Design each blast to avoid damage to existing facilities, adjacent property, and completed Work. Consider effects of blast-induced vibrations and air blast, and fly rock potential in design of each blast.
- B. Whenever peak particle velocity exceeds vibration limits, change design of subsequent blasts, as necessary to reduce peak particle velocity to within limits established by BIC.
- C. Whenever air blast exceeds limits, change design of subsequent blasts or provide controls necessary to reduce air blast to within specified limits.

3.06 VIBRATION LIMITS

General: Establish appropriate maximum limit for vibration for each structure or facility that is adjacent to or near blast sites. Base maximum limits on expected sensitivity of each structure or facility to vibration, and federal, state, or local regulatory requirements, but not to exceed 1.25 in/sec.

3.07 AIR-BLAST LIMITS

Establish appropriate maximum limit for air blast for each structure or facility that is adjacent to or near blast sites. Base maximum limits on expected sensitivity of each structure or facility to air blast, and federal, state, or local regulatory requirements, but not to exceed 0.015 psi peak overpressure (133 decibels).

3.08 FLY ROCK CONTAINMENT

Where fly rock may damage existing facilities, adjacent property, or completed Work, cover area to be blasted with blasting mats or provide other means that will contain and prevent scattering of blast debris.

3.09 VIBRATION AND AIR-BLAST MONITORING

- A. Monitor and record blast-induced vibrations and air blast using suitable sensors and recording equipment for each blast.
- B. Contractor shall provide two (2) seismographs during blasting operations capable of the following:
 - 1. Designed for monitoring blast-induced vibrations and air blast. Capable of recording particle velocity in three mutually perpendicular directions in range from 0 to 6 inches per second.

2. Flat vibration frequency response between 4- and 200-Hz.
 3. Capable of recording air-blast overpressure up to 140 decibels.
 4. Flat air-blast frequency response between 2- and 500-Hz.
- C. Monitor on, or at, structures or other facilities that are closest to point of blasting. Monitoring more distant facilities that are expected to be sensitive to blast-induced vibrations and air blast.
- D. BIC shall supervise establishment of monitoring programs and initial operation of equipment; review interpretation of records and recommend revisions of blast designs.
- E. Include following information in blasting plan.
1. Vibration and air-blast limits as recommended by BIC.
 2. Name of qualified BIC who will be responsible for monitoring program and interpretation of records.
 3. Types and models of equipment proposed for monitoring.
 4. Numbers and locations of proposed monitoring stations.
 5. Procedures to be used for coordinating recording of each blast.
 6. Steps to be taken if blasting vibrations or air blast exceed limits.
- C. The CONTRACTOR shall be solely responsible for his blasting operations. The CONTRACTOR shall not hold HCWD1 and/or the ENGINEER liable for any damages resulting from his blasting operations on this project.

3.10 BLASTING RECORDS

- A. For each blast, document the following:
1. Location of blast in relation to Project stationing or state plane coordinate system and elevation.
 2. Date and times of loading and detonation of blast.
 3. Name of person in responsible charge of loading and firing.
 4. Details of blast design, as previously specified.
 5. Vibration records including location and distance of seismograph geophones to blast and to nearest structure, and measured peak particle velocity. Report peak particle velocity in units of inches per second.
 6. Air-blast records. Report peak air blast values in units of pounds per square inch overpressure above atmospheric or in decibels at linear response.
 7. Comments by BIC regarding damage to existing facilities, adjacent property, or completed Work, misfires, fly rock occurrences, unusual results, or unusual effects as required.

3.11 SUSPENSION OF BLASTING

- A. In event damage to existing facilities, adjacent property, or completed Work occurs due to blasting, immediately suspend blasting and report damage to ENGINEER and OWNER. CONTRACTOR shall be responsible for all costs of repairs or replacement due to damage from blasting.
- B. Before resuming blasting operations, adjust design of subsequent blasts, or take other appropriate measures to control effects of blasting, and submit complete description of proposed changes for reducing potential for future damage.
- C. Do not resume blasting until authorized by OWNER and applicable regulatory authorities.

3.12 ROCK REMOVAL - MECHANICAL METHOD

- A. Excavate and remove rock by the mechanical method. Drill holes and utilize mechanical impact to fracture rock.
- B. In utility trenches, excavate 6 inches below invert elevation of pipe and 9 inches from the pipe. A minimum trench width of 30 inches shall be provided.
- C. Stockpile excavated materials and reuse select materials for site landscaping. Remove and dispose of excess materials offsite at approved location.
- D. Correct unauthorized rock removal in accordance with backfilling and compacting requirements of Section 02220.

3.13 PAYMENT

Rock excavation shall be bid as unclassified and will **not** be paid for separately.

END OF SECTION 02221

SECTION 02225 - EXCAVATING, BACKFILLING, AND COMPACTING FOR UTILITIES

PART 1 - GENERAL

1.01 WORK INCLUDED

The Contractor shall make excavations in such widths and depths as will give suitable room for below grade vaults, pump stations, etc., laying pipe to the lines, grades and elevations, furnish, place and compact all backfill materials specified herein or denoted on the Drawings. The materials, equipment, labor, etc., required herein are to be considered as part of the requirements and costs for installing the various pipes, structures and other items they are incidental to.

1.02 RELATED WORK

- A. Section 02221 - Blasting.
- B. Section 02610 - Water Pipe and Fittings.
- C. Section 02731 - Gravity Sewers.
- D. Section 02732 - Force Mains.
- E. Standard Details **xxxx, xxxx and xxxx**

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Crushed stone material shall conform with the requirements of the applicable sections of the Kentucky Bureau of Highways Standard Specifications and shall consist of clean, hard, and durable particles or fragments, free from dirt, vegetation or objectionable materials.
- B. Two types of crushed stone material are used in this Section, No. 9 Aggregate and Dense Graded Aggregate (DGA).

PART 3 - EXECUTION

3.01 EXCAVATION OF TRENCHES

- A. Unless otherwise directed by the Engineer, trenches are to be excavated in open cuts.
 - 1. Where pipe is to be laid in gravel bedding or concrete cradle, the trench may be excavated by machinery to, or just below, the designated subgrade, provided that the material remaining at the bottom of the trench is no more than slightly disturbed and is suitable to support the installed pipe.
 - 2. Pipe shall never be laid directly on trench bottom.
- B. Trenches shall be sufficient width (minimum 30 inches) to provide working space on each side of the pipe and to permit proper backfilling around the pipe.
 - 1. The Contractor shall remove only as much of any existing pavement as is necessary for the prosecution of the Work. The pavement shall be cut without extra compensation to the Contractor, to prevent damage to the remaining road surface. Where pavement is removed in large pieces, it shall be disposed of before proceeding with the excavation.
- C. All excavated materials shall be placed a safe distance back from the edge of the trench.
- D. Unless specifically directed otherwise by the Engineer, not more than 500 feet of trench shall be opened ahead of the pipe laying work of any one crew, and not more than 500 feet of open ditch shall be left behind the pipe laying work of any one crew. Watchmen or barricades, lanterns and other such signs and signals as may be necessary to warn the public of the dangers in connection with open trenches, excavations and other obstructions, shall be provided by and at the expense of the Contractor. Temporary fencing will be required around any excavation in a residential area left unmonitored.
- E. When so required, or when directed by the Engineer, only one-half of street crossings and road crossings shall be excavated before placing temporary bridges over the side excavated, for the convenience of the traveling public. All backfilled ditches shall be maintained in such manner that they will offer no hazard to the passage of traffic. The convenience of the traveling public and the property owners abutting the improvements shall be taken into consideration. All public or private drives shall be promptly backfilled or bridged at the direction of the Engineer.

- F. Trench excavation shall include the removal of earth, rock, or other materials encountered in the excavating to the depth and extent shown or indicated on the Drawings.

3.02 WATER AND FORCE MAIN BEDDING

- A. Piping for water and force mains shall be supported as follows:
 - 1. The trench bottom for water and force main piping shall be excavated 6 inch below the pipe invert and bedded with a relatively smooth and free of frozen material, clodded dirt, foreign material and rock or granular material larger than 1/2 inch in diameter. When the trench is made through rock, the bottom shall be lowered to provide 6 inches of clearance around the pipe. No. 9 crushed stone bedding shall be used to bring the trench bottom to grade.
- B. After each pipe has been brought to grade, aligned, and placed in final position, earth material for water and force main piping in areas not subject to vehicular traffic and material for water and force mains in paved areas, shall be deposited and densified under the pipe haunches and on each side of the pipe up to the spring line of the pipe to prevent lateral displacement and hold the pipe in proper position during subsequent pipe jointing, bedding, and backfilling operations. Densified bedding material shall be mechanically tamped in 8-inch layers to obtain the maximum possible compaction as specified in Articles 3.08 and 3.09 herein.
- C. In wet, yielding and mucky locations where pipe is in danger of sinking below grade or floating out of grade or line, or where backfill materials are of such a fluid nature that such movements of pipe might take place during the placing of the backfill, the pipe must be weighted or secured permanently in place by such means as will prove effective.
- D. Where an unstable (i.e., water, mud, etc.) trench bottom is encountered, stabilization of the trench bottom is required. This is to be accomplished by undercutting the trench depth and replacing to grade with a foundation of crushed stone aggregate. It is the Contractor's responsibility to contact the Engineer when this is encountered.
- E. The depth of the foundation is dependent upon the severity of the trench bottom. The size of stone aggregate used in the foundation will be determined by the condition of the unstable material. Once the trench bottom has been stabilized, the required No. 9 crushed stone bedding material can be placed.

- F. It should be noted that no pipe shall be laid on solid or blasted rock.
- G. Pipe bedding as required in Paragraphs A, B, C, and D of this Section is **not** considered a separate pay item.

3.03 WATER AND FORCE MAIN BACKFILLING

A. Initial Backfill:

1. This backfill is defined as that material which is placed over the pipe from the spring line to a point 6 inches above the top of the pipe. For water main piping in areas not subject to vehicular traffic, initial backfill material shall be earth material free of rocks, acceptable to the Engineer or with No. 9 crushed stone when a condition exists mentioned in Paragraph A, 3. below. For water main piping in paved areas, initial and final backfill shall be No. 9 crushed stone material, full depth. Granular backfill material shall be mechanically tamped in approximately 8-inch layers to obtain maximum possible compaction as specified in Articles 3.08 and 3.09 herein.
2. Material used, whether earth or crushed stone material, in the initial backfilling is **not** a separate pay item. Payment for the material is included in the unit price per linear foot of water main.
3. In areas where large quantities of rock are excavated and the available excavated earth in the immediate vicinity is insufficient for placing the required amount of backfill over the top of the pipe as set forth in Paragraph A.1, the Contractor shall either haul in earth or order No. 9 crushed stone material for backfilling over the pipe. Neither the hauling nor placement of earth nor the ordering and placement of crushed stone material to fulfill the backfill requirements set forth herein is considered a separate pay item.

B. Final Backfill:

1. There are two cases where the method of final backfilling varies. The various cases and their trench situations are as follows:
 - a. Case I - Areas not subject to vehicular traffic.
 - b. Case II - Paved areas including streets, drives, parking areas, and sidewalks.
2. In all cases, walking or working on the completed pipelines, except as may be necessary in backfilling, will not be permitted until the trench has been backfilled to a point 6 inches above the top of the pipe. The method of final backfilling for each of the above cases is as follows:

- a. Case I - The trench shall be backfilled from a point 6 inches above the top of the pipe to a point 12 inches below the surface of the ground with earth material free from large rock (greater than 6 inches in the longest dimension), acceptable to the Engineer. The final backfill shall be mechanically tamped in approximately 18-inch layers to obtain maximum possible compaction as specified in Articles 3.08 and 3.09 herein. The remainder of the trench shall be backfilled with topsoil material free of any rocks.
- b. Case II - The trench shall be backfilled from a point 6 inches above the top of the pipe to pavement replacement subgrade with No. 9 crushed stone aggregate material. The backfill shall be mechanically tamped in approximately 18-inch layers to obtain the maximum possible compaction as specified in Articles 3.08 and 3.09 herein. The remaining backfill shall be as follows:
 - (1) For gravel surfaces – DGA material mechanically tamped to maximum possible compaction. The trench may be left with a slight mound if permitted by the Engineer.
 - (2) For bituminous and concrete surfaces - Bituminous and concrete pavement sections as detailed on the Drawings and as specified for Bituminous Pavement Replacement and Concrete Pavement Replacement.
3. Earth and crushed stone material used in final backfill is not a separate pay item. Payment shall be included in the price of water and force main.
4. DGA material used in final backfill for gravel surfaces shall be included in the unit price of the pipe. DGA material used as base for pavements shall be included in the unit price for pavement replacement.
- C. A sufficient amount of DGA material shall be stockpiled to insure immediate replacement by the Contractor of any settled areas. No extra payment will be made for the filling in of settled or washed areas by the Contractor.
- D. Excavated materials from trenches, in excess of quantity required for trench backfill, shall be disposed of by the Contractor. It shall be the responsibility of the Contractor to obtain location or permits for its disposal, unless specific waste areas have been designated on the Drawings or noted in these Specifications. The cost of disposal of excess excavated materials, as set forth herein, no additional compensation being allowed for hauling or overhaul.
- E. Spoil materials that are hauled off projects Fort Knox MUST be disposed of at the Fort Knox landfill.

3.04 GRAVITY SEWER BEDDING

- A. Piping for gravity sewers shall be supported as follows:
1. All gravity sewer piping shall be laid on a bed of granular material except when a concrete encasement situation occurs. All pipe bedding material shall be No. 9 crushed stone aggregate and shall be placed to a depth of 6 inches in an earth trench and 6 inches in a rock trench. Aggregate bedding shall be graded to provide for a uniform and continuous support beneath the pipe at all points.
- B. After each pipe has been brought to grade, aligned, and placed in final position, No. 9 crushed stone material shall be deposited and densified under the pipe haunches and on each side of the pipe up to the spring line of the pipe to prevent lateral displacement and hold the pipe in proper position during subsequent pipe jointing, bedding, and backfilling operations. Densified bedding material shall be mechanically tamped in approximately 8-inch layers to obtain maximum possible compaction as specified in Articles 3.08 and 3.09 herein.
- C. In wet, yielding and mucky locations where pipe is in danger of sinking below grade or floating out of grade or line, or where backfill materials are of such a fluid nature that such movements of pipe might take place during the placing of the backfill, the pipe must be weighted or secured permanently in place by such means as will prove effective. When this condition is encountered the Engineer must be contacted.
- D. Where an unstable (i.e., water, mud, etc.) trench bottom is encountered, stabilization of the trench bottom is required. This is to be accomplished by undercutting the trench depth and replacing to grade with a foundation of crushed stone aggregate. When this condition is encountered the Engineer must be contacted.
- E. The depth of the foundation is dependent upon the severity of the trench bottom. The size of stone aggregate used in the foundation will be determined by the condition of the unstable material. Once the trench bottom has been stabilized, the required No. 9 crushed stone bedding material can be placed.
- F. It should be noted that no pipe shall be laid on solid or blasted rock.
- G. Pipe bedding, as required in Paragraphs A, B, C, and D of this Section, is **not** considered a separate pay item.

3.05 GRAVITY SEWER BACKFILLING

A. Initial Backfill:

1. This backfill is defined as that material which is placed over the pipe from the spring line to a point 6 inches above the top of the pipe. For gravity sewer piping the material shall be No. 9 crushed stone aggregate material and mechanically tamped in approximately 8-inch layers to obtain maximum possible compaction as specified in Articles 3.08 and 3.09 herein. Uneven places in the backfill shall be leveled by hand.
2. Crushed stone material used in the initial backfilling is **not** a separate pay item. Payment for the material is included in the unit price per linear foot of gravity sewer.
3. Neither the hauling nor the placement of crushed stone material to fulfill the backfill requirements set forth herein is considered a separate pay item.

B. Final Backfill:

1. There are two cases where the method of final backfilling varies. The various cases and their trench situations are as follows:
 - a. Case I - Areas not subject to vehicular traffic.
 - b. Case II - Paved areas including streets, drives, parking areas, and sidewalks.
2. In all cases, walking or working on the completed pipelines, except as may be necessary in backfilling, will not be permitted until the trench has been backfilled to a point 6 inches above the top of the pipe. The method of final backfilling for each of the above cases is as follows:
 - a. Case I - The trench shall be backfilled from a point 6 inches above the top of the pipe to a point 12 inches below the surface of the ground with earth material free from large rock (greater than 6 inches in the longest dimension), acceptable to the Engineer. The final backfill shall be mechanically tamped in approximately 18-inch layers to obtain maximum possible compaction as specified in Articles 3.08 and 3.09 herein. The remainder of the trench shall be backfilled with topsoil material reasonably free of any rocks.
 - b. Case II - The trench shall be backfilled from a point 6 inches above the top of the pipe to pavement replacement subgrade with No. 9 crushed stone aggregate material. The backfill shall be mechanically tamped in approximately 18-inch layers to obtain maximum possible compaction as specified in Articles 3.08 and 3.09 herein. The remaining backfill shall be as follows:

- (1) For gravel surfaces – DGA material mechanically tamped to maximum possible compaction. The trench may be left with a slight mound if permitted by the Engineer.
 - (2) For bituminous and concrete surfaces - Bituminous and concrete pavement sections as detailed on the Drawings and as specified for Bituminous Pavement Replacement and Concrete Pavement Replacement.
3. Earth and crushed stone material used in final backfill is not a separate pay item. Payment shall be included in the price of gravity sewer and force main.
4. DGA material used in final backfill for gravel surfaces shall be included in the unit price for gravity sewer. DGA material used as base for pavement shall be included in the unit price for pavement replacement.
- C. A sufficient amount of DGA material shall be stockpiled to insure immediate replacement by the Contractor of any settled areas. No extra payment will be made for the filling in of settled or washed areas by the Contractor.
- D. Excavated materials from trenches, in excess of quantity required for trench backfill, shall be disposed of by the Contractor. It shall be the responsibility of the Contractor to obtain location or permits for its disposal, unless specific waste areas have been designated on the Drawings or noted in these Specifications. The cost of disposal of excess excavated materials, as set forth herein, no additional compensation being allowed for hauling or overhaul.

3.06 BEDDING AND BACKFILLING PROCEDURES

- A. Place all bedding in pipe trenches in horizontal layers not exceeding 8 inches in depth up to a point 6 inches or more above the top of the pipe and thoroughly compact each layer along the full trench width before the next layer is placed.
- B. Backfill shall be placed in horizontal loose lifts not exceeding 18 inches in thickness and shall be mixed and spread in a manner assuring uniform lift thickness after placing. Backfill shall then be compacted as specified in Article 3.09, Compaction, up to 8 inches from existing ground level in non-paved areas or pavement subgrade level in paved areas.
- C. Perform compaction of bedding and backfill with equipment suitable for the type of material placed and which is capable of providing the densities required. Contractor shall select compaction equipment and submit it and his proposed procedure to Engineer for approval.
- D. Bedding and backfill shall be compacted by at least two coverages of all portions of the surface of each lift by compaction equipment. One coverage is

defined as the condition obtained when all portions of the surface of the material have been subjected to the direct contact of the compactor.

- E. Test the effectiveness of the equipment selected by Contractor at the commencement of compaction by construction of a small section of trench bedding or backfill within the area where material is to be placed. If tests on this section show that the specified compaction is not obtained, Contractor shall increase the number of coverages, decrease the lift thickness or obtain a different type of compactor. No additional cost to Owner shall be incurred.

3.07 COMPACTION

A. Granular Material:

- 1. 85% relative density (ASTM D-4253 and D-4254).

B. Earth Material:

- 1. 90% standard proctor maximum dry density (ASTM D-698).

3.08 PLACEMENT OF IDENTIFICATION TAPE

- A. Detectable underground marking tape shall be placed over all utility lines. Care shall be taken to insure that the buried marking tape is not broken when installed and shall be Lineguard brand encased aluminum foil, Type III, or approved equal.
- B. The identification tape shall bear the printed identification of the utility line below it, such as "Caution - Buried Below". Tape shall be reverse printed; surface printing will not be acceptable. The tape shall be visible in all types and colors of soil and provide maximum color contrast to the soil. The tape shall meet the APWA color code, and shall be 2 inches in width. Colors are: yellow - gas, green - sewer, red - electric, blue - water, orange - telephone, brown - force main.
- C. The identification tape shall be the last equipment installed in the trench so as to be first out. The tape shall be buried 4 to 6 inches below top of grade. After trench backfilling, the tape shall be placed in the backfill and allowed to settle into place with the backfill. The tape may be plowed in after final settlement, installed with a tool during the trench backfilling process, unrolled before final restoration or installed in any other way acceptable to HCWD1 or Engineer.

3.09 PLACEMENT OF LOCATION WIRE

- A. Detectable underground location wire shall be placed above all non-metallic water mains and force mains. Care shall be taken to insure that the buried wire is not broken. The location wire shall be taped to the pipeline every 5 feet.
- B. The location wire shall be #12 AWG solid copper-coated steel wire.
- C. The location wire shall be continuous from valve box to valve box and shall be terminated (unconnected) with a wire nut and enough loose wire to extend 24 inches outside the valve box.

END OF SECTION 02225

SECTION 02228 DIRECTIONAL BORING

PART 1 - GENERAL

1.01 WORK INCLUDED

{Specifier fill in diameter and DR ratio based on specific project}

The work specified in this section consists of furnishing and installing a XX-inch HDPE (DR XX) pipe using the directional boring (horizontal directional drilling, HDD) method of installation. This work shall include water and sewer force mains, services, equipment, materials, and labor for the complete and proper installation, testing, and environmental protection and restoration.

1.02 QUALITY ASSURANCE

The requirements set forth in this document specify a wide range of procedural precautions necessary to ensure that the very basic, essential aspects of a proper directional bore installation are adequately controlled. Strict adherence shall be required under specifically covered conditions outlined in this specification. Adherence to the specifications contained herein, or the Engineer's approval of any aspect of any directional bore operation covered by this specification, shall in no way relieve the Contractor of their ultimate responsibility for the satisfactory completion of the work authorized under the Contract.

1.03 SUBMITTALS

- A. Drill Work Plan: Prior to beginning work, the Contractor must submit to the Engineer and Owner a Drill Work Plan outlining the procedure and schedule to be used to execute the project. The plan shall include, but not limited to, the following items:
1. The location of each entry and exit points and pipe layout areas.
 2. Proposed depth of cover (minimum 42 inches).
 3. Proposed composition of drilling fluid, viscosity, and density.
 4. Proposed drilling fluid pumping capacity, pressure, and flowrate.
 5. Type of tracking method/system.
 6. Diameter of pilot hole, and number and size of pre-ream/backreams.
 7. Crew experience.
- B. Equipment: Contractor shall submit specifications on directional drilling equipment to be used to ensure that the equipment will be adequate to complete the project.

- C. Material: Specifications on material to be used shall be submitted to Engineer. Material shall include the pipe, fittings and any other item which is to be an installed component of the project.

PART 2 - EQUIPMENT AND MATERIALS

2.01 EQUIPMENT GENERAL

The directional drilling equipment shall consist of a directional drilling rig of sufficient capacity to perform the bore and pullback the pipe, a drilling fluid mixing & delivery system of sufficient capacity to successfully complete the trenchless installation, a guidance system to accurately guide boring operations and trained and competent personnel to operate the system. All equipment shall be in good, safe operating condition with sufficient supplies, materials and spare parts on hand to maintain the system in good working order for the duration of this project.

2.02 BORING SYSTEM

- A. Directional Bore Machine: The directional boring machine shall consist of a hydraulically powered system to rotate, push and pull hollow drill pipe into the ground at a variable angle while delivering a pressurized fluid mixture to a guidable bore head. The machine shall be anchored to the ground to withstand the pulling, pushing and rotating pressure required to complete the crossing. The hydraulic power system shall be self-contained with sufficient pressure and volume to power drilling operations. Hydraulic system shall be free of leaks. Rig shall have a system to monitor and record maximum pull-back pressure during pull-back operations. The rig shall be grounded during drilling and pull-back operations.
- B. Bore Head: The bore head shall be steerable by changing it's rotation and shall provide the necessary cutting surfaces and drilling fluid jets.
- C. Mud Motors (if required): Mud motors shall be of adequate power to turn the required boring tools.
- D. Drill Pipe: Shall be constructed of high quality 4130 seamless tubing, grade D or better, with threaded box and pins. Tool joints should be hardened to 32-36 RC.

2.03 GUIDANCE SYSTEM

The Guidance System shall be of a proven type and shall be set up and operated by personnel trained and experienced with this system. If using a magnetic system, the operator shall be aware of any magnetic anomalies and shall consider such influences in the operation of the guidance system.

2.04 DRILLING FLUID (MUD) SYSTEM

- A. **Mixing System:** A self-contained, closed, drilling fluid mixing system shall be of sufficient size to mix and deliver drilling fluid composed of bentonite clay, potable water and appropriate additives. Mixing system shall be able to molecularly shear individual bentonite particles from the dry powder to avoid clumping and ensure thorough mixing. The drilling fluid reservoir tank shall be a minimum of 1000 gallons. Mixing system shall continually agitate the drilling fluid during drilling operations.
- B. **Drilling Fluids:** Drilling fluid shall be composed of clean water and an appropriate additive. Water shall be from a clean source with a pH of 8.5 - 10. Water of a lower pH or with excessive calcium shall be treated with the appropriate amount of sodium carbonate or equal. The water and additives shall be mixed thoroughly and be absent of any clumps or clods. No hazardous additives may be used. Drilling fluid shall be maintained at a viscosity sufficient to suspend cuttings and maintain the integrity of bore wall.
- C. **Delivery System:** Drilling mud pressure in the borehole should not exceed that which can be supported by the overburden to prevent heaving or a hydraulic fracturing of the soil. The delivery system shall have filters in-line to prevent solids from being pumped into the drill pipe. Connections between the pump and drill pipe shall be relatively leak-free. Used drilling fluid and drilling fluid spilled during drilling operations shall be contained and properly disposed of.

2.05 OTHER EQUIPMENT

- A. **Pipe Rollers:** Pipe rollers, if required, shall be of sufficient size to fully support the weight of the pipe while being hydro-tested and during pull-back operations. Sufficient number of rollers shall used to prevent excess sagging of pipe.
- B. **Pipe Rammers:** Hydraulic or pneumatic pipe rammers may only be used if necessary and with the authorization of Engineer.

- C. Restrictions: Other devices or utility placement systems for providing horizontal thrust other than those previously defined in the preceding sections shall not be used unless approved by the Engineer prior to commencement of the work. Consideration for approval will be made on an individual basis for each specified location. The proposed device or system will be evaluated prior to approval or rejection on its potential ability to complete the utility placement satisfactorily without undue stoppage and to maintain line and grade within the tolerances prescribed by the particular conditions of the project.

2.06 PIPE MATERIAL AND FITTINGS

- A. Polyethylene pipe and fittings shall be made from virgin resins exhibiting a cell classification of 345464C as defined by ASTM D3350 with an established hydrostatic design basis of 1600 psi for water at 73.4 degrees F. The resin shall have a material designation of PE 3408 and shall be listed by the Plastics Pipe Institute (PPI) in the name of the manufacturer. Pipe shall meet the requirements of AWWA C906 and NSF for polyethylene (PE) pressure pipe. Pipe color shall be blue, black with blue stripes or have a thin blue shell for identification as water main.
- B. The pipe supplied under this specification shall have a pressure class of 200 psi and nominal ductile iron pipe size (DIPS) outside diameter (Driscopipe Prisma 4000 Series or Equivalent), and have a minimum dimension ratio (DR) of 9.
- C. Fittings and valves shown on the plans related to the balance of the system piping shall supplied by the Contractor.

2.07 OTHER MISCELLANEOUS MATERIALS

- A. Special adapters, couplings, saddles and restraint systems to connect HDPE pipe with the balance of the system piping shall be furnished and installed by the Directional Boring System Operator.
- B. Stainless steel wire (1/8" thick) shall be attached to the HDPE pipe during pull back, to function as a tracer wire.

PART 3 EXECUTION

3.01 PERSONNEL REQUIREMENTS

All personnel shall be fully trained in their respective duties as part of the directional drilling crew and in safety.

3.02 DRILLING PROCEDURE

- A. Site Preparation: Prior to any alterations to work-site, contractor shall photograph or video tape entire work area, including entry and exit points.
- B. Safety: Contractor shall adhere to all applicable state, federal and local safety regulations and all operations shall be conducted in a safe manner. Safety meetings shall be conducted at least weekly with a written record of attendance and topic submitted to Engineer.
- C. Pipe: Pipe shall be welded/fused together in one length, if space permits. Pipe will be placed on pipe rollers before pulling into bore hole with rollers spaced close enough to prevent excessive sagging of pipe.
- D. Pilot Hole: Pilot hole shall be drilled on bore path with no deviations greater than 5% of depth over a length of 100'. In the event that pilot does deviate from bore path more than 5% of depth in 100', contractor will notify Engineer and Engineer may require contractor to pull-back and re-drill from the location along bore path before the deviation. In the event that a drilling fluid fracture, inadvertent returns or returns loss occurs during pilot hole drilling operations, contractor shall cease drilling, wait at least 30 minutes, inject a quantity of drilling fluid with a viscosity exceeding 120 seconds as measured by a March funnel and then wait another 30 minutes. If mud fracture or returns loss continues, contractor will cease operations and notify Engineer. Engineer and contractor will discuss additional options and work will then proceed accordingly.
- E. Reaming: Upon successful completion of pilot hole, contractor will ream bore hole to a minimum of 25% greater than outside diameter of pipe using the appropriate tools. Contractor will not attempt to ream at one time more than the drilling equipment and mud system are designed to safely handle.
- F. Pull-Back: After successfully reaming bore hole to the required diameter, contractor will pull the pipe through the bore hole. In front of the pipe will be a swivel. Once pull-back operations have commenced, operations must continue without interruption until pipe is completely pulled into bore hole. During pull-back operations contractor will not apply more than the maximum safe pipe pull pressure at any time. In the event that pipe becomes stuck, contractor will cease pulling operations to allow any potential hydro-lock to subside and will commence pulling operations. If pipe remains stuck, contractor will notify Engineer. Engineer and contractor will discuss options and then work will proceed accordingly.

3.03 PIPE TESTING

- A. Filling and cleaning of the main shall be accomplished in accordance with Section 02610, Water Pipe and Fittings. Disinfection of water mains shall be accomplished in accordance with Section 02675, Disinfection of Potable Water Pipe.
- B. Pressure testing of the HDPE main will be required. The hydrostatic test shall be performed in accordance with Alternate 2, Hydrostatic Leak Testing as outlined in Technical Note 802 - Leak Testing, which is attached as a supplement. The ends of the pipe shall be sealed or otherwise blocked to prevent leakage during the test.
 - 1. For purposes of this hydrostatic test, the maximum allowable test pressure shall be determined by the Engineer in compliance with the technical note.
 - 2. The pressure test shall consist of an initial pressurization phase, a three-hour initial expansion phase, and a hydrostatic test consisting of one to three hours. During the performance of the pressure test, measurements of the pipe diameter shall be recorded immediately before and after the application of the specified test pressure.

3.04 SITE RESTORATION

Following drilling operations, contractor will demobilize equipment and restore the worksite to original condition. All excavations will be backfilled and compacted to 95% of original density.

3.05 RECORD KEEPING

- A. Record Drawings shall be furnished in accordance with Section 01720, Project Record Documents.

END OF SECTION 02228

SECTION 02505 - CRUSHED STONE PAVEMENT

PART 1 - GENERAL

1.01 WORK INCLUDED

Crushed stone pavement, compacted.

1.02 REFERENCES

ASTM C33 - Aggregate for Concrete.

1.03 TESTS

Gradation of stone materials shall be performed in accordance with ASTM C33.

PART 2 - PRODUCTS

2.01 MATERIALS

Crushed stone shall conform to ASTM C33, Type No. 57, Type No. 2, and No. 610.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Subgrade soils shall be compacted to at least 95 percent of standard Proctor maximum dry density. Verify compacted subgrade.
- B. Minimum slope of subgrade and pavement surface shall be one-quarter inch per foot to promote surface drainage. Verify that gradients and elevations of base are correct.

3.02 PAVEMENT THICKNESS

- A. Pavement thickness shall be provided as called for on the Drawings from the Engineer.

- B. The minimum pavement thickness provided shall be: 6 inches No. 3 stone and 6 inches DGA.
- C. Place stone in 6-inch layers and compact and level surfaces to elevations and gradients indicated.
- D. Add small quantities of sand to stone mix as appropriate to assist compaction.
- E. Add water to assist compaction. With an excess water condition, rework topping and aerate to reduce moisture content.

END OF SECTION 02505

SECTION 02510 - BITUMINOUS PAVEMENT

PART 1 - GENERAL

1.01 SUMMARY

- A. Provide bituminous pavement for following applications, with prepared subbase and compacted base.
 - 1. Roads.
 - 2. Parking areas.
 - 3. Driveways.
 - 4. Walkways.
 - 5. Curbs.
- B. Provide striping for parking, roadway, and handicapped markings.

1.02 SUBMITTALS

Submit for approval product data, test reports.

1.03 REGULATORY AGENCIES

Comply with encroachment or road cut permits, governing codes and regulations of the agency having jurisdiction over the roadways impacted by the Project. Agencies may include:

- A. Hardin County Roads Department
- B. City of Radcliff Public Works Department
- C. Kentucky Transportation Cabinet - Department of Highways, Elizabethtown District
- D. Fort Knox Directorate of Public Works

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Prime coat: Cut-back asphalt.
- B. Tack coat: Emulsified asphalt.
- C. Asphaltic cement: AASHTO M226 and as required by local authorities.
- D. Aggregate: Crushed stone or crushed gravel.

- E. Traffic paint: Quick-drying chlorinated-rubber alkyd type, color as approved.
- F. Wheel-stops: Precast concrete of uniform color and texture with steel stakes.

PART 3 - EXECUTION

3.01 CHOOSE APPROPRIATE TITLE:

NEW PAVEMENT INSTALLATION

OR:

FULL WIDTH PAVEMENT REPLACEMENT

OR:

TRENCH WIDTH PAVEMENT REPLACEMENT

OR:

FULL WIDTH PAVEMENT OVERLAY

- A. Asphalt/aggregate Mixture: Comply with local agency Standard Specifications. Class as required by loading and use.
- B. Remove loose material from compacted subbase or existing pavement. Proof roll and check for areas requiring additional compaction. Beginning of work means acceptance of compacted subbase or condition of existing pavement and subbase.
- C. Apply prime coat to prepared surface. Apply tack coat to previous laid work and adjacent in-place concrete surfaces.
- D. Place bituminous concrete at minimum temperature of 225 degrees F in strips not less than 10' wide overlapping joints in previous courses. Complete entire base course thickness before beginning surface course.
- E. Construct curbs, where required, to dimensions indicated or if not indicated to standard shapes. Provide tack coat between curb and pavement.
- F. Begin rolling when pavement can withstand weight of roller. Roll while still hot to obtain maximum density and to eliminate roller marks.

- G. Provide 4" lane and striping paint in uniform, straight lines. Provide wheelstops where indicated and securely dowel into pavement. Protect work from traffic and damage.
- H. Test in-place asphalt work for thickness and smoothness. Remove and replace defective work and patch to eliminate evidence of patching. Provide the following minimum thickness and smoothness unless otherwise greater thickness is required on the Drawings: {Specifier provide pavement design thicknesses}
1. Subbase course: ____-inch No. 2 stone and ____-inch DGA.
 2. Base course: ____-inch.
 3. Surface course: ____-inch plus or minus 1/4-inch at drives and parking; ____-inch plus or minus 1/4-inch at walks.
 4. Surface course smoothness: Plus or minus 1/8-inch in 10 feet. No ponding of water is acceptable.

[For New Pavement Installation or Full Width Pavement Replacement, include the following paragraph.]

- H. Thickness of bituminous surface and base shall be determined by coring of the newly constructed pavement in accordance with Kentucky Method 64-420-04, Paragraphs 1.2, 1.3, 2, and 3, with the following exceptions:
1. Coring frequency shall be 500 feet.
 2. Exploratory cores for a deficiency shall be spaced at 100 foot intervals.
 3. Excess thickness will be considered as included in the Contract price per unit.
 4. Deficient thickness between 1/2-inch and 3/4-inch will require a deduction from the unit price in the proportion of the actual thickness to the design thickness for the area of the deficiency as determined in accordance with the stipulated method. Deficient thickness of greater than 3/4-inch will require an additional 1-inch layer of surface to be overlaid over the area of the deficiency.

3.02 TRENCH WIDTH PAVEMENT REPLACEMENT

- A. Sections of pavement shall be replaced as required to install the pipelines. Disturbed pavement shall be reconstructed to original lines and grades with bituminous binder as detailed on the Drawings and in such manner as to leave all such surfaces in fully as good or better condition than that which existed prior to these operations.
- B. Prior to trenching, the pavement shall be scored or cut to straight edges along each side of the proposed trench to avoid unnecessary damage to the

remainder of the paving. Edges of the existing pavement shall be recut and trimmed as necessary to square, straight edges after the pipe has been installed and prior to placement of the binder course or concrete.

- C. Backfilling of trenches shall be in accordance with the applicable portions of Section 02225.
- D. Bituminous base or bituminous surface shall be one course construction of an appropriate base or surface JMF prepared and installed in accordance with the requirements of the Kentucky Department of Highways.
 - 1. Placement and compaction of binder course shall be in accordance with Section 403 of the Kentucky Department of Highways Standard Specifications. Minimum thickness after compaction shall be as detailed on the Drawings.
- E. Concrete base, as detailed on the Drawings, shall be 4,000 psi conforming to the applicable requirements of Division 3.
- F. Bituminous pavement replacement is a separate pay item.

END OF SECTION 02510

SECTION 02512 - PAVEMENTS, WALKS, AND CURBS

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. This Section includes all labor, materials, equipment and related items required to complete the work of pavements, walks, and curbs shown on the Drawings and specified herein.
- B. This Section does not include the following related items:
 - 1. Clearing and grubbing.
 - 2. Earthwork, including establishing of subgrades for pavements, walks, and curbs.
 - 3. Storm drainage and utilities.
 - 4. Concrete work in connection with storm drainage.

1.02 COORDINATION

Coordinate carefully the Work specified in this Section with storm drainage and utility installations specified under other Sections of these Specifications. Notify the Engineer promptly of any conflict between work of this Section and that of other trades.

1.03 STATE SPECIFICATIONS

Where the words "State Specifications" are used herein, they shall be understood to refer to the Standard Specifications of the Kentucky Department of Highways. Reference to State Specifications is solely for the purpose of specifying kind and quality of materials and methods of construction. Where, in such specifications, the word "Engineer" or the title of any other State Official or employee appears, it shall for the purpose just stated and be understood to mean the duly authorized representative of HCWD1.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

3.01 SUBGRADES FOR PAVEMENTS, WALKS, AND CURBS

- A. Grading. Do any necessary grading in addition to that performed in accordance with Section 02225 to bring subgrades after final compaction to the required grades and sections for pavements and curbs.
- B. Preparation of Subgrades. Loosen exceptionally hard spots and recompact. Remove spongy and otherwise unsuitable material and replace it with stable material. Fill and tamp traces of storm drain trenches.
- C. Compaction of Subgrade. Compact the subgrades of all surface areas with appropriate compacting equipment or by other means to such degree as will ensure against settlement of the superimposed work.
- D. Checking Subgrade. Maintain all subgrade in satisfactory condition, protected against traffic and properly drained until the surface improvements are placed. Immediately in advance of concreting, check subgrade levels with templates riding the forms, correct irregularities and compact thoroughly any added fill material. On areas to receive concrete pavement, place grade stakes spaced sufficiently to afford facility for checking subgrade levels. Correct irregularities, compacting thoroughly any fill material.
- E. Drainage Structures. Check for correct elevation and position all manhole covers, grates, and similar structures located within areas to be paved and make, or have made, any necessary adjustments in such structures.

3.02 CONCRETE WORK

- A. General. Concrete and concrete materials for work of this Section shall conform to applicable requirements of Section 03300, and, in addition the following:
 - 1. Concrete used in all work of this Section shall be Class A and shall have a minimum 28-day allowable compressive strength of 4,000 pounds per square inch, shall contain not less than six (6) sacks of cement per cubic yard, and shall be an air entrained type, with 4 percent to 6 percent total air content, by use of an approved air entraining agent as specified under Section 03300.
- B. Requirements for forms, reinforcement, mixing, placing, finishing and curing shall be generally as specified for other concrete work under Section 03300, as modified hereinafter under particular item specification.

3.03 CONCRETE CURBS

- A. General. Concrete curb and gutter and header curb shall be constructed in accordance with State Specifications at locations shown and to details shown on the Drawings. Curved forms shall be used where curbs are curved to a radius of 100 feet or less.
 - 1. The Contractor may, at his option, install extruded section curb and gutter and header curb. If used, the section, equipment, jointing provisions, etc., shall be reviewed by the Engineer and approved prior to installation.
- B. Contraction Joints. Construct concrete curbs in sections 6 to 10 feet long by use of 1/8-inch steel division plates. Such plates shall be of size and shape conforming to cross sections of the concrete and shall not be bent or otherwise deformed.
- C. Expansion Joints. Provide expansion joints with premolded filler cut to shape of cross section as follows: (1) at ends of all the returns, (2) at not more than 50 feet intervals. Expansion joints shall be at least 1/2-inch wide, and if adjoining pavement is concrete, of the same width and at same locations as expansion joints in the pavement.
- D. Finish. Tamp and screed concrete as soon as placed. Remove division plates and face forms as soon as practicable; fill any honeycombed places with 1:2 mortar and give exposed surfaces a smooth, wood-float finish without plastering. Finish square corners to 1/4-inch radius and other corners to radius shown.
- E. Height. Curb height shall be as detailed on the Drawings. Transition height at handicap ramp locations to meet level of drive and walk pavement.
- F. Protection. Remove no forms (except face forms) for 24 hours after placing concrete. Barricade against vehicular traffic 14 days and against pedestrian for 3 days. Compact thoroughly the backfill behind the curb.

3.04 CONCRETE WALKS AND PAVING

- A. General. Walks in City streets or in streets to be dedicated shall be constructed in accordance with the local agency having jurisdiction over the roadway impacted or in the absence of same, in accordance with the following specifications for all other concrete walks.
- B. Concrete walks shall be one course construction, reinforced concrete nominally 5-inches thick, but in no case less than 4-inches actual thickness, of

widths shown on the Drawings. Edges of walks shall be formed adequately and braced to maintain alignment. Use flexible or curved forms for all curves in walks.

1. Provide integral turn-down at walk edges where abutting bituminous paving as detailed.
 2. Slopes. Provide grade stakes not more than 25 feet apart for all walk construction. Check tops of forms for grade before placing concrete. Introduce short vertical curves in all walks as shown on the Drawings, or at points where change in walk grade exceeds 2%. For a distance of 2 feet from top and bottom of steps, walk slopes shall not exceed 2 inch per foot. Provide 1/4 inch per foot cross slope in the direction of natural drainage, and make slight adjustments in slopes at walk intersections as necessary or directed to provide proper drainage.
 3. Finish. Tamp and screed the concrete true to grade and section bringing sufficient mortar to the surface for finishing and give a wood or carpet-float finish, providing that where the walk grade exceeds 5%, the surface shall be given a belted or broomed finish as directed by the Engineer. Round all edges, including those along expansion joints and scored joints to a 1/4 inch radius. Where walks terminate at curbs, finish the walk 1/4 inch above the curb providing a neat bevel.
 4. Expansion Joints. Provide 2 inch transverse expansion joints with premolded filler not more than 50 feet apart, also at walk junctions and intersections, at top and bottom of steps and where walks abut curb returns, buildings, platforms, or other fixed structures, or terminate at curbs. Such expansion joints are not required (except for curb returns) between walks and contiguous parallel curbs. At walk junctions and intersections, the required expansion joints shall be located at the end of each rounding or fillet. Expansion joints shall be at right angles to the slab and extend the full depth thereof; the premolded filler shall extend to within 1/4 inch of the walk surface. Locate expansion joints in all walks as nearly as practicable opposite those in abutting curbs.
 5. Scored Joints. Between expansion joints, cut grooves 1/8 inch to 1/4 inch wide, at least 3/4 inch deep, and with a spacing approximately equal to the walk width but not greater than 6 feet on centers.
- C. Handicap Ramp. Provide ramped sections for handicapped access where shown and as detailed. Ramp surface shall be given a uniform medium broomed finish at right angles to ramp pitch. Install tactile warning strip of width shown in Cobble II pattern as manufactured by Paverlock, Inc., of Cincinnati, Ohio.
- D. Other concrete paving at exterior areas shall conform to requirements shown on the Drawings.

1. Provide reinforced concrete entrance area paving at Auditorium Building where shown. Thickness and dimensions shall be as detailed. Surface shall match grade of adjacent existing paving and finish spot grades as shown on the Drawings. The pad shall be given a uniformly textured finish to match existing paving.

E. Protection. Remove no forms for 24 hours after pouring concrete. Protect concrete walks and paving from pedestrian traffic for a period of 3 days after pouring, and against vehicular traffic for a period of 14 days.

3.05 CONCRETE STEPS

A. Concrete steps shall be constructed under work of this Section where shown and as detailed on the Drawings. Verify elevations at top and bottom landings prior to laying out formwork, excavation or preparation of subgrade.

B. Excavation and Preparation of Subgrade. Excavate for corner posts to dimensions shown, and trim subgrade of concrete to required shape and slope. Footing excavations and subgrades shall be in a firm, moist condition, prior to placing any concrete, clean and free from loose material.

C. Build forms to details shown on the Drawings, and so as to permit their removal without damage to the concrete. Place reinforcement as detailed, properly supported to maintain it in position during placing of concrete.

D. Finish. Place concrete, and thoroughly compact it in the forms by means of spading, rodding, tamping or vibrating so as to thoroughly work into all corners and around reinforcement. All treads shall be pitched as detailed to drain, and shall be given a uniformly textured wood or carpet float finish. Exposed edges of treads shall be rounded smoothly to 2-inch radius. Remove face forms as soon as practicable, patch any surface voids with 1:2 mortar to match color of concrete, and rub with carborundum stone and water to a uniformly textured finish. Plastering of concrete surfaces will not be permitted.

E. Protection. Do not open steps for use for seven days after concrete is placed.

3.06 BITUMINOUS PAVING

A. General. All roadway and parking area pavement designated as bituminous shall consist of a crushed stone and dense graded aggregate base, and bituminous surface course. Refer to the Drawings for thickness of base, and surfacing, and total paving thickness.

B. Subgrades shall be in accordance with applicable provisions of State

Specifications. The subgrades shall be shaped to conform to the lines, grades, and cross sections indicated on the Drawings. All high areas shall be removed and all low areas shall be filled with approved material and compacted. Areas of yielding or unstable material shall be excavated and backfilled with approved material as directed by the Engineer. Compaction shall be to a uniform density throughout.

C. Bituminous Surface

1. Surfacing shall be one-course bituminous concrete construction and in accordance with applicable provisions of the Kentucky Department of Highways Standard Specifications, Section 402. The surface course shall contain no aggregate larger than 2-inch. The surface mixture shall contain natural sand in the proportions of no less than 25 percent of the total combined fine and course aggregates.
2. Surface course shall be of minimum thickness after compaction as shown on the Drawings.
3. Thickness of bituminous surface and base shall be determined by coring of the newly constructed pavement in accordance with Kentucky Method 64-420-04, Paragraphs 1.2, 1.3, 2, and 3, with the following exceptions:
 - a. Coring frequency shall be 500 feet.
 - b. Exploratory cores for a deficiency shall be spaced at 100 foot intervals.
 - c. Excess thickness will be considered as included in the Contract price per square yard.
 - d. Deficient thickness between 1/2-inch and 3/4-inch will require a deduction from the unit price per square yard in the proportion of the actual thickness to the design thickness for the area of the deficiency as determined in accordance with the stipulated method. Deficient thickness of greater than 3/4-inch will require an additional 1-inch layer of surface to be overlaid over the area of the deficiency.

D. Dense Graded Aggregate Base

1. Dense graded aggregate base shall be one-course construction and shall conform to the applicable provisions of the Kentucky Department of Highways Standard Specifications, Section 303. The base shall consist of graded aggregate no larger than 1 inch and water sufficient to provide the mixture with a satisfactory moisture content for compaction to a density of not less than 84 percent of the solid volume.
2. Dense graded aggregate base shall be of minimum thickness after compaction as shown on the Drawings.

E. Crushed Stone Base

1. Crushed stone base shall be one-course construction of No. 2 aggregate and shall conform to the applicable provisions of the Kentucky Department of Highways Standard Specifications, Section 302 for Gravel Base Type 1. The crushed stone shall consist of graded aggregate no larger than 3 inches and compacted to a minimum thickness as shown on the Drawings.
- F. A cut-back asphalt emulsion primer shall be applied to the dense graded aggregate base course prior to placing the bituminous surface course. Primer-L shall conform to the applicable provisions of the Kentucky Department of Highways Standard Specifications, Section 407 for materials and application.
- G. Compact the subgrade of all pavement areas and place and compact crushed stone base, dense graded aggregate base, and bituminous surface course in conformance with applicable sections of the Kentucky Department of Highways Standard Specifications to the lines, grades and cross-sections shown on the Drawings.
- H. Signing: Construct signs for traffic control in areas as shown on the Drawings in accordance with the MUTCD, latest edition.
- I. Striping: Lay off and stripe parking areas and service road as indicated on the Drawings and in accordance with the MUTCD, latest edition. Provide cross-hatching, stop bars, and centerline stripes for roadway to limits shown on the Drawings. Cross-hatching and stripes shall be approximately 4 inches wide, stop bars shall be 24-inches wide, of lengths indicated. Paint materials shall be as recommended in State Specifications. Color shall be white.
1. Provide painted lettering for "Stop" in location shown on the Drawings. Color shall be white and material shall be as specified above.
 2. Paint face and top of curbs in locations shown on the Drawings. Color shall be yellow and material shall be as specified above.

END OF SECTION 02512

SECTION 02605 - VALVE AND METER VAULTS

PART 1 - GENERAL

1.01 WORK INCLUDED

The Contractor shall provide all materials and labor to install a valve and meter vaults as shown on the Drawings and specified herein.

1.02 RELATED WORK

- A. Section 02225 - Excavating, Backfilling, and Compacting for Utilities.
- B. Section 02610 - Water Pipe and Fittings.
- C. Section 02640 - Water Valves and Gates.

PART 2 - PRODUCTS

2.01 VALVE VAULT AT CREEK CROSSING

- A. Concrete Manholes - General:
 - 1. Manholes shall conform in shape, size, dimensions, materials, and other respects to the details indicated on the Drawings or bound in the Specifications.
 - 2. All concrete manholes shall have precast reinforced concrete developed bases. No other type of base will be allowed.
 - 3. The concrete manhole walls (barrels and cones) shall be precast concrete sections. The top of the cone shall be built of reinforced concrete adjustment rings to permit adjustment of the frame to meet the finished surface. Minimum strength of the concrete for the precast sections shall be 4,000 psi at the time of shipment.
 - 4. For concrete manholes, the cast-iron frames and covers shall be the standard frame and cover as indicated on the Drawings and specified hereinafter in this Section.
- B. Precast Concrete Sections:
 - 1. Precast concrete sections and appurtenances shall conform to the ASTM Standard Specifications for Precast Reinforced Concrete Manhole Sections, Designation C478, latest revision, with the following exceptions and additional requirements.
 - 2. The base section shall be monolithic for 4-foot diameter manholes. Manholes with diameter of 5 feet or larger shall have base slab.

3. The wall sections shall be not less than 5 inches thick.
4. Type II cement shall be used except as otherwise permitted.
5. Joints between sections shall be made watertight through the use of rubber O-ring gaskets or rubber profile gaskets such as Forsheda 138. Gaskets shall conform to the ASTM Standard C-443, latest revision. Rope mastic or butyl mastic sealant will not be allowed except as noted in Article 2.01 B.6.
6. Butyl mastic sealant shall be installed between the cone section, any adjusting sections or rings, and casting.

C. Concrete Manhole Frames and Covers:

1. The Contractor shall furnish all cast-iron manhole frames and covers conforming to the details shown on the Drawings, or as hereinbefore specified.
2. The castings shall be of good quality, strong, tough, evengrained cast iron, smooth, free from scale, lumps, blisters, sandholes, and defects of every nature which would render them unfit for the service for which they are intended. Contact surfaces of covers and frame seats shall be machined to prevent rocking of covers.
3. All castings shall be thoroughly cleaned and subject to a careful hammer inspection.
4. Castings shall be at least Class 25 conforming to the ASTM Standard Specifications for Gray Iron Casting, Designation A48, latest revision.
5. Unless otherwise specified, manhole covers shall be 22-3/4 inches in diameter, weighing not less than 350 pounds per frame and cover. Manhole covers shall set neatly in the rings, with contact edges machined for even bearings and tops flush with ring edge. They shall have sufficient corrugations to prevent slipperiness. The covers shall have two (2) pick holes about 1-1/4 inches wide and 1/2 inches deep with 3/8 inch undercut all around. Covers shall not be perforated. Frames and covers shall be J.R. Hoe and Sons, Mc-350, or approved equal.
6. All covers shall be marked in large letters "WATER" in the center.

- D. Pre-molded Elastomeric-sealed Joints: All holes for pipe connections in concrete barrels and bases shall have a factory-installed flexible rubber gasket to prevent infiltration. The manhole boots shall conform to the latest revision of ASTM-C973. The boots shall be Contour Seal or Kor-N-Seal made by National Pollution Control Systems, Inc., Nashua, NH; A-Lok Manhole Pipe Seal made by A-Lok Corporation, Trenton, NJ; or an approved equal.

2.02 PRV/PSV AND MASTER METER VAULT

- A. General: A pre-cast concrete valve vault shall be furnished and installed in accordance with the details and dimensions as shown on the Plans. Concrete for the vault shall be Type I, 4,500 psi at 28 days, and shall conform to the applicable requirements of ACI 301-72 in all respects. Reinforcement shall conform to the requirements of ASTM A-615, A-616, or A-617. Minimum yield strength of the reinforcement shall be 60,000 psi.
- B. Access Hatch: Aluminum access hatch assemblies shall be installed in the top slab of the valve pit at the location shown on the Drawings. Frames and covers shall be fabricated of aluminum. Frame shall be securely mounted over the valves. Covers shall be provided with lifting handle and safety latch to hold the cover in the 90 degrees open position. Locking hasps shall be provided. Covers shall be of the checkered plate design. Access frame and cover shall be sized in accordance with the Drawings. Access frame and cover shall be Model KD-2 as manufactured by the Bilco Company, New Haven, CT, or approved equal.

2.03 MASTER METER

Master meters are specified in Section 02640.

2.04 VALVES

Valves are specified in Section 02640.

2.05 CORPORATION STOP

Corporation stop shall be in accordance with Section 02660.

PART 3 - EXECUTION

3.01 FABRICATION - PRECAST SECTIONS

- A. No manholes steps shall provided in the manhole sections.

- B. Sections shall be cured in an enclosed curing area and shall attain strength of 4,000 psi prior to shipment.
- C. No more than two (2) lift holes or inserts may be cast or drilled in each section.
- D. Flat slab tops shall have a minimum thickness of 6 inches and reinforcement in accordance with ASTM C478.
- E. The date of manufacture and the name or trademark of the manufacturer shall be clearly marked on the precast sections.
- F. Acceptance of the sections will be on the basis of material tests and inspection of the completed product and test cylinders if requested by the Engineer.
- G. Cones shall be precast sections of similar construction.

3.02 SETTING PRECAST MANHOLE SECTIONS

- A. Precast-reinforced concrete manhole sections shall be set so as to be vertical and with sections and steps in true alignment.
- B. Rubber gaskets shall be installed in all manhole joints in accordance with the manufacturer's recommendations.
- C. All holes in sections used for their handling shall be thoroughly plugged with rubber plugs made specifically for this purpose.

3.03 ADJUSTING MANHOLE FRAMES AND COVERS TO GRADE

- A. Unless otherwise shown on the Drawings, the top of the precast concrete eccentric cone of a standard manhole or the top of the flat slab of a shallow manhole shall terminate not less than 4 inches below existing grade in an unpaved non-traffic area (except in a residential yard) and not less than 13 inches below existing grade in a paved or unpaved traffic area and in a residential yard. The frame and lid shall be adjusted to the required final grade as described hereinafter.
- B. Only clean adjusting sections shall be used. Each adjusting section shall be laid in a bead of butyl mastic sealant and shall be thoroughly bonded.
- C. When a manhole is located in an unpaved non-traffic area (other than a residential yard), the frame and cover shall be adjusted to a final elevation of 3 inches to 5 inches above the existing grade at the center of the cover. If field changes have resulted in the installed manhole invert elevation being

lower than the invert elevation shown on the Drawings, the adjustment to the required final elevation of 3 inches to 5 inches above existing grade shall be accomplished by the use of precast concrete adjusting rings. If field changes have resulted in the completed manhole invert being higher than the invert shown on the Drawings and the top of the frame and cover being higher than 5 inches above the existing grade, then the Contractor shall substitute, at no additional cost to HCWD1, a shorter barrel section on the manhole so that the frame and lid may be adjusted to the proper final elevation through the use of precast concrete adjusting rings.

- D. When a manhole is located in a bituminous, concrete, or crushed stone traffic area, or in a residential yard, the frame and cover shall be adjusted to the grade of the surrounding area by the use of precast concrete rings. The adjusted frame and lid shall conform to the elevation and slope of the surrounding area. If field changes have resulted in the completed manhole invert being higher than the invert shown on the Drawings and the top of the eccentric cone, when used, or the top of the flat slab, when used, being less than the height of the frame and lid below the grade of the surrounding area, then the Contractor shall substitute, at no additional cost to HCWD1, a shorter barrel section on the manhole so that the frame and lid may be adjusted to the proper final elevation through the use of precast concrete adjusting rings.
- E. The Contractor shall coordinate elevations of manhole covers in paved streets with HCWD1. If resurfacing of the street in which sewers are laid is expected within twelve (12) months, covers shall be set 1-1/2 inches above the existing pavement surface in anticipation of the resurfacing operations.

3.04 ADJUSTING SECTIONS

Only clean adjusting sections shall be used. Each adjusting section shall be laid in a bead butyl mastic sealant and shall be thoroughly bonded.

3.05 SETTING MANHOLE FRAMES AND COVERS

- A. Manhole frames shall be set with the tops conforming to the required elevations set forth hereinbefore. Frames shall be set concentric with the top of the concrete and in a full bead of butyl mastic sealant so that the space between the top of the masonry and the bottom flange of the frame shall be completely watertight.
- B. Only clean adjusting sections shall be used. Each adjusting section shall be laid in a bead butyl mastic sealant and shall be thoroughly bonded.

- C. Manhole covers shall be left in place in the frames on completion of other work at the manholes.

END OF SECTION 02605

SECTION 02630 - ENCASUREMENT PIPE

PART 1 - GENERAL

1.01 WORK INCLUDED

The Contractor shall furnish all labor, material, and equipment necessary to install encasement pipe together with all appurtenances as shown and detailed on the Drawings and specified herein.

1.02 RELATED WORK

- A. Section 02225 - Excavating, Backfilling and Compacting for Utilities.
- B. Section 02610 - Water Pipe and Fittings.
- C. Section 02731 - Gravity Sewers.
- D. Section 02732 - Sewage Force Mains.

PART 2 - PRODUCTS

2.01 STEEL PIPE

- A. Steel seamless pipe shall be new Grade B steel material, with a minimum yield of 35,000 psi and a wall thickness as shown below unless otherwise required by a permitting authority. The material shall conform to the chemical and mechanical requirements of the latest revision of ASTM A139 "Electric-Fusion (ARC) - Welded Steel Pipe (NPS 4 and Over)," unless otherwise stated herein.
- B. The minimum wall thickness shall be in accordance with the following table:

Steel Casing Pipe Wall Thickness

Casing Diameter (inches)	(Minimum Wall Thickness Under Railroads (inches)	Minimum Wall Thickness All Other Uses (inches)
16 and under	0.250	0.250
18	0.281	0.250
20 and 22	0.312	0.281
24	0.344	0.312
26	0.375	0.344

Casing Diameter (inches)	(Minimum Wall Thickness Under Railroads (inches)	Minimum Wall Thickness All Other Uses (inches)
28	0.406	0.375
30	0.438	0.406
32	0.469	0.438
34 and 36	0.500	0.469

- C. Welds of the steel casing pipe shall be solid butt-welds with a smooth non-obstructing joint inside and conform to all specifications as required by American Welding Society (AWS). The casing pipe shall be installed without bends. All welders and welding operators shall be qualified as prescribed by AWS requirements.
- D. Hydrostatic testing shall not be necessary.
- E. A protective coating shall be applied to each length of pipe. Following an SSPC SP-7 "Brush-Off Blast Cleaning" surface preparation, 3 (dry) mils of Tnemec-Primer 10-99 (red), or Porter International Primer 260FD (red), or an equivalent thickness of an approved equivalent paint shall be applied in the manner recommended by the respective paint manufacturer.
- F. Each length of pipe shall be legibly marked, stating: manufacturer, diameter, wall thickness and primer.
- G. Precaution shall be taken to avoid deforming the pipe and damaging the primer during shipping.

2.02 CARRIER PIPE SPACERS

- A. Carrier pipes installed inside encasement pipes shall be centered throughout the length of encasement pipe. Centering shall be accomplished by the installation of polyethylene pipeline spacers attached to the carrier pipe in such manner as to prevent the dislodgement of the spacers as the carrier pipe is pulled or pushed through the encasement pipe. Spacers shall be of such dimensions to provide: full supportive load capacity of the pipe and contents; of such thickness to allow installation and/or removal of the pipe; and to allow no greater than 2 inch movement of the carrier pipe within the cover pipe after carrier pipe is installed.
- B. Spacers shall be located immediately behind each bell and at a maximum spacing distance as follows:

Carrier Pipe Diameter (inches)	Maximum Spacing (feet)
2 - 2-1/2	4
3 - 8	7
10 - 26	10
28	9
30	8
32	7
34	6
36 - 38	5.5

The materials and spacing to be used shall be accepted by the Engineer prior to installation. The polyethylene pipeline spacers shall be manufactured by Pipeline Seal and Insulator, Inc. (PSI), Raci Spacers, Inc., or equivalent. Installation shall be in accordance with manufacturer's recommendations.

2.03 ENCASEMENT PIPE END SEALS

After installation of the carrier pipe within the encasement pipe, the ends of the casing shall be sealed with either a wraparound or a pull-on casing end seals fabricated of minimum 1/8-inch thick neoprene rubber. The seals shall be attached to the encasement pipe and the carrier pipe by 304 stainless steel band clamps not less than 1/2-inch wide. The casing end seals shall be as manufactured by Advance Products & Systems, Inc., or approved equivalent.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Where shown on the Drawings, the Contractor shall install encasement pipe. Install encasement pipe to maintain alignment, grade and the circular shape of the encasement pipe. The encasement pipe shall be straight and true in alignment; and any significant deviation from line or grade, in the opinion of the Engineer or permitting authority, shall be sufficient cause for disapproving or rejecting the installation.
- B. Two methods of installation are designated, the open-cut method and the boring method.
 - 1. The open-cut method shall consist of placing the encasement pipe in the excavated trench, then installing the carrier pipe inside the encasement pipe. Excavation, bedding and backfilling shall be in accordance with Section 02225.

2. The boring and jacking method consists of pushing or jacking the encasement pipe into the subsurface material as an auger cuts out the material or after the auger has completed the bore. Where designated on the drawings, crossings beneath state maintained roads, railroads, or other surfaces not to be disturbed, shall be installed by boring and jacking of steel casing pipe followed by installation of the carrier pipe within the casing pipe. The Contractor shall provide a jacking pit, bore through the earth, and/or rock, jack the casing pipe into proper line and grade and then install the carrier pipe within the casing pipe. The approach trench shall be large enough to accommodate one section of casing pipe, the jacks and blocking. The Contractor shall furnish and use adequate equipment to maintain the line and grade.
 - C. The carrier pipe shall be ductile iron, polyvinyl chloride, or polyethylene pipe as designated on the Drawings. The carrier pipe shall be installed using pipe spacers as described in this Section. Carrier pipe shall be restrained through the encasement with harness type restraints for PVC pipe and field locking style gasket for DI pipe. Carrier pipe will not be permitted to rest on bells or couplings.
 - D. Following installation of the carrier pipe, the ends of the encasement pipe shall be sealed with products of the type described in this Section.
- 3.02 DAMAGE

The cost of repairing damage to the highway or railroad which is caused by a boring and jacking installation shall be borne by the Contractor.

END OF SECTION 02630

SECTION 02930 - RESTORATION OF LAWNS AND GRASSES

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

The work covered by this section shall include the establishment or restoration of all ground cover including areas to be seeded and/or sodded. This work shall include the supply of all materials, labor, superintendence and maintenance as outlined in these specifications.

1.02 RELATED WORK

- A. Section 02225 - Excavating, Backfilling and Compacting for Utilities.
- B. 01565 - Erosion and Sediment Control

1.03 SCOPE OF THE WORK

Restoration of Fields, Lawns and Grasses by seeding and/or sod placement shall be performed on all areas which are not occupied by structures, roads, curbs and gutters, sidewalks, and concrete slab walls, etc.

PART 2 - PRODUCTS

2.01 SEED

- A. The seed mixture furnished shall be in the following proportions:

Common Name	Proportion By Weight	Percent of Purity	Percent of Germination
Kentucky Bluegrass	40	90	85
Chewings Fescue	25	90	85
Italian Rye Grass	20	90	85
Red Top	10	90	85
White Clover	05	95	90

- B. All seed shall be fresh and clean and shall be delivered mixed, in unopened packages, bearing a guaranteed analysis of the seed and mixture.

2.02 SOD

- A. Sod shall be bluegrass or fine fescue sod strongly rooted and free of pernicious weeds. It shall be a uniform thickness of not more than 1-½ inches and shall have not less than ¾ inches of soil. All sod shall be grown on a commercial turf farm and no pasture sod shall be acceptable. The source of the sod must be approved by the Engineer before it is cut for delivery.
- B. The sod shall be delivered and installed within 48 hours of being harvested by the producer.

2.03 FERTILIZER

A complete commercial fertilizer with a 1:2:2 ratio of nitrogen, phosphorus, and potassium shall be furnished. It shall be free flowing and suitable for application with approved equipment. The material shall conform to State fertilizer laws. Bagged fertilizer shall be delivered in sealed standard containers and shall bear the name, trademark, and warranty of the producer.

2.04 LIME

Lime shall be agricultural grade limestone crushed so that no less than 85% will pass a No. 10 sieve.

PART 3 - EXECUTION

3.01 SEQUENCE OF WORK

All finish grading in a general area shall be complete before fertilizing and seeding or sodding begins.

3.02 SOIL PREPARATION AND SEEDING

- A. The work consists of furnishing all labor, equipment, and materials in all operations in connection with the fertilizing and seeding of all the finished graded areas not occupied by structures, roads, concrete slabs, sidewalks, walls, etc., and including grassed areas destroyed or damaged by the Contractor.
- B. The areas to be seeded shall be thoroughly tilled to a depth of at least 4 inches by discing, harrowing, or other approved methods until the condition of the soil is acceptable to the Engineer or, in the event of work on an existing

utility easement, to the satisfaction of the easement holder. After harrowing or discing, the seed bed shall be dragged and/or hand raked to finish grade.

- C. The incorporation of the fertilizer and the agricultural lime may be a part of the tillage operation and shall be applied not less than 24 hours nor more than 48 hours before the seed is to be sown. Fertilizer shall be applied at a rate to provide not less than 2 ½ pounds of nitrogen, 5 pounds of phosphorus, and 5 pounds of potash per 1,000 square feet. Agricultural limestone shall be applied at a rate of not less than 100 pounds per 1,000 square feet.
- D. Seed shall be broadcast either by hand or approved sowing equipment at the rate of ninety pounds per acre (two pounds per 1,000 square feet), uniformly distributed over the area. Broadcasting seed during high winds will not be permitted. The seed shall be drilled or raked into a depth of approximately ½ inch and the seeded areas shall be lightly raked to cover the seed and rolled. Drill seeding shall be done with approved equipment with drills not more than 3 inches apart. All ridges shall be smoothed out, and all furrows and wheel tracks shall be removed.
- E. Seed may be sown during the following periods:
 - 1. February 1 to April 15.
 - 2. August 15 to October 15.
- F. Seed may not be sown at any other time except with the written approval of Owner.
- G. After the seed has been sown, the areas so seeded shall be mulched with clean straw at the rate of one bale per 2,000 square feet (approximately 1-inch loose depth). Mulch on slopes exceeding 20% shall be held in place with binder twine staked down at approximately 18-inch centers or by other equally acceptable means.
- H. Areas seeded shall be protected until a uniform stand develops, when it will be accepted and the Contractor relieved of further responsibility for maintenance. Displaced mulch shall be replaced or any damage to the seeded area shall be repaired promptly, both in a manner to cause minimum disturbance to the existing stand of grass. If necessary to obtain a uniform stand, the Contractor shall fertilize, seed, and mulch again as needed. Scattered bare spots up to one square yard in size will be allowed up to a maximum of ten percent (10%) of any area.

3.03 SOIL PREPARATION AND SOD PLACEMENT

- A. This work consists of furnishing all labor, equipment, and materials and all operations in connection with the placement of sod on all of the finished graded areas not occupied by structures, roads, concrete slabs, sidewalks, walls, etc., and including grassed areas destroyed or damaged by the Contractor.
- B. The areas where sod is to be placed shall be thoroughly tilled to a depth of at least 4 inches by discing, harrowing, or other approved methods until the condition of the soil is acceptable to the Engineer or, in the event of work on an existing utility easement, to the satisfaction of the easement holder . After harrowing or discing, the sod bed shall be dragged and/or hand raked to 1/2" below finish grade.
- C. The incorporation of the fertilizer and the agricultural lime may be a part of the tillage operation and shall be applied not less than 24 hours nor more than 48 hours before the sod is to be placed. Fertilizer shall be applied at a rate to provide not less than 2 1/2 pounds of nitrogen, 5 pounds of phosphorus, and 5 pounds of potash per 1,000 square feet. Agricultural limestone shall be applied at a rate of not less than 100 pounds per 1,000 square feet.
- D. Prior to the sod being placed, the area to be sodded shall be lightly watered to moisten the soil surface. The sod shall be carefully unrolled and trimmed to fit irregular areas, with the edges of the sod strips placed tightly together in such a manner as to conceal the joints between the strips. Following placement, the sod shall be lightly watered (approximately a 1/4" application) and rolled with a medium weight lawn roller to minimize any ridging at the seams.
- E. Sod may be placed whenever the sod is not dormant, and the ground is not frozen or muddy. Sod may not be placed at any other time.
- F. For a period of first two weeks following placement, the sod shall be maintained by thoroughly watering the entire area covered by the sod every second day, with a 1/2" minimum application by sprinklers or a misting hose. Lawn watering gauges shall be used to measure the application. Flooding or sheet watering will not be allowed. For the third through sixth weeks following placement, the sod shall be maintained by thoroughly watering the entire area covered by the sod twice weekly (three to four days apart), with a 1/2" minimum application by sprinklers or a misting hose. Lawn watering gauges shall be used to measure the application. Flooding or sheet watering will not be allowed.

- G. Actual rainfall event amounts received during the period of watering may be counted towards the required application totals when the amount of the rainfall exceeds 1/4" per event.
- H. In the third through sixth week following placement, the Contractor shall maintain the sodded areas by mowing to a height of not less than three inches, prior to water applications. Contractor shall not allow sod blade height to exceed five inches during this period.
- I. Following the six-week watering period, the area covered by the sod will be rolled one additional time with a medium weight lawn roller, and shall be inspected by HCWD1 for acceptance.

3.04 RETORATION WARRANTY

All restoration work shall carry a warranty period of 18 months upon final acceptance of work. The Contractor shall repair and address all restoration items upon notification during the warranty period at no additional cost to HCWD1.

END OF SECTION 02930

SECTION 03300 - CAST-IN-PLACE CONCRETE

{May be too much for concrete thrust blocks, sidewalks, etc.}

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Formwork.
- B. Reinforcing Steel.
- C. Expansion and Contraction Joints.
- D. Waterstops
- E. Concrete.

1.02 RELATED REQUIREMENTS

- A. Section 02226 – Excavating, Backfilling and Compacting for Utilities.

1.03 REFERENCES

- A. ACI 350R Environmental Engineering Concrete Structures.
- B. ACI318 - Building Code Requirements for Reinforced Concrete.
- C. ACI347 - Recommended Practice for Concrete Formwork.
- D. CRSI - Manual of Standard Practice.
- E. CRSI - Placing Reinforcing Bars.
- F. ASTM - A-615, A-120, A-185, C-31, C-39.

1.04 SUBMITTALS

- A. The Contractor shall submit the following data to the Engineer for review:
 - 1. Mix designs for all mixes proposed or required to be used, including all mixes containing admixtures.
 - 2. Certification by the manufacturer that cement meets the Specification contained herein.
 - 3. Shop drawing for reinforcing steel showing bar schedules, location, and splices.

4. Reports on laboratory compression tests of cylinders taken during concrete placement.
5. Manufacturer's cut sheets for all other concrete related products.

PART 2 - PRODUCTS

2.01 CLASSES OF CONCRETE AND USAGE

A. Structural concrete of the various classes required shall be proportioned to produce the following 28-day compressive strengths:

1. Selection of Proportions for 4,500 psi Concrete:
 - a. 4,500 psi compressive for strength at 28 days.
 - b. Type I/II cement plus air.
 - c. Maximum water/cement ratio - 0.42.
 - d. Minimum cement content - 564 lbs. (6.0 bags)/cubic yard concrete.
 - e. Nominal maximum size coarse aggregate - No. 67 (3/4-inch maximum) or No. 57 (1-inch maximum).
 - f. Air content - 5% plus or minus 1% by volume.
 - g. Slump - 4 inches in accordance with ASTM C-143, when measured with only an air entraining admixture. Additional slump is allowed by use of water reducing or superplasticizing admixtures.
2. Selection of Proportions for 3,000 psi Concrete:
 - a. 3,000 psi compressive strength at 28 days.
 - b. Type I/II cement plus air.
 - c. Maximum water/cement ratio - 0.56.
 - d. Minimum cement content - 470 lbs. (5.0 bags)/cubic yard concrete.
 - e. Nominal maximum size coarse aggregate - No. 67 (3/4-inch maximum) or No. 57 (1-inch maximum).
 - f. Air content - 5% plus or minus 1% by volume.
 - g. Slump - 4 inches in accordance with ASTM C-143, when measured with only an air entraining admixture.

B. Concrete shall be used as follows:

1. 4,500 psi concrete for all concrete work except as noted below.
2. 3,000 psi concrete for encasement of piping where indicated, and thrust blocking.

C. All testing of aggregates and determination of proportions shall be or have been performed by a recognized independent testing laboratory.

- D. Cement for exposed concrete shall have a uniform color classification.
- E. Type I/II cement conforming to ASTM C-150 shall be used in all concrete.
- F. Coarse aggregate shall be crushed stone having clean, hard, uncoated particles, and shall be free from injurious amount of soft, friable, thin, elongated or laminated pieces. Coarse aggregates shall conform to all requirements of ASTM C-33.
- G. Fine aggregates shall be natural sand having clean, hard, uncoated grains, free from injurious amounts of clay, dust, organic matter or other deleterious substances, and shall conform to ASTM C-33.
- H. Water for concrete shall be clean, fresh, and free from injurious amounts of oil, acid, alkali, organic matter, or other deleterious substances.

2.02 ADMIXTURES

- A. An air entraining admixture shall be used on all concrete and shall be the neutralized vinsol resin type such as Master Builders MB-VR, Euclid Chemical Company AIR-MIX or equivalent. The admixture shall meet the requirements of ASTM C-260.
- B. Other admixtures (water reducing agents, acellerating agents, retarding agents, superplasticizing agents) shall be considered where necessary to meet the needs of construction.
- B. Admixtures shall be used in concrete design mixes in the same manner and proportions as in the field so that the effects of the admixtures are included in preliminary test submitted to the Engineer for review prior to the start of construction.

2.03 REINFORCEMENT

- A. The minimum yield strength of the reinforcement shall be 60,000 pounds per square inch. Bar reinforcement shall conform to the requirements of ASTM A-615. All bar reinforcement shall be deformed.
- B. Welded wire fabric shall conform to ASTM A-185 and shall be of weight and gauge as indicated on the Drawings.
- C. Reinforcement supports and other accessories in contact with the forms for members which will be exposed to view in the finished work shall be of stainless steel or shall have approved high-density polyethylene tips so that

the metal portion shall be at least one-quarter of an inch from the form or surface. Supports for reinforcement, when in contact with the ground or stone fill, shall be precast stone concrete blocks.

2.04 FORMS

- A. Forms shall be of suitable material, design, and construction so as to be rigid, tight enough to prevent the passage of mortar, and plane surfaces with a tolerance of 1/16-inch in 4 feet.
- B. For surfaces to be given burlap-rubbed finish, the form surface in contact with the concrete shall be made of heavy gauge metal, new plywood (used plywood which, in the opinion of the Engineer, is substantially equal to new plywood may be used), tempered wood fiberboards with smooth surface, or similar materials. Metal forms or form linings shall have square edges so that the concrete will not have fins or fluting. Forms shall not be pieced out by use of materials different from those in the adjacent form or in such manner as will detract from the uniformity of the finished surface.
- C. For surfaces other than those to be given burlap-rubbed finish, forms shall be made of wood, metal, or other acceptable material. Wooden forms shall be constructed of sound lumber or plywood of suitable dimensions, free from knotholes and loose knots. Plywood shall be reasonable good, as accepted. Metal forms shall be of an acceptable type for the work involved. Edges of forms in contact with concrete shall be flush within 1/16-inch.
- D. Form for walls, columns, or piers shall have removable panels at the bottom for cleaning, inspection, and scrubbing-in of bonding grout. Forms for thin sections (such as walls or columns) of considerable height shall be arranged with suitable openings so that the concrete can be placed in a manner that will prevent segregation and accumulations of hardened concrete on the forms or reinforcement above the fresh concrete, unless special spouts are used to place concrete, and so that construction joints can be properly keyed and treated.
- E. Forms for exposed surfaces shall be built with 3/4-inch chamfer strips attached to produce smooth, straight chamfers at all sharp edges of concrete.
- F. Form ties to be encased in concrete shall not be made of through-bolts or common wire, but shall be of a well-established type, so made and installed as to embody the following features:
 - 1. After removal of the protruding part of the tie, there shall be no metal nearer than 1 inch to the face of the concrete.

2. That part of the tie which is to be removed shall be at least 1/2-inch in diameter, or if smaller, it shall be provided with a wood or metal cone 1 inch long placed against the inside of the forms. Cones shall be carefully removed from the concrete after the forms have been stripped.
3. Ties which pass through walls subject to hydrostatic pressure shall be provided with acceptable water stops, such as washers, securely fastened to the ties.

2.05 OTHER MATERIALS

- A. Anchorage items shall be of standard manufacture and of type required to engage with the anchors to be installed therein under other sections of the Specifications and shall be subject to approval by the Engineer.
- B. Premolded expansion-joint filler strips shall conform to ASTM D-1752 and shall be 3/8-inch thick unless otherwise shown.
- C. Joint sealants shall conform to ANSI 116.1. The following joint sealants are acceptable:
 1. Colma by Sika Corporation.
 2. Hornflex by A. C. Horn, Inc.
 3. Sonolastic by Sonneborn Division of Contech, Inc.
- D. GROUT
 1. Precision-support grout shall consist of a non-shrink, ready-to-use, precision grout material; proportioned, pre-mixed and packaged at the factory; delivered to the job site to place with only the addition of water; forming, placing and curing as stipulated by the manufacturer.
 2. Grouts which depend upon aluminum powders, chemicals, or other agents which produce gas for expansion are not acceptable.
 3. Precision-support grout shall also meet the following requirements:
 - a. Free of gas producing agents.
 - b. Free of oxidizing catalysts.
 - c. Free of inorganic accelerators, including chlorides.
- E. Construction Joint Waterstops:
 1. Polyvinylchloride (PVC) Waterstops:
 - a. Provide PVC waterstops complying with Corps of Engineers CRD-C572.

- b. Provide serrated type with a minimum thickness of 3/8 inch by a minimum width of 6 inches may be provided in specific applications as approved by the ENGINEER.
 - c. Provide PVC waterstops as manufactured by Greenstreak Plastic Products company; Vinylex Corporation, or equivalent product.
 - 2. Adhesive Waterstop:
 - a. Provide pre-formed adhesive waterstop in construction joint locations where shown, or as alternative to PVC waterstop where appropriate.
 - b. The preformed waterstop shall meet or exceed all requirements of Federal Specifications SS-S-210A, "Sealing Compounds for Expansion Joints".
 - c. Provide adhesive waterstops as manufactured by Synko-Flex Products, Division of Henry Products, Inc.; or equivalent product.
 - 3. Hydrophilic Waterstops:
 - a. Hydrophilic waterstop may be used as an alternate to the adhesive waterstop.
 - b. Provide waterstops as manufactured by Greenstreak Plastic Products Company; Adeka, Inc.; or equivalent product.
- F. Membrane Forming Curing compound: ASTM C 309, Type I-D.
 - 1. Provide without fugitive dye when requested by Engineer.
- G. Epoxy Bonding Agent: Provide two-component epoxy resin bonding agent as manufactured by Sika Chemical Corporation; A.C. Horn, Incorporated; or equivalent product.
- H. Adhesive Dowels:
 - 1. Drilling equipment used and installation of adhesive dowels shall be in accordance with manufacturer's instructions.
 - 2. Assure that embedded items are protected from damage and are not filled in with concrete.
 - 3. Unless otherwise shown or approved by Engineer, embedment depths shall be based on a compressive strength of 2,500 psi when embedded into existing concrete.)
 - 4. The Contractor shall comply with the adhesive material manufacturer's installation instructions on the hole diameter. The Contractor shall properly clean out the hole utilizing a synthetic brush and compressed air to remove all loose material from the hole, prior to installing

- adhesive capsules or material. Proper mixing of the two-component system shall be done to the manufacturer's recommendations.
5. Adhesive material manufacturer's representative shall observe and demonstrate the proper installation procedures for the adhesive dowels and adhesive material at no additional expense to HCWD1. Each installer shall be certified in writing by the manufacturer to be qualified to install the adhesive dowels.
 6. Provide two-component dowel installation adhesive as manufactured by Hilti Corporation, or approved equivalent product.

PART 3 - EXECUTION

3.01 FORMING

- A. Forms shall be so constructed and placed that the resulting concrete will be of the shape, lines, dimensions and to the elevations indicated on the Drawings or specified, and exposed concrete will be substantially free from board or grain marks, poorly matched joints, and other irregularities or defects.
- B. Forms shall be sufficiently rigid to prevent displacement or sagging between supports, and so constructed that the concrete will not be damaged by their removal. The Contractor shall be entirely responsible for their adequacy.
- C. All falsework to support structural slabs, beams, girders, etc., shall be designed to safely and adequately support the concrete and forms during placement and curing. The adequacy and safety of the falsework shall be the sole responsibility of the Contractor.
- D. All forms shall be oiled with an acceptable nonstaining oil or liquid form coating before reinforcement is placed.
- E. Before form material is reused, all surfaces that are in contact with the concrete shall be thoroughly cleaned, all damaged places repaired, and all projecting nails withdrawn.
- F. Except as otherwise specifically authorized by the Engineer, forms shall not be removed until the concrete has aged for the following number of days-degrees*:
 1. Beams and slabs: 500 day-degrees.
 2. Walls and vertical surfaces: 100 day-degrees.
 3. *Day-degree: Total number of days times average daily air temperature at surface of concrete. For example, 5 days at a daily average temperature of 60 degrees F, equals 300 day-degrees.

- G. Shores under beams and slabs shall not be removed until the concrete has attained at least 60 percent of the specified compressive strength and also sufficient strength to support safely its own weight and the construction live loads upon it.

3.02 PLACING REINFORCEMENT

- A. Reinforcement shall be bent cold to the dimensions and shapes shown on the Drawings and within tolerances specified in the CRSI Manual of Standard Practice.
- B. Before being placed in position, reinforcement shall be cleaned of loose mill and rust scale, dirt and other coatings that will interfere with development of proper bond.
- C. Reinforcement shall be accurately placed in positions shown on the Drawings and firmly held in place during placement and hardening of concrete by using annealed wire ties. Bars shall be tied at all intersections except where spacing is less than one foot in both directions, then alternate intersections may be tied.
- D. Distance from the forms shall be maintained by means of stays, blocks, ties, hangers or other approved supports. Blocks for holding the reinforcement from contact with the forms shall be precast mortar blocks or approved metal chairs. Layers of bars will be separated by precast mortar blocks or other equally suitable devices; the use of pebbles, pieces of broken stone or brick, metal pipe and other such blocks will not be permitted. If fabric reinforcement is shipped in rolls, it shall be straightened into flat sheets before being placed.
- E. Before any concrete is placed, the Engineer shall have inspected the placing of the steel reinforcement and given permission to deposit the concrete. Concrete placed in violation of this provision will be rejected and thereupon shall be removed.
- F. Unless otherwise specified, reinforcement shall be furnished in the full lengths indicated on the plans. Splicing of bars, except where shown on the plans, will not be permitted without the approval of the Engineer. Where splices are made, they shall be staggered insofar as possible.

3.03 TESTING AGGREGATES AND DETERMINING PROPORTIONS

- A. No concrete shall be used in the work until the materials and mix design have been accepted by the Engineer.

- B. The conformity of aggregates to the Specifications hereinbefore given shall be demonstrated and determined by tests per ASTM C-33 made with representative samples of the materials to be used on the work.
- C. The actual proportions of cement, aggregates, admixtures and water necessary to produce concrete conforming to the requirements set forth herein shall be determined by making test cylinders using representative samples of the materials to be used in the work. A set of four standard 6-inch cylinders shall be made and cured per ASTM C-31. Two shall be tested at 7 days and two at 28 days per ASTM C-39. The slump shall not be less than the greatest slump expected to be used in the work.
- D. Reports on the tests and a statement of the proportions proposed for the concrete mixture, shall be submitted in triplicate to the Engineer for review as soon as possible, but not less than five days prior to the proposed beginning of the concrete work. If the Contractor furnishes in writing, similar, reliable detailed information from an acceptable source, and of date not more than four months prior to the time when concrete will be used on this project, the above requirements for laboratory test may be modified by the Engineer. Such data shall derive from mixtures containing constituents, including the admixtures where used, of the same types and from the same sources as will be used on this project.
- E. The Engineer shall have the right to make check tests of aggregates and concrete, using the same materials, and to order changes as may be necessary to meet the specified requirements.
- F. The Contractor may request permission to add water at the job site; and when the addition of water is permitted by the Engineer, the quantity added shall be the responsibility of the Contractor and in no case shall the total water per bag of cement exceed the ratio set forth herein.
- G. If concrete of the required characteristics is not being produced as the work progresses, the Engineer may order such changes in proportions or materials or both, as may be necessary to secure concrete of the specified quality. The Contractor shall make such changes at his own expense and no extra compensation will be allowed because of such changes.

3.04 MIXING

- A. All central-plant and rolling-stock equipment and methods shall conform to the Truck Mixer and Agitator Standards of the Truck Mixer Manufacturers' Bureau of the National Ready Mixed Concrete Association, as well as the ACI Standards for measuring, Mixing and Placing Concrete (ACI 614), and with

the ASTM Standard Specification for Ready-Mixed Concrete, Designation C94, insofar as applicable.

- B. Ready-mixed concrete shall be transported to the site in watertight agitator or mixer trucks. The quantity of concrete to be mixed or delivered in any one batch shall not exceed the rated capacity of the mixer or agitator for the respective conditions as stated on the nameplates.
- C. Central-mixed concrete shall be plant-mixed a minimum of 1-1/2 minutes per batch, and then shall be truck-mixed or agitated a minimum of 8 minutes. Agitation shall begin immediately after the premixed concrete is placed in the truck and shall continue without interruption until discharge. For transit-mixed concrete the major portion of the mixing water shall be added and mixing started immediately after the truck is charged.
- D. The amount of water initially added shall be recorded on the delivery slip for the Engineer's information; no additional water shall be added, either in transit or at the site, except as directed. Mixing (at mixing speed) shall be continued for at least 10 minutes followed by agitation without interruption until discharge. Concrete shall be discharged at the site within 1-1/2 hours after water was first added to the mix, and shall be mixed at least 5 minutes after all water has been added.
- E. Concrete which has become compacted or segregated during transportation to or in the site of the work shall be satisfactorily remixed just prior to being placed in the forms.
- F. Partially hardened concrete shall not be deposited in the forms. The retempering of concrete which has partially hardened (that is, the remixing of concrete with or without additional cement, aggregate, or water) will not be permitted.

3.05 COMPRESSION TESTS

- A. During the progress of the work, at least one (1) set of four (4) compression test cylinders shall be made for each 50 cubic yards of concrete or major fraction thereof, and not less than one such set for each type of concrete for each day's pouring. Cylinders made in the field shall be made and cured in accordance with the ASTM Standard Method of Making and Curing Concrete Test Specimens in the Field, Designation C31, except that wherever possible molds shall be left on the cylinders until they have reached the laboratory. Testing services to satisfy the requirements of ACI shall be paid for by the Contractor at his expense. Testing lab must be approved by the Engineer.

- B. One cylinder of each set shall be broken in accordance with ASTM C-39 at seven (7) days and the other two at twenty-eight (28) days. Two copies of these test results shall be submitted to the Engineer on the same day of the tests.
- C. On evidence of these tests, any concrete that fails to meet the specified strength requirements shall be strengthened or replaced as directed by the Engineer at the Contractor's expense.

3.06 METALWORK IN CONCRETE

- A. All trades shall be notified, at the proper time, to install items to be embedded in concrete.
- B. All castings, inserts, conduits, and other metalwork shall be accurately built into or encased in the concrete by the Contractor as directed, and all necessary precautions shall be taken to prevent the metalwork from being displaced or deformed.
- C. Anchor bolts shall be set by means of substantial templates.

3.07 PLACING AND COMPACTING CONCRETE

- A. At least twenty-four (24) hours before the Contractor proposes to make any placement of concrete, he shall notify the Engineer of his intention and planned procedure. Unless otherwise permitted, the work shall be so executed that a section begun on any day shall be completed during daylight of the same day.
- B. No concrete shall be placed until the subgrade has been accepted in accordance with the requirements of Section 01400, Quality Control, nor shall it be placed on frozen subgrade or in water. Placement of concrete shall not be scheduled until the forms, reinforcing, and preliminary work have been accepted. No concrete shall be placed until all materials to be built into the concrete have been set and have been accepted by the various trades and by the Engineer. All such materials shall be thoroughly clean and free from rust, scale, oil, or any other foreign matter.
- C. Forms and excavations shall be free from water and all dirt, debris, and foreign matter when concrete is placed. Except as otherwise directed, wood forms and embedded wood called for or allowed shall be thoroughly wetted just prior to placement of concrete.
- D. Concrete placed at air temperatures below 40 degrees shall have a minimum temperature of 50 degrees F. and a maximum of 70 degrees F. when placed.

- E. Concrete shall be transported from the mixer to the place of final deposit as rapidly as practicable and by methods which will prevent separation of ingredients and avoid rehandling.
- F. Chutes for conveying concrete shall be metal or metal-lined and of such size, design, and slope as to ensure a continuous flow of concrete without segregation. The slope of chutes shall be not flatter than 1 on 2 and all parts of a chute shall have approximately the same slope. The discharge end of the chute shall be provided with a baffle, or, if required, a spout; and the end of the chute or spout shall be kept as close as practicable to, but in no event more than 5 feet above the surface of the fresh concrete. When the operation is intermittent, the chute shall discharge into a hopper.
- G. In thin sections of considerable height (such as walls and columns), concrete shall be placed in such a manner as will prevent segregation and accumulations of hardened concrete on the forms or reinforcement above the mass of concrete being placed. To achieve this end, suitable hoppers, spouts with restricted outlets, etc., shall be used as required or permitted unless the forms are provided with suitable openings.
- H. Chutes, hoppers, spouts, etc., shall be thoroughly cleaned before and after each run and the water and debris shall not be discharge inside the form.
- I. For any one placement, concrete shall be deposited continuously in layers of such thickness that no concrete will be deposited on concrete which has hardened sufficiently to cause the formation of seams and planes of weakness within the section, and so as to maintain, until the completion of the unit, an approximately horizontal, plastic surface.
- J. No wooden spreaders shall be left in the concrete.
- K. During and immediately after being deposited, concrete shall be thoroughly compacted by means of suitable tools and methods, such as internal-type mechanical vibrators operating at not less than 5,000 rpm., or other tool spading, to produce the required density and quality of finish. Vibration shall be done only by experienced operators under close supervision and shall be carried on in such a manner and only long enough to produce homogeneity and optimum consolidation without permitting segregation of the solid constituents, "pumping" of air, or other objectionable results. All vibrators shall be supplemented by proper spade puddling approximately 2 to 3 inches away from forms to remove included bubbles and honeycomb. Excessive spading against the forms, causing the deposition of weak mortar at the surface, shall be avoided.

- L. The concrete shall be thoroughly rodded and tamped about embedded materials so as to secure perfect adhesion and prevent leakage. Care shall be taken to prevent the displacement of such materials during concreting.

3.08 BONDING CONCRETE AT CONSTRUCTION JOINTS

- A. In order to secure full bond at construction joints, the surface of the concrete previously placed (including vertical, inclined, and substantially horizontal areas) shall be thoroughly cleaned of foreign materials and laitance, if any, and then roughened.
- B. The previously placed concrete at the joint shall be saturated with clean water and kept thoroughly wet overnight, after which all pools shall be removed. After free or glistening water disappears, the concrete shall be given a thorough coating of neat cement mixed to a suitable consistency. The coating shall be 1/8-inch thick on vertical surfaces and 1/4-inch thick on horizontal surfaces, and shall be well scrubbed in by means of stiff bristle brushes wherever possible. New concrete shall be deposited before the neat cement dries.

3.09 CURING AND PROTECTION

- A. All concrete, particularly slabs and including finished surfaces, shall be treated immediately after concreting or cement finishing is completed, to provide continuous moist curing for at least seven days, regardless of the adjacent air temperature. Walls and vertical surfaces may be covered with continuously saturated burlap, or kept moist by other acceptable means. Horizontal surfaces, slab, etc., shall be ponded to a depth of 1/2-inch wherever practicable, or kept continuously wet by the use of lawn sprinklers, a complete covering of continuously saturated burlap, or by other acceptable means.
- B. For at least seven (7) days after having been placed, all concrete shall be so protected that the temperature at the surface will not fall below 45 degrees F.
 - 1. No manure, salt, or other chemicals shall be used for protection.
 - 2. Wherever practicable, finished slabs shall be protected from the direct rays of the sun to prevent checking and crazing.

3.10 TRIMMING AND REPAIRS

- A. The Contractor shall use suitable forms, mixture of concrete, and workmanship so that concrete surfaces, when exposed, will require no patching.

- B. As soon as the forms have been stripped and the concrete surfaces exposed, fins and other projections shall be removed, recesses left by the removal of form ties shall be filled, and surface defects which do not impair structural strength shall be repaired.
- C. Defective concrete shall be cut perpendicular to the surface until sound concrete is reached, but less than 1 inch deep. The remaining concrete shall be thoroughly roughened and cleaned. Concrete around the cavity or the form-tie recess shall be thoroughly wetted and promptly painted with a 1/16-inch brush coat of neat cement mixed to the consistency of lead paint. The hole shall then be filled with mortar.
 - 1. Mortar shall be 1:1-1/2 cement and sand mix with sufficient white cement, or fine limestone screenings in lieu of sand, to produce a surface matching the adjoining work. Cement and sand shall be from the same sources as in the parent concrete.
 - 2. For filling form-tie recesses, the mortar shall be mixed slightly damp to the touch (just short of "balling"), hammered into the recess until it is dense and an excess of paste appears on the surface, and then troweled smooth. Mortar in patches shall be applied so that after partial set it can be compressed and rubbed to produce a finish flush and uniform in texture with the adjoining work. All patches shall be warm-moist cured as above specified.
- D. The use of mortar patching as above specified shall be confined to the repair of small defects in relatively green concrete. If substantial repairs are required, the defective portions shall be cut out to sound concrete and the masonry replaced by means of a cement gun, or the masonry shall be taken down and rebuilt, all as the Engineer may decide or direct.

3.11 SURFACE FINISH

- A. Fins and irregularities on formed surfaces to receive no other finish shall be smoothed.
- B. The top of concrete on which other concrete or unit masonry will later be placed shall be struck off true at the surface indicated on the Drawings or as permitted by the Engineer, as the concrete is being placed. As soon thereafter as the condition of the concrete permits and before it has hardened appreciably (normally within 2 hours after being deposited), all water, scum, laitance, and loose aggregate shall be removed from the surface by means of wire or bristle brooms in such a manner as to leave the coarse aggregate slightly exposed and the surface clean.

- C. Concrete surfaces shall be finished as follows, except as otherwise required by various sections of the Specifications or shown on the Drawings.
1. Wood-float finish shall be given to all top, substantially horizontal, exposed surfaces.
 2. Burlap-rubbed finish shall be given to all interior and exterior surfaces placed against forms which will be exposed to view on completion of the work. (Finish shall be to one foot below ground and below normal liquid surface elevations).
 3. All surfaces shaped without forms and over which liquids will flow shall be given a steel-trowel finish.
 4. Concrete surfaces to which roof insulation or roofing are to be applied shall be finished sufficiently smooth to receive the roofing material, as obtained by steel trowel or very smooth wood-float finish.

3.12 METHOD OF FINISHING

- A. Broomed Finish: Surfaces to be given broomed finish shall first be given a steel-trowel finish. Immediately after troweling, the surface shall be lightly brushed in one direction with a hair broom to produce a nonslip surface of uniformly good appearance.
- B. Wood-float Finish:
1. Surfaces to be given a wood-float finish shall be finished by tamping with special tools to force aggregates away from the surface, and screeding with straight edges to bring the surface to the required line.
 2. As soon after the condition of concrete permits and before it has hardened appreciably, all water, film, and foreign material which may work to the surface shall be removed. Rough finishing shall be done with straight edges and derbies. Machine floating if used, shall not be started until the surface will support the float adequately without digging in and bringing excess fines to the surface. At such time, a minimum of machine and hand floating with a wood float shall be employed to bring the finish to a true and uniform surface with no coarse aggregate visible.
 3. Under no circumstances will sprinkling with water or dusting with cement be permitted during finishing of the slab.
- C. Steel Trowel Finish: Surfaces to be given a steel-trowel finish shall first be given a wood-float finish. This shall be followed by hand troweling with steel trowels to bring the surface to a uniform, smooth, hard, impervious surface free from marks and blemishes. Troweling shall not be started until all water has disappeared from the surface. Over-troweling shall be avoided. Dusting

with dry cement or other mixtures or sprinkling with water will not be permitted in finishing.

D. Burlap Rubbed Finish:

1. Immediately after the forms have been stripped and before the concrete has changed in color, all fins and other projections shall be carefully removed by use of a hammer or other suitable means, and imperfections shall be repaired as hereinbefore specified under "Trimming and Repairs". While the surface is still damp, a thin coat of cement slurry of medium consistency shall be applied by means of bristle brushes to provide a bonding coat within pits and minor blemishes in the parent concrete; the coating of large areas of the surface with this slurry shall be avoided.
2. Before the slurry has dried or changed color, a dry (almost crumbly) grout composed of 1 volume of cement to 1-1/2 volumes of masonry sand shall be applied. The sand shall have a fineness modulus of approximately 2.25 and comply with the gradation requirements of the ASTM Standard Specifications for Aggregate for Masonry Mortar, Designation C144-76.
3. The grout shall be uniformly applied by means of damp (neither dripping wet nor dry) pads of burlap of convenient size (approximately 6 inches square) and shall be allowed to harden for one to two hours, depending on the weather. In hot, dry weather the surface shall be kept damp by means of a fine fog spray during the hardening period.
4. When the grout has hardened sufficiently, but before it becomes so hard as to be difficult to remove, excess grout shall be scraped from the surface of the parent concrete by the edge of a steel trowel, without removing the grout from the imperfections. Thereafter, the surface shall be allowed to dry thoroughly and then be rubbed vigorously with burlap to remove all dried grout so that no visible film remains on the surface after the rubbing. The entire cleaning operation for any area shall be so planned that sufficient time is allowed for the grout to dry and be rubbed after it has been cut with the trowel.
5. On the day following the grouting and burlap rubbing, the concrete surface shall again be rubbed clean with a dry burlap to remove inadvertent dust. If any built-up film remains on the parent surface, it shall be removed by being rubbed with a fine abrasive stone without breaking through the surface film of the original concrete. Such rubbing shall be light and sufficient only to remove excess material without working up a lather of mortar or changing the texture of the concrete. Following the final rubbing with burlap or abrasive stone, the surface shall be thoroughly washed with stiff bristle brushes (worked only along parallel lines) to remove extraneous materials from the surface. The surface shall then be sprayed with a fine fog spray to maintain a

continually damp condition for at least three (3) days after application of the grout.

6. When the burlap-rubbed finish has been completed, the concrete surface shall be smooth, free from discolorations and stains, and of uniformly good appearance.

3.13 HOT WEATHER CONDITIONS

Placing of concrete under conditions of high temperature, low humidity or wind shall be done in accordance with the American Concrete Institute "Hot Weather Conditions" (latest edition).

3.14 COLD WEATHER CONDITIONS

Cold weather concreting procedures precautions shall conform with American Concrete Institute "Cold Weather Concreting" (latest edition).

END OF SECTION 03300

**STANDARD SPECIFICATIONS AND DRAWINGS
HARDIN COUNTY WATER DISTRICT NO. 1**

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SECTION 02610 - WATER PIPE AND FITTINGS

PART 1 - GENERAL

1.01 WORK INCLUDED

The Contractor shall furnish all labor, material, and equipment necessary to install water main piping together with all appurtenances as shown and detailed on the Drawings and specified herein.

1.02 RELATED WORK

- A. Section 02225 - Excavating, Backfilling and Compacting for Utilities.
- B. Section 02630 - Encasement Pipe.
- C. Section 02640 - Water Valves and Gates.
- D. Section 02675 - Disinfection of Potable Water Pipe.

PART 2 - PRODUCTS

2.01 DUCTILE IRON PIPE (DIP) AND FITTINGS

- A. Ductile iron pipe (DIP) shall conform to ANSI/AWWA C150/A21.50, ANSI/AWWA C151/A21.51 Standard. The pipe shall conform to pressure class 350 minimum unless noted otherwise. All fittings and joints should be capable of accommodating pressure of not less than 250 psi. DIP is required for all new water mains 14-inch diameter and larger and for all fire hydrant lateral and fire service lines.
- B. Fittings shall be ductile iron in accordance with AWWA C153 and have a body thickness and radii of curvature conforming to ANSI A21.10 or ANSI A21.53 for compact fittings and shall conform to the details and dimensions shown therein. Fittings shall have rubber gasket joints meeting the requirements of AWWA C111. Fittings shall be cement-mortar lined and bituminous coated to conform to the latest revision of ANSI/AWWA standards.
- C. DIP shall be installed within 200 feet of fuel station or contaminated soils. Joints shall be installed with petroleum resistant nitrile gaskets.

- D. Ductile iron mechanical joint fittings shall be in accordance with AWWA C153 and have a body thickness and radii of curvature conforming to ANSI A21.10 (or A21.53 for compact fittings) and have joints in accordance with ANSI/AWWA C111/A21.11. Fittings and joints shall be supplied with all accessories.
- E. All fittings and valves shall be restrained with a friction type retainer gland, as manufactured by Ford, Romac or approved equal.
- F. All ductile fittings shall be rated at 250 psi water working pressure plus water hammer. Ductile iron fittings shall be ductile cast-iron grade 70-50-05 per ASTM Specification A339-55.
- G. Cement mortar lining and seal coating for pipe and fittings, where applicable shall be in accordance with ANSI/AWWA C104/A21.4. Bituminous outside coating shall be in accordance with ANSI/AWWA C151/A21.51 for pipe and ANSI/AWWA C110/A21.10 for fittings.
- H. No separate pay item has been established for fittings and no determination of the number of fittings required on the job has been made. The Contractor, during the bidding phase, shall determine the number of fittings required on the job and include the cost of the fittings and installation in the unit price for pipe.
- I. Ductile iron pipe and fittings shall be as manufactured by U.S. Pipe & Foundry Company, American Cast Iron Pipe Company, or approved equivalent.

2.02 POLYVINYL CHLORIDE (PVC) WATER PIPE - C.I. PIPE SIZE

- A. This pipe shall meet the requirements of AWWA C900-75 for Polyvinyl Chloride (PVC) Pressure Pipe. The pipe shall be PVC 1120 pipe with cast iron pipe equivalent ODs. Pressure class (PC) 235 pipe shall meet the requirements of DR 18 and PC 305 pipe meet the requirements of DR 14.
- B. Provisions must be made for expansion and contraction at each joint with a rubber ring. The bell shall consist of an integral wall section with a solid cross-section rubber ring which meets the laboratory performance of ASTM D3139. The bell section shall be designed to be at least as strong as the pipe wall.
- C. Standard laying lengths shall be 20 feet \pm for all sizes. At least 85 percent of the total footage of pipe of any class and size shall be furnished in standard lengths, the remaining 15% in random lengths. Random lengths shall not be

less than 10 feet long. Each standard and random length of pipe shall be tested to four times the class pressure of the pipe for a minimum of 5 seconds. The integral bell shall be tested with the pipe.

- D. Fittings for all lines shall be ductile iron and in accordance with AWWA C153 and have a body thickness and radii of curvature conforming to ANSI A21.10 or ANSI A21.53 for compact fittings. Cement mortar lining and seal coating shall be in accordance with ANSI/AWWA C104/A21.4. Bituminous outside coating shall be in accordance with ANSI/AWWA C110/A21.10. All fittings shall be rated at 250 psi water working pressure plus water hammer and be ductile cast-iron grade 70-50-05 per ASTM Specification A339.
- E. All fittings and valves shall be restrained with a friction type retainer gland, as manufactured by Ford, Romac or approved equal.
- F. No separate pay item has been established for fittings and no determination of the number of fittings required on the job has been made. The Contractor during the bidding phase shall determine the number of fittings required and include the cost of the fittings and installation in the unit price for pipe.

PART 3 - EXECUTION

3.01 LAYING DEPTHS

In general, water mains shall be laid with a minimum cover of 36 inches and a maximum depth of 60 inches, except as otherwise indicated on the Drawings. Under existing and future highway ditches the cover depth shall be 48 inches, as measured from the ditch flowline to the top of pipe.

3.02 SEWER/CONTAMINANT PIPE CROSSING

- A. At locations shown on the Drawings, required by the Specifications, or as directed by the Engineer, encasement shall be used when the clearance between the proposed water pipe and any existing sewer or contaminant carrying pipe is 18 inches or less. Contaminant carrying pipe includes underground petroleum, slurry, food processing, and other pipe as determined by the Engineer. Encasement may be concrete or an encasement pipe.
- B. Whether the proposed water pipe is above or below the existing sewer/contaminant pipe, the concrete shall fully encase the sewer/contaminant pipe and extend to the spring line of the water pipe. Encasement shall extend in each direction along the sewer/contaminant pipe until the encased sewer/contaminant pipe is 10 feet from the proposed water main, measured perpendicular to the water main.

- C. The pipe segment of the water main shall be installed so that it centers at the crossing with the contaminant pipe.
- D. Concrete shall be 3,000 psi and shall be mixed sufficiently wet to permit it to flow between and under the pipes to form a continuous bridge. In tamping the concrete, care shall be taken not to disturb the grade or line of either pipe or damage the joints. Sack concrete is not acceptable.
- E. Concrete for this Work is not a separate pay item and will be considered incidental to water pipe installation.

3.03 PIPE LAYING

A. Slip Jointed Pipe:

1. All pipes shall be laid with ends abutting and true to the lines and grades indicated on the plans. Pipe shall be fitted and matched so that when laid in the Work, it will provide a smooth and uniform invert. Supporting of pipe shall be as set out in Section 02225 and in no case shall the supporting of pipe on blocks be permitted.
2. Before each piece of pipe is lowered into the trench, it shall be thoroughly swabbed out to insure it is clean. Any piece of pipe or fitting which is known to be defective shall not be laid or placed in the lines. If any defective pipe or fittings shall be discovered after the pipe is laid, it shall be removed and replaced with a satisfactory pipe or fitting without additional charge. In case a length of pipe is cut to fit in a line, it shall be so cut as to leave a smooth end at right angles to the longitudinal axis of the pipe. Bevel can be made with hand or power tools.
3. Joint deflection for slip joint or mechanical joint pipe shall be no more than 75% of the maximum deflection recommended by the manufacturer. No pipe bending on 4-inch or larger. Joint deflection must be shown on shop drawing submittals.
4. The interior of the pipe, as the Work progresses, shall be cleaned of dirt, jointing materials, and superfluous materials of every description. When laying of pipe is stopped for any reason, the exposed end of such pipe shall be closed with a plywood plug fitted so as to exclude earth or other material and precautions taken to prevent floatation of pipe by runoff into trench.
5. Anchorage of Bends:

- a. At all tees, plugs, caps and bends of 11-1/4 degrees and over, and at reducers or in fittings where changes in pipe diameter occur, movement shall be prevented by providing both a friction type restrainer gland and poured concrete thrust blocking. Thrust blocks shall be as shown on the Drawings, with sufficient volumes of poured concrete being provided; however, care shall be taken to leave weep holes unobstructed and allow for future tightening of all nearby joints. Unless otherwise directed by the Engineer, thrust blocks shall be placed so that pipe and fitting joints will be accessible for repair. Polyethylene wrap shall be provided around all fittings, including retainer glands before pouring concrete thrust blocks. Sack concrete is not acceptable.
 - b. No extra pay shall be allowed for work on proper anchorage of pipe, fittings or other appurtenances. Such items shall be included in the price bid for the supported item.
6. No backfilling (except for securing pipe in place) over pipe will be allowed until the Engineer has the opportunity to make an inspection of the joints, alignment and grade in the section laid, but such inspection shall not relieve the Contractor of further liability in case of defective joints, misalignment caused by backfilling and other such deficiencies that are noted later.
 7. All joint surfaces shall be cleaned immediately before jointing the pipe. The joint shall be lubricated in accordance with the pipe manufacturer's recommendations. Each pipe unit shall then be carefully pushed into place without damage to pipe or gasket. All pipe shall be provided with home marks to insure proper gasket seating. Details of gasket installation and joint assembly shall follow the manufacturer's direction for the joint type and material of the pipe. The resulting joints shall be watertight and flexible.

3.04 TESTING OF WATER PIPE

- A. The completed work shall comply with the provisions listed herein, or similar requirements which will insure equal or better results. Suitable test plugs, water pump or other equipment and apparatus, and all labor required to properly conduct the tests shall be furnished by the Contractor at no expense to HCWD1.
- B. Only HCWD1 personnel are permitted to operate active hydrants and valves. There will be no charge to the Contractor for water or labor for contracts with HCWD1.

- C. Water main piping shall be pressure tested to 250 percent of the normal system operating pressure or to 100 percent of the rated working pressure of the pipe, whichever is less. At no time shall the test pressure exceed 100 percent of the pipe's rated working pressure. A chart recorder provided by HCWD1 shall be installed on the pump discharge connection to the new water main to record pressure and time. A pipe section shall be accepted if the test pressure does not fall more than 5 psi during the minimum 2-hour test period. The pipe shall be tested for allowable leakage according to AWWA C-600 or C-605, as applicable, concurrently with the pressure test.
- D. Where practicable, pipelines shall be tested between line valves or plugs in lengths of not more than 6,000 feet. Testing shall proceed from the source of water toward the termination of the line. The line shall be tested upon the completion of the first 6,000 feet. After the completion of two (2) consecutive tests without failure, the Contractor, at his option and with the Engineer's approval, may discontinue testing until the system is complete.
- E. All pipe, fittings and other materials found to be defective under test shall be removed and replaced at the Contractor's expense.
- F. Before applying the specified test pressure, air shall be expelled completely from the pipe, valves and hydrants. If permanent air vents are not located at high points within the test section, the Contractor shall install corporation cocks at such points so that the air can be expelled as the line is filled with water.
- G. All piping shall be tested for leakage at a pressure no less than that specified for the pressure test. The leakage shall be defined as the quantity of water that must be supplied to the tested section to maintain pressure within 5 psi of the specified test pressure after the air in the pipeline has been expelled and the pipe has been filled with water. The leakage shall be less than an allowable amount determined by the following equation:

$$L = \frac{SD (P)^{1/2}}{133,200}$$

- Where:
- L = allowable leakage (gallons/hour)
 - S = length of pipe tested, in feet
 - D = nominal diameter of pipe (inches)
 - P = test pressure (psig)

- G. Should the sections under test fail to meet the requirements, the Contractor shall do all work of locating and repairing the leaks and retesting as the Engineer may require without additional compensation. All visible leaks are to be repaired regardless of the amount of leakage.

- H. If in the judgment of the Engineer, it is impracticable to follow the foregoing procedures for any reason, modifications in the procedures shall be made as required and as acceptable to the Engineer, but in any event, the Contractor shall be responsible for the ultimate tightness of the line within the above test requirements.

3.06 PLACEMENT OF IDENTIFICATION TAPE

Detectable underground marking tape shall be placed over all water mains as specified in Section 02225.

3.07 PLACEMENT OF LOCATION WIRE

Detectable underground location wire shall be placed above all non-metallic water main as specified in Section 02225.

- 3.08 Granular HTH shall be placed in appropriately measured quantities of each pipe segment to facilitate disinfection, see Section 02675.

END OF SECTION 02610

SECTION 02640 - WATER VALVES AND GATES

PART 1 - GENERAL

1.01 WORK INCLUDED

The Contractor shall furnish all labor, material, and equipment necessary to install valves together with all appurtenances as shown and detailed on the Drawings and specified herein.

1.02 RELATED WORK

- A. Section 02225 - Excavating, Backfilling and Compacting for Utilities.
- B. Section 02610 - Water Pipe and Fittings.
- C. Section 02645 - Hydrants.

1.03 SUBMITTALS

- A. Complete shop drawings of all valves and appurtenances shall be submitted to the Engineer in accordance with the requirements of Section 01300.
- B. The manufacturer shall furnish the Engineer an affidavit stating that the valve and all materials used in its construction conform to the applicable requirements of the latest revision of the applicable AWWA Standard, and that all tests specified therein have been performed and that all test requirements have been met.

PART 2 - PRODUCTS

2.01 GATE VALVES

- A. All gate valves shall be of the resilient seat type in accordance with the latest revision of AWWA C509 Standard. The valve body, bonnet and gate castings shall be ductile iron or cast iron. The valve shall have a non-rising stem (NRS), fully bronze mounted or stainless steel with o-ring seals. Valve body and bonnet, inside and out, shall be fully coated with fusion bonded epoxy coating in accordance with AWWA C550 Standard. Valves shall have a rated working pressure of 200 psi. Gate valves shall be installed on lines 6-inch through 12-inch.
- B. Gate valves for buried service shall be furnished with mechanical joint end connections, unless otherwise shown on the Drawings or specified herein.

The end connection shall be suitable to receive ductile iron or PVC pipe.

- C. Gate valves for meter pits, pump stations, or other installations as shown on the Drawings shall be furnished with flanged joint and connections, non rising stem and handwheel operator. The gate valve shall have the direction of opening cast on the rim of the handwheel and provided with chain and lock.
- D. Buried service gate valves shall be provided with a 2-inch square operating nut and shall be opened by turning to the left (counterclockwise).
- E. Buried service gate valves shall be installed in a vertical position with valve box as detailed on the Drawings. They shall be set vertically and properly adjusted so that the cover will be in the same plane as the finished surface of the ground or street.
- F. Valves shall be those manufactured by **Mueller, Kennedy** or approved equivalent.

2.02 TAPPING VALVES

- A. All tapping valves shall be of the resilient seat, gate valve type in accordance with the latest revision of AWWA C509 Standard. The valve body, bonnet and gate castings shall be cast iron. The valve shall have a non-rising stem (NRS), fully bronze mounted with o-ring seals. Valve body and bonnet, inside and out, shall be fully coated with fusion bonded epoxy coating in accordance with AWWA C550 Standard. Valves shall have a rated working pressure of 200 psi.
- B. Valve shall be furnished with ANSI B16.1 mechanical jointend with centering ring on tapping side. Outlet side shall be mechanical joint. All valves through 12 inches shall mate all sleeves through 12-inch outlet regardless of manufacturer.
- C. All cast iron shall conform to ASTM A126, Class B. Castings shall be clean and sound without defects that will impair their service. No plugging or welding of such defects will be allowed. Bolts shall be stainless steel with hex heads and hex nuts in accordance with ASTM A-307 and A-563.
- D. Stems shall be manganese bronze having a minimum tensile strength of 60,000 psi, a minimum yield of 20,000 psi. NRS stem collars shall be cast integral with them and machined to size. The housing for the valve stem collar shall be machined. All thrust bearing shall be incorporated as required, to optimize operating torques. NRS valves shall be furnished with two (2) o-ring stem seals located above the thrust collar and one (1) below. O-rings shall be set in grooves in the stem. The o-ring grooves shall not be less than the root diameter of the stem threads.

- E. Gates for valve shall be totally encapsulated in rubber, be field replaceable, and provide a dual seal on the mating body seat. Valve shall be capable of installation in any position with rated sealing in both directions. Rubber sets of specially compounded SBR materials shall be utilized and be capable of sealing even under conditions of normal wear. The valve body shall have integral guide engaging lugs in the gate in a tongue-and-groove manner, supporting the gate throughout the entire open/close travel.
- F. Tapping valves shall be capable of making taps by using a cutter not less than 1/4-inch smaller than nominal pipe size.
- G. Tapping valves shall be provided with a 2-inch square operating nut and shall be opened by turning to the left counterclockwise).
- H. Tapping valves shall be installed in a vertical position with valve box as detailed on the Drawings. They shall be set vertically and properly adjusted so that the cover will be in the same plane as the finished surface of the ground or street.
- I. Valves shall be those manufactured by **Mueller, Kennedy, M & H, American Flow Control** or approved equivalent.
- J. **See Standard Detail XX.**

2.03 TAPPING SLEEVES

- A. Tapping sleeves shall be stainless steel and capable of containing pressure within the full volume of the sleeve. Sleeve shall be mechanical joint suitable for use with ductile iron or PVC pipe.
- B. Sleeve shall be rated at 200 psi working pressure through 12-inch size and 150 psi for sleeves 14-inch through 24-inch.
- C. Mechanical joint throat section of mechanical joint sleeves through 12-inch size shall conform to MSS SP60 Standard. For throat sections larger than 12 inches, flanged section shall mate valves of same manufacture as sleeves.
- D. Tapping sleeves shall be capable of withstanding their rated pressure without leakage past the side gaskets and end gaskets of the sleeve. Tapping sleeves shall be fast-tap stainless steel with mechanical joint outlet.
- E. Tapping sleeve shall be manufactured by **Mueller, Kennedy, M & H, American Flow Control** or approved equivalent.

F. See Standard Detail XX.

2.04 BUTTERFLY VALVES (BURIED)

For Valves 14-inch and larger: The butterfly valve shall be DeZurik or M&H Valve Company AWWA C504 series (or approvable equivalent), mechanical joint, resilient seat, cast iron body and disk, stainless steel shaft and seating edge (ring), Chloroprene seat, Class 150B, cast iron housing with 2-inch operator nut in vertical position for use with a valve box. The valve shall be fully coated, inside and out, with fusion bonded epoxy in accordance with the latest revision of AWWA C550 Standard.

2.05 AIR RELEASE AND AIR/VACUUM VALVES

A. Air release valves shall be installed at high points along the water main as shown on the Drawings and directed by the Engineer. Size shall be determined by main size and operating pressure. Valve shall be manufactured by Valve and Primer Corp, APCO Series 200A or approved equivalent. See Standard Detail XX.

B. The valves shall be in accordance with ANSI/AWWA C512.

C. At air release valve locations the water line or force main shall be installed at 48-inch cover. The increase in depth shall be gradual toward and away from the valve installation.

D. Valves shall be constructed of cast iron body and cover, stainless trim and float with a Buna-N seat for positive seating. The baffle shall be ductile iron and shall protect float from direct impact of air and water. The seat shall slip fit into the baffle or cover and lock in place without any distortion. The float and baffle assembly shall be shrouded with a water diffuser. The float shall be stainless steel center guided for positive seating and be rated at 1,000 psi non-shock service.

E. The discharge orifice shall be fitted with a double-acting throttle device to regulate and restrict air venting.

F. All parts of the valves and the operating mechanisms shall be made of non-corrodible materials.

2.06 REDUCED PRESSURE ZONE BACKFLOW PREVENTOR

A. Backflow preventors shall have FDA approved epoxy coated cast iron check valve bodies with bronze seats, and FDA approved epoxy coated cast iron relief valve with stainless steel trim. Test cocks shall be bronze body ball

valves. Features shall include replaceable bronze seats, non-rising stem resilient wedge gate valve shut-offs, epoxy coated check and relief valves (inside and out), and stainless steel internal parts.

- B. Backflow preventors shall be suitable for continuous use for water supply pressure to 175 psi and water temperature up to 110 degrees Fahrenheit. They shall comply with the latest revision of AWWA C-511.
- C. Markings shall be in accordance with AWWA C-508 and include size, working pressure, and cast arrow to indicate direction of flow, name of manufacturer, and year of manufacturer.
- D. End configurations shall be furnished with 125 pound ANSI flanged ends with accessories.
- E. Painting the inside and outside of all valves, together with the working parts except bronze and machined surfaces, shall be coated in accordance with the latest revision of AWWA C-550.
- F. The backflow preventor shall be Series 909 Reduced Pressure Zone Backflow Preventor as manufactured by **WATTS Regulator**, or an acceptable equivalent product.

2.07 VALVE BOXES

- A. Each buried stop and valve shall be provided with a suitable valve box. Boxes shall be of the screw type, adjustable, telescoping, heavy-pattern type with the lower part of cast iron and the upper part of steel or cast iron. They shall be so designed and constructed as to prevent the direct transmission of traffic loads to the pipe or valve.
- B. The upper or screw section of the box shall be provided with a flange having sufficient bearing area to prevent undue settlement. The lower section of the box shall be designed to enclose the operating nut and stuffing box of the valve and rest on the valve bonnet.
- C. The boxes shall be adjustable through at least 6 inches vertically without reduction of the lap between sections to less than 4 inches.
- D. The inside diameter of boxes for valves shall be at least 4-1/2 inches, and the lengths shall be as necessary for the depths of the valves or stops with which the boxes are to be used.
- E. Covers for valves shall be close fitting and substantially dirt-tight. The top of

the cover shall be flush with the top of the box rim. An arrow and the word OPEN to indicate the direction of turning to open the valve shall be cast in the top of the valve covers with "WATER" cast into lid.

- F. A 24-inch square concrete collar, 4-inches thick shall be installed around the cover in earth areas.
- G. See Standard Detail XX.

2.08 COUPLING ADAPTER

- A. The pipe couplings shall be of a gasketed, sleeve-type with diameter to properly fit the pipe. Each coupling shall consist of one (1) steel middle ring, of thickness and length specified, two (2) steel followers, two (2) rubber-compounded wedge section gaskets and sufficient track-head steel bolts to properly compress the gaskets. Field joints shall be made with this type of coupling. The middle ring and followers of the coupling shall be true circular sections free from irregularities, flat spots, or surface defects. They shall be formed from mill sections with the follower-ring section of such design as to provide confinement of the gasket. After welding, they shall be tested by cold expanding a minimum of 1 percent beyond the yield point. The coupling bolts shall be of the elliptic-neck, track-head design with rolled threads. The manufacturer shall supply information as to the recommended torque to which the bolts shall be tightened. All bolt holes in the followers shall be oval for greater strength. The gaskets of the coupling shall be composed of a crude or synthetic rubber base compounded with other products to produce a material which will not deteriorate from age, from heat, or exposure to air under normal storage conditions. It shall also possess the quality of resilience and ability to resist cold flow of the material so that the joint will remain sealed and tight indefinitely when subjected to shock, vibration, pulsation and temperature or other adjustments of the pipe line. The couplings shall be assembled on the job in a manner to insure permanently tight joints under all reasonable conditions of expansion, contraction, shifting and settlement, unavoidable variations in trench gradient, etc.
- B. Nuts and bolts shall be in accordance with AWWA C111.
- C. Couplings shall be shop primed and field painted in accordance with Division 9 (or one coat of coal tar epoxy if not specified in Division 9).
- D. Compression couplings shall be equivalent to Style 38 manufactured by Dresser. Flanged couplings shall have flanges in accordance with AWWA C207 and be equivalent to Style 128 manufactured by Dresser.

2.09 FIBERGLASS LINE MARKER FOR BURIED VALVES

A. General:

1. Design: The continuous fiberglass reinforced composite line marker shall be a single piece marker capable of simple, permanent installation by one person using a manual driving tool. The marker, upon proper installation, shall resist displacement from wind and vehicle impact forces. The marker shall be of a constant flat "T" cross-sectional design with reinforcing support ribs incorporated longitudinally along each edge to provide sheeting protection and structural rigidity. The bottom end of the marker shall be pointed for ease of ground penetration.
2. Material: The marker shall be constructed of a durable, UV resistant, continuous glass fiber and marble reinforced, thermosetting composite material which is resistant to impact, ozone, and hydrocarbons within a service temperature range of -40^o F to +140^o F.
3. Marking: Each marker shall be permanently marked "Water Line Below." The letters shall be a minimum of 2 inches in height. A black line shall be stamped horizontally across the front of the marker near the bottom to indicate proper burial depth as shown in the standard detail. The marker shall be a CRM-375 as manufactured by Carsonite International, or approved equivalent.

B. Physical and Mechanical Requirements:

1. Dimensions: The marker shall conform to the shape and overall dimensions shown in the standard detail.
2. Mechanical Properties: The marker shall have the minimum mechanical properties as follows:

Property	ASTM Test Method	Minimum Value
Ultimate Tensile Strength	D-638	50,000 psi
Ultimate Compressive Strength	D-638	45,000 psi
Specific Gravity	D-792	1.7
Weight % Glass Reinforcement	D-2584	50%
Barcol Hardness	D-2583	47

3. Color Fastness: The marker shall be pigmented throughout the entire cross-section so as to produce a uniform color which is an integral part of the material. Ultraviolet resistant materials shall be incorporated in the construction to inhibit fading or cracking of the delineator upon field exposure.

- C. Reflectors:
 - 1. The reflector shall be of impact resistant, pressure sensitive retro-reflective sheeting which shall be subject to approval by the Engineer. The sheeting shall be of appropriate color to meet MUTCD requirements.
 - 2. Mounting: The retro-reflective sheeting shall consist of a minimum of a 3-inch wide strip placed a maximum of 2 inches from the top of the post unless otherwise specified.

- D. See Standard Detail XX.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Valves shall be installed as nearly as possible in the positions indicated on the Drawings consistent with conveniences of operating the handwheel or wrench. All valves shall be carefully erected and supported in their respective positions free from all distortion and strain on appurtenances during handling and installation.

- B. All material shall be carefully inspected for defects in workmanship and material, all debris and foreign material cleaned out of valve openings and seats, all operating mechanisms operated to check their proper functioning, and all nuts and bolts checked for tightness.

- C. Valves and other equipment which do not operate easily or are otherwise defective shall be repaired or replaced at the Contractor's expense. Valves shall not be installed with stems below the horizontal.

- D. Valves shall be provided with extension stems where required for convenience of operation. Extension stems shall be provided for valves installed underground and elsewhere so that the operating wrench does not exceed 6 feet in length.

3.02 PAINTING

- A. Valves shall be factory primed and fully coated, inside and out, with fusion bonded epoxy in accordance with the latest revision of AWWA C550 Standard.

END OF SECTION 02640

SECTION 02645 - HYDRANTS

PART 1 - GENERAL

1.01 WORK INCLUDED

The Contractor shall furnish all labor, materials, and equipment required to complete the work of installing fire hydrants with all appurtenances as shown on the Drawings and specified herein.

PART 2 - PRODUCTS

2.01 FIRE HYDRANTS

- A. Fire hydrants shall be improved AWWA compression model with 4-1/2 inch hydrant valve, two (2) 2-1/2 inch hose outlets, one (1) 4-1/2 inch pumper nozzle, national standard threads, national standard pentagon operating nut opening left. Fire hydrant shall be equipped with safety flanges designed to prevent barrel breakage when struck by a vehicle, flanged inlets and auxiliary gate valves. Fire hydrants shall be installed off mains 6-inches and larger and have 6-inch inlets. and shall be Mueller Super Centurion 200 as manufactured by Mueller Company, or approved equivalent.
- B. Each fire hydrant shall be installed with an auxiliary gate valve and valve box. Valve box cover shall be marked "WATER".
- C. Inlet cover depth shall be minimum of 36 inches and the minimum dimension from ground to centerline of lowest opening shall be 18 to 24 inches. Fire hydrants shall be supported on a poured-in-place concrete thrust block and provided with a drainage pit as indicated on **Standard Detail XX**.
- D. All fire hydrants shall be fully coated, inside and out, with fusion bonded epoxy coating in accordance with AWWA C550 Standard and color shall be as selected by the Owner.

2.02 SPARE PARTS

- A. The Owner shall be furnished with two (2) hydrant barrel wrenches, four (4) spanner wrenches and two (2) operating nut wrenches at Owner's request.

PART 3 - EXECUTION

3.01 INSTALLATION

Fire hydrants shall be installed in accordance with the manufacturer's directions and as detailed on the Drawings.

3.02 Fire hydrants shall be fully restrained from the barrel through the shut-off valve to the main line with an anchor tee, friction type restraint glands and poured concrete thrust blocking.

3.03 Temporary out of service tags shall be placed on all newly installed fire hydrants until such time the water line is put into service.

3.04 No bollards are allowed on state roads.

3.05 During pressure testing of the main line, the hydrant isolation valve shall be open and pressure tested to the hydrant valve.

END OF SECTION 02645

SECTION 02660 - DOMESTIC WATER DISTRIBUTION CONNECTIONS

PART 1 - GENERAL

1.01 WORK INCLUDED

The Contractor shall furnish all labor and equipment necessary to install water service piping together with tapping saddle and corporation stop as shown and detailed on the Drawings and specified herein.

1.02 RELATED WORK

- A. Section 02225 - Excavating, Backfilling and Compacting for Utilities.
- B. Section 02640 - Water Valves and Gates.
- C. Section 02675 - Disinfection of Potable Water Pipe.

PART 2 - PRODUCTS

2.01 SADDLES

Saddles shall be for PVC or DI pipe equal to the **Ford S70 Series**. $\frac{3}{4}$ - inch and 1- inch services shall have direct insertion of corporation stops.

2.02 CORPORATION STOP

- A. Corporation stops to be used with copper pipe with compression type connections, where connected into PVC pipe, shall be the same, except with compression type outlet connections. Stops shall be **Ford F-1000**.
- B. Corporation stops shall be factory tested to 150 psi to be compatible with the pipes in which they are installed.

2.03 WATER METERS AND SETTERS

- A. Water meters and setters shall be purchased directly from HCWD1.

2.05 METER BOX

- A. Meter box shall be high density polyethylene conforming to the minimum requirements of cell classification 424420 B as described in ASTM D3350.

The box shall be able to withstand 1,200 pounds compression and shall be used for both single and tandem setters.

- B. The meter box sizes shall be as follows: 36 inch ID for 2 inch meter; 30 inch ID for 1½ meter; and 18 inch ID for 1 inch meter or less. Length (depth) shall be minimum 24 inches. Meter box shall be manufactured by **Hancor** or approved equivalent.
- C. Cast iron meter box and lid shall be provided for each meter box in the following sizes: 20 inch for 36 inch ID box and 18 inch for 30 inch ID box and less. CI meter box and lid shall be manufactured by **Tyler and Ford**. Lid shall read "Water Meter".

2.06 COPPER SERVICE PIPE AND FITTINGS

- A. Copper pipe for sizes 3/4-inch and 1-inch water service piping shall be Type K, seamless, annealed tubing, meeting latest edition of ASTM Specification B-88. Fittings shall be standard wrought copper meeting ANSI B16.29 and manufactured by **Ford, Mueller** or equal.
- B. Pipe shall meet all applicable provisions of the Commercial Standards and shall bear the National Sanitation Foundation (NSF) seal of approval.
- C. Service pipe shall be installed in 2 inch Schedule 40 PVC casing pipe across under roadways.

2.07 PRESSURE REDUCING VALVE (PRV)

Pressure reducing valves for water service shall be single seated for dead-end or continuous service. Size 3/4-inch shall have bronze bodies with screwed ends. The cup packing and valve seat shall be of high grade leather; the diaphragm of nylon-inserted neoprene. The valves shall be equal to **Wilkins #600 or Watts Regulator Series US #35130**.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. All service connections shall be installed in the locations shown, rigidly supported.
- B. After installation, all service connections shall be tested at least one hour at the working pressure corresponding to the class of pipe, unless a different test

pressure is specified. If any joint proves to be defective, it shall be repaired to the satisfaction of the Engineer with main services on to the meter setter.

- C. All materials shall be carefully inspected for defects in workmanship and materials; all debris and foreign material cleaned out of valve openings, etc.; all operating mechanisms operated to check their proper functioning, and all fittings checked for tightness. All materials which do not operate easily, or are otherwise defective, shall be repaired or replaced at no additional cost to the Owner.

3.02 INSPECTION AND TESTING

All service connections shall be tested to demonstrate their conformance with the specified operational capabilities and any deficiencies shall be corrected, device replaced or otherwise made acceptable to the Engineer.

END OF SECTION 02660

SECTION 02675 - DISINFECTION OF POTABLE WATER PIPE

PART 1 - GENERAL

1.01 WORK INCLUDED

The Contractor shall furnish all labor and material necessary to disinfect and flush the newly installed or repaired potable water mains as shown on the Drawings and specified herein. Included are materials for temporary blowoff and sampling taps. Only HCWD1 personnel shall operate active hydrants and valves. For contracts with HCWD1, there will be no charge for water or labor.

1.02 RELATED WORK

- A. Section 02225 - Excavating, Backfilling and Compacting for Utilities.
- B. Section 02610 - Water Pipe and Fittings.
- C. Section 02640 - Water Valves and Gates
- D. Section 02660 - Domestic Water Distribution Connections

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 DISINFECTION AND FLUSHING OF WATER LINES

- A. Sterilization of pipe line shall be in accordance with the American Water Works Association Specification C651-05 using granular HTH. The pipe line shall be disinfected by using a 50 mg/l chlorine solution for a contact period of 24 hours. Not before the end of the 24 hour retention period, the residual will be tested and the concentration shall be at least 25 ppm. Pipes shall be thoroughly flushed upon meeting the chlorine residual requirements.
- B. Before the main is chlorinated, it shall be filled to eliminate air pockets and flushed to remove particulates.

- C. Preliminary and final flushing velocity in the main shall not be less than 2.5 ft/sec unless waived by HCWD1. The required flow and opening size to flush pipelines at 40 psi residual pressure is provided below.

<u>Pipe Dia (in)</u>	<u>Size of Tap/Hydrant Outlet (in)</u>
4	1
6	1.5
8	2
10	2
12	2.5 (two)
16	2.5 (two)

- D. The environment to which the chlorinated water is to be discharged shall be inspected. All flushing of high chlorinated mains need to be dechlorinated prior to discharging.
- E. Before the pipes are placed in service, samples of the water must be taken by the Contractor and submitted to a state-certified laboratory for testing. No pipes shall be placed in service until the samples have been approved by the agency. The Contractor shall obtain prior approval lab services from HCWD1 and bear all the cost of sampling, testing and postage.
- F. Sampling locations shall be approved by HCWD1.
- G. A satisfactory report for the section(s) under test must be submitted to HCWD1 and the Engineer before authorizing domestic consumption of the water.
- H. Sterilization procedures shall be continued until approved samples have been obtained.

END OF SECTION 02675

**STANDARD SPECIFICATIONS AND DRAWINGS
HARDIN COUNTY WATER DISTRICT NO. 1**

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SECTION 02600 - MAINTAINING WASTEWATER FLOW

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. This Section shall include all pumps, hoses, tank trucks, traffic control, clean up, and any other materials required to effectively by-pass pump and maintain continuous wastewater flow in the existing sewer system.
- B. The Contractor shall furnish all labor, materials, tools and equipment necessary to maintain wastewater flows in the sewer by means of by-pass pumping around the sewer segment or manhole to maintain flow continuously until work is completed.

PART 2 – PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 CONSTRUCTION REQUIREMENTS

The Contractor shall contact the Engineer 48 hours in advance of any work where active sewers will be entered by personnel or equipment. Procedures and equipment planned by the Contractor for maintaining wastewater flow during work shall be coordinated with the Engineer. The Contractor shall utilize the District's Standard Operating Procedure in addition to his/her own methods/procedures. Call the District immediately if there is any overflow or backup.

3.02 SEWER PLUGGING OR BLOCKING

- A. During any type of sewer replacement work, if necessary to temporarily control wastewater flow, after proper notice is given to the Engineer, the Contractor may plug or block the sewer pipe.
- B. A sewer line plug shall be inserted into the pipe at a manhole upstream from the section being replaced. The plug shall be so designed that during all or any portion of the operation, wastewater flows shall be shut off or substantially reduced in order to properly inspect and test the segment being replaced. After replacement work is complete, flows shall be restored to normal.

- C. The Contractor shall abide by the requirements of HCWD1 for notifications and visual signage at the manhole structure being plugged or blocked.

3.03 BYPASS PUMPING

- A. Where in the opinion of the Engineer pumping is required for wastewater flow control and to assure completion of the replacement, the Contractor shall furnish pumping equipment, traffic control, conduits, fittings, barricades, safety equipment, power and other necessary equipment. No pumping operations shall be performed from manhole to manhole in which wastewater is allowed to enter surface drainage facilities, ditches, or natural water courses. No additional compensation will be due to the Contractor when by-passing is deemed necessary.
- B. Sanitary sewage shall be pumped directly into the nearest downstream available manhole, providing that the existing sewer has capacity to transport the flow, or, if no manhole is available, into tank trucks for hauling sewage. The Contractor shall be responsible for keeping pumps running continuously, 24 hours a day if required, until the by-pass operation is no longer required.
- C. The by-pass system shall have adequate capacity to handle existing wastewater flow plus any additional peak flows which may occur during the rehabilitation work process. The estimated peak flow rate of the gravity sewer to be relocated or plugged is XXXX gpm.
- D. The Contractor shall utilize the District's Standard Operating Procedure in addition to his/her own methods/procedures where active sewers are entered. Call the District immediately if there is any overflow or backup.

3.04 PRECAUTIONS AND LIABILITY

- A. During wastewater flow control operations, the Contractor shall take proper precautions to prevent flooding and/or damage to existing sanitary sewer facilities, or to public or private property.
- B. The Contractor shall make repairs or replacements or rebuild any damaged section or sections of existing sewers, as directed by the Engineer. All such repairs, replacements, and rebuilding shall be paid for by the Contractor.

- C. The Contractor shall make provisions as necessary for handling all flows in existing sewers, connections, and manholes by pipes, flumes, or by other approved methods at all times in which operations would interfere with normal functioning of those facilities.
- D. The Contractor shall be responsible for the removal of any debris and sedimentation in the existing sewers, laterals and manholes, etc. which is attributable to work under this Contract.
- E. All operations shall be performed by the Contractor in strict accordance with OSHA and any applicable local safety requirements. Particular attention of the Contractor is directed to safety regulations for excavations and entering confined spaces.
- F. It is the Contractor's responsibility to notify any property owner having a sewer service connection on the sewer being rehabilitated that such work is being performed. The Contractor shall be solely responsible for any damage caused by property service connection backups caused by the Contractor's sewer rehabilitation efforts.
- G. If sewage should leak or spill during any of the Contractor's operations under this Contract, the Contractor shall immediately contact the Engineer and implement emergency containment actions.

3.05 PAYMENT

{Specifier select}

Payment for bypass pumping shall be included in the in the unit price for gravity sewer line or force main pipe.

Or

Payment for bypass pumping will be made at the Contract unit price each or lump sum amount.

END OF SECTION 02600

SECTION 02642 - SEWAGE VALVES AND GATES

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. The Contractor shall furnish and install valves, gates, and miscellaneous piping appurtenances, as indicated on the Drawings and as herein specified.
- B. Valves for use in the following services are specified under their appropriate sections: **{Specifier list valves for Project}**
 - 1. _____.
 - 2. _____.
 - 3. _____.
 - 4. _____.
- D. Enclosures shall be of a suitable type for the atmospheres in which they are installed. Sizes and capacities not specified herein are indicated on the Drawings.

1.02 RELATED WORK

- A. Section 02225 - Excavating, Backfilling and Compacting for Utilities.
- B. Section 02731 - Gravity Sewers
- C. Section 02732 - Sewage Force Mains.

1.03 SUBMITTALS

- A. Complete shop drawings of all valves and appurtenances shall be submitted to the Engineer in accordance with the requirements of Section 01300.
- B. The manufacturer shall furnish the Engineer two (2) copies of an affidavit stating that the valve and all materials used in its construction conform to the applicable requirements of ANSI/AWWA valve, and that all tests specified therein have been performed and that all test requirements have been met.

PART 2 - PRODUCTS

2.01 BALL VALVES

- A. Ball valves shall have double union ends to permit removal of the valve without disconnecting the pipeline and shall be of the type which will not leak when the downstream union end is disconnected.
- B. Viton "O" ring seals shall be used with teflon seats. Ball valves shall be installed with the flow arrow pointed in the direction of flow to permit disconnection of downstream piping.
- C. During installation, the valve handle shall be oriented for ease of operation by rotating the valve body about its axis prior to tightening the ends.

{Specifier choose desired valve(s): Air Release, Air/Vacuum Valve and Combination Air Valve}

2.02 AIR RELEASE VALVES (SEWAGE)

- A. The air release valve shall automatically vent small pockets of air that may accumulate at high points in the force main system while the system is operating and pressurized.
- B. Valves shall be constructed of high strength plastic, stainless steel, and other non-corrosion materials and be rated for not less than 150 psi operating pressure.
- C. The air release valve shall be Series 200A or 200, as manufactured by APCO, or an approved equivalent. **See Standard Detail XX.**

2.03 AIR/VACUUM VALVES (SEWAGE)

- A. The air/vacuum valve vents large volumes of air when the force main is filled and allows air to re-enter when draining, to prevent vacuum or column separation from occurring. The air/vacuum valve utilizes two floats, each connected to a common stem.
- B. Valves shall be constructed of high strength plastic, stainless steel, and other non-corrosion materials and be rated for not less than 150 psi operating pressure. Backflushing attachments that include inlet and outlet blow off valves, quick disconnect coupling and 5 feet of rubber hosing shall be provided with each valve.
- C. The air/vacuum valve shall be Series 401, as manufactured by APCO, or an approved equivalent. **See Standard Detail XX.**

2.04 COMBINATION AIR VALVES (SEWAGE)

- A. The combination valve shall be of the type that automatically exhausts large quantities of air during the filling of a system and allows air to re-enter

during draining or when a vacuum occurs and automatically vent small pockets of air that may accumulate at high points while the system is operating and pressurized.. The over-all height less back wash accessories shall not exceed 24 inches. Valves shall be constructed of cast iron body and cover, stainless trim and float with a Buna-N seat for positive seating.

- B. Backflushing attachments that include inlet and outlet blow off valves, quick disconnect coupling and 5 feet of rubber hosing shall be provided with each valve.
- C. All parts of the valves and the operating mechanisms shall be made of non-corrodible materials.
- D. The combination air valve (air/vacuum and air release) shall be Series 440 SCAV, as manufactured by APCO or an approved equivalent. **See Standard Detail XX.**

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Valves shall be installed as nearly as possible at the locations indicated on the Drawings. Valves shall be set plumb and supported adequately in conformance with the instructions of the manufacturer. All valves shall be carefully erected and supported in their respective positions free from all distortion and strain on appurtenances during handling and installation.
- B. All material shall be carefully inspected for defects in workmanship and material, all debris and foreign material cleaned out of valve openings and seats, all operating mechanisms operated to check their proper functioning, and all nuts and bolts checked for tightness.

3.02 PAINTING

- A. Valves shall be factory primed and fully coated, inside and out, with fusion bonded epoxy in accordance with the latest revision of AWWA C550 Standard.

END OF SECTION 02642

SECTION 02731 - GRAVITY SEWERS

PART 1 - GENERAL

1.01 WORK INCLUDED

The Contractor shall furnish all labor, material, and equipment necessary to install gravity sewer piping together with all appurtenances as shown and detailed on the Drawings and specified herein.

1.02 RELATED WORK

- A. Section 02225 - Excavating, Backfilling, and Compacting for Utilities.
- B. Section 02735 - Manholes and Precast Sewage Structures.
- C. Section 02762 – Sanitary Sewer Line Cleaning and Internal Inspection.

PART 2 - PRODUCTS

2.01 PIPE AND FITTINGS

- A. Polyvinyl Chloride (PVC) Pipe:
 - 1. Solid and Heavy Wall PVC Pipe:
 - a. PVC pipe and fittings less than 15 inches in diameter shall conform to the requirements of ASTM Standard Specifications for Type PSM Polyvinyl Chloride (PVC) Sewer Pipe and Fittings, Designation D 3034. Pipe and fittings shall have a minimum cell classification of 12454 as defined in ASTM D-1784. Pipes with a cover depth of 15 feet or less shall have a pipe diameter to wall thickness ratio (SDR) of a maximum of 35. Pipes with a cover depth of 15 feet or greater shall have a pipe diameter to wall thickness ratio (SDR) of a maximum of 26.
 - b. PVC pipe and fitting with diameters 18-inch through 27-inch shall conform to the requirements of ASTM D-1784 and ASTM F-679. Pipe and fittings shall have a minimum cell classification of 12454. The minimum wall thickness shall conform to ASTM F-679 for a minimum pipe stiffness of 46 psi for SDR 35 pipe and 115 psi for SDR 26 pipe.
 - c. Joints shall be push-on bell and spigot type using elastomeric ring gaskets conforming to ASTM D 3212 and F 477. The gaskets shall

be securely fixed into place in the bells so that they cannot be dislodged during joint assembly. The gaskets shall be of a composition and texture which is resistant to common ingredients of sewage and industrial wastes, including oils and groundwater, and which will endure permanently under the conditions of the proposed use.

- d. Pipe shall be furnished in lengths of not more than 13 feet. The centerline of each pipe section shall not deviate from a straight line drawn between the centers of the openings at the ends by more than 1/16 inch per foot of length.
- e. PVC pipe shall not have a filler content greater than ten percent (10%) by weight relative to PVC resin in the compound.
- f. PVC pipe shall be clearly marked at intervals of 5 feet or less with the manufacturer's name or trademark, nominal pipe size, PVC cell classification, the legend "Type PSM SDR 35 PVC Sewer Pipe" and the designation "ASTM D 3034", or "ASTM F-679". Fittings shall be clearly marked with the manufacturer's name or trademark, nominal size, the material designation "PVC", "PSM" and the designation "ASTM D 3034", or "ASTM F-679".
- g. PVC pipe shall have a minimum pipe stiffness of 46 psi for each diameter when measured at 5 percent vertical ring deflection and tested in accordance with ASTM D-2412.
- h. Tools for handling and installing the pipe shall be furnished to the Contractor by the manufacturer at the first delivery of pipe to the job. PVC pipe installation shall conform to ASTM D-2321 latest revision.
- i. Pipe shall be as manufactured by J&M Pipe Company, or equivalent.

PART 3 - EXECUTION

3.01 PIPE LAYING

- A. All pipe shall be laid with ends abutting and true to the lines and grades indicated on the Drawings. The pipe shall be laid straight and uniform slope between manholes and at uniform grade between changes in grade. Pipe shall be fitted and matched so that when laid in the trench, it will provide a smooth and uniform invert. Supporting of pipe shall be as set out in Section 02225 and in no case shall the supporting of pipe on blocks be permitted.
- B. Before each piece of pipe is lowered into the trench, the gaskets shall be swabbed out to insure its being clean. Any piece of pipe or fitting which is known to be defective shall not be laid or placed in the lines. If any defective pipe or fitting shall be discovered after the pipe is laid, it shall be removed and replaced with a satisfactory pipe or fitting without additional charge. In

case a length of pipe is cut to fit in a line, it shall be so cut as to leave a smooth end at right angles to the longitudinal axis of the pipe and beveled to match the factory bevel for insertion into gasketed joints. Bevel can be made with hand or power tools.

- C. The interior of the pipe, as the work progresses, shall be cleaned of dirt, jointing materials, and superfluous materials of every description. When laying of pipe is stopped for any reason, the exposed end of such pipe shall be closed with a plywood plug fitted into the pipe bell so as to exclude earth or other material and precautions taken to prevent flotation of pipe by runoff into trench.
- D. All pipe shall be laid starting at the lowest point and installed so that the spigot ends point in the direction of flow.

3.02 JOINTING

All joint surfaces shall be cleaned immediately before jointing the pipe. The bell or groove shall be lubricated in accordance with the manufacturer's recommendation. Each pipe unit shall then be carefully pushed into place without damage to pipe or gasket. All pipe shall be provided with home marks to insure proper gasket seating. Details of gasket installation and joint assembly shall follow the direction of the manufacturer's of the joint material and of the pipe. The resulting joints shall be watertight and flexible. **No solvent cement joints shall be allowed.**

3.03 WATER PIPE CROSSING CONCRETE ENCASUREMENT

- A. At locations shown on the Drawings, required by the Specifications, or as directed by the Engineer, encasement shall be used when the clearance between the proposed sewer pipe and any existing water pipe is 18 inches or less.
- B. Whether the proposed sewer pipe is above or below the existing water pipe, the concrete shall fully encase the sewer pipe and extend to the spring line of the water pipe. Encasement shall extend in each direction along the sewer pipe until the encased sewer pipe is 10 feet from the water pipe, measured perpendicular to the water pipe. The pipe segment of proposed sewer shall be centered on the existing water pipe.
- C. Concrete shall be 3000 psi and shall be mixed sufficiently wet to permit it to flow between and under pipes to form a continuous bridge. In tamping the concrete, care shall be taken not to disturb the grade or line of either pipe or damage the joints.

- D. Concrete for this Work is not a separate pay item and will be considered incidental to sewer pipe installation.

3.04 TESTING OF GRAVITY SEWER LINES

- A. After the gravity piping system has been brought to completion, and prior to final inspection, the Contractor shall rod out the entire system by pushing through each individual line in the system, from manhole to manhole, appropriate tools for the removal from the line of any and all dirt, debris, and trash.
- B. During the final inspection, the Engineer will require all flexible sanitary sewer pipe to be mandrel deflection tested after installation.
 - 1. The mandrel (go/no-go) device shall be cylindrical in shape and constructed with nine (9) evenly spaced arms of prongs. The mandrel dimension shall be 95 percent of the flexible pipe's published ASTM average inside diameter. Allowances for pipe wall thickness tolerances of ovality (from shipment, heat, shipping loads, poor production, etc.) shall not be deducted from the ASTM average inside diameter, but shall be counted as part of the 5 percent allowance. The contact length of the mandrel's arms shall equivalent or exceed the nominal diameter of the sewer to be inspected. Critical mandrel dimensions shall carry a tolerance of 0.001 inch.
 - 2. The mandrel inspection shall be conducted no earlier than 30 days after reaching final trench backfill grade provided, in the opinion of the Engineer, sufficient water densification or rainfall has occurred to thoroughly settle the soil throughout the entire trench depth. Short-term (tested 30 days after installation) deflection shall not exceed 5 percent of the pipe's average inside diameter. The mandrel shall be hand pulled by the contractor through all sewer lines. Any sections of the sewer not passing the mandrel test shall be uncovered and the Contractor shall replace and recompact the embedment backfill material to the satisfaction of the Engineer. These repaired sections shall be retested with the go/no-go mandrel until passing.
 - 3. The Engineer shall be responsible for approving the mandrel. Proving rings may be used to assist in this. Drawings of the mandrel with complete dimensioning shall be furnished by the Contractor to the Engineer for each diameter and type of flexible pipe.
- C. The pipe line shall be made as nearly watertight as practicable, and leakage tests and measurements shall be made. All apparatus and equipment required for testing shall be furnished by the Contractor and the cost shall be included in the unit price bid for pipe and manholes.

- D. Low pressure air tests shall be made using equipment specifically designed and manufactured for the purpose of testing sewer lines using low pressure air. The equipment shall be provided with an air regulator valve or air safety valve so set that the internal pressure in the pipeline cannot exceed 8 psig.
1. The test shall be made on each manhole-to-manhole section of pipeline after placement of the backfill. The Engineer or his designated representative must be present to witness each satisfactory air test before it will be accepted as fulfilling the requirements of these Specifications.
 2. Pneumatic plugs shall have a sealing length equivalent to or greater than the diameter of the pipe to be tested. Pneumatic plugs shall resist internal test pressures without requiring external bracing or blocking.
 3. For new sewer sections tested that connect to manholes with active sewers, the Contractor shall abide by the requirements of HCWD1 for notifications and visual signage at the manhole structure being plugged or blocked. See Manhole Plugging SOP and Checklist in Appendix.
 4. Low pressure air passing through a single control panel, shall be introduced into the sealed line until the internal air pressure reaches 4 psig greater than the maximum pressure exerted by groundwater that may be above the invert of the pipe at the time of test. However, the internal air pressure in the sealed line shall not be allowed to exceed 8 psig. When the maximum pressure exerted by the groundwater is greater than 4 psig, the Contractor shall conduct only an infiltration test.
 4. At least two minutes shall be allowed for the air pressure to stabilize in the section under test. After the stabilization period, the low-pressure air supply hose shall be quickly disconnected from control panel. The time required in minutes for the pressure in the section under test to decrease from 3.5 to 2.5 psig (greater than the maximum pressure exerted by groundwater that may be above the invert of the pipe) shall not be less than that shown in the following table:

Pipe in Diameter in Inches	Minutes
4	2.0
6	3.0
8	4.0
10	5.0
12	5.5
15	7.5
18	8.5
21	10.0
24	11.5
30 & larger	13

5. When the sewer section to be tested contains more than one size of pipe, the minimum allowable time shall be based on the largest diameter pipe in the section, and shall be the time shown in the table reduced by 0.5 minutes.

- E. Infiltration tests may be required at the discretion of the Engineer if underdrains are present. Upon completion of a section of the pipeline, the line shall be dewatered and a satisfactory test conducted to measure infiltration for at least 24 hours. The amount of infiltration, including manholes, tees and connections, shall not exceed 100 gallons per nominal inch diameter per mile of sewer per 24 hours.

- F. The Contractor shall furnish suitable test plugs, water pumps, and appurtenances, and all labor required to properly conduct the tests. Suitable bulkheads shall be installed, as required, to permit the test of the sewer. The Contractor shall construct weirs or other means of measurements as may be necessary.

- G. After installation, a laser survey shall be utilized to establish grades from manhole to manhole. These grade values shall be recorded on the Contractor's Record Drawings.

- H. A post-construction closed circuit television (CCTV) inspection shall be provided after the sewers have been installed and backfilled for a minimum period of 30 days in accordance with Section 02762.

- I. Should the sections under test fail to meet the requirements, the Contractor shall do all work of locating and repairing the leaks and retesting as the Engineer may require without additional compensation.

- J. If in the judgment of the Engineer, it is impracticable to follow the foregoing procedures for any reason, modifications in the procedures shall be made as required and as acceptable to the Engineer, but in any event, the Contractor shall be responsible for the ultimate tightness of the line within the above test requirements.

END OF SECTION 02731

SECTION 02732 - SEWAGE FORCE MAINS

PART 1 - GENERAL

1.01 WORK INCLUDED

The Contractor shall furnish all labor, material, and equipment necessary to install force main piping together with all appurtenances as shown and detailed on the Drawings and specified herein.

1.02 RELATED WORK

- A. Section 02225 - Excavating, Backfilling, and Compacting for Utilities.
- B. Section 02630 - Encasement Pipe.

PART 2 - PRODUCTS

2.01 POLYVINYL CHLORIDE (PVC) FORCE MAIN PIPE

- A. Polyvinyl chloride (PVC) pipe for force mains shall be PVC pressure rated pipe with integral bell joints with rubber O-ring seals, of the pressure class and dimension ration shown on the Drawings.
- B. All PVC pipe shall conform to the latest revisions of ASTM D-1784 (PVC Compounds), ASTM D-2241 (PVC Plastic Pipe, SDR) and ASTM D-2672 (Bell - End PVC Pipe). PVC pipe shall have a minimum cell classification of 12454B or 12454C ad defined in ASTM D-1784. Rubber gasketed joints shall conform to ASTM D-3139. The gaskets for the PVC pipe joint shall conform to ASTM F-477 and D-1869.
- C. Fittings for all lines shall be ductile iron and in accordance with AWWA C153 and have a body thickness and radii of curvature conforming to ANSI A21.10 or ANSI A21.53 for compact fittings. Cement mortar lining and seal coating shall be in accordance with ANSI/AWWA C104/A21.4. Bituminous outside coating shall be in accordance with ANSI/AWWA C110/A21.10. All fittings shall be rated at 250 psi water working pressure plus water hammer and be ductile cast-iron grade 70-50-05 per ASTM Specification A339.
- D. No separate pay item has been established for fittings and no determination of the number of fittings required on the job has been made. The Contractor during the bidding phase shall determine the

number of fittings required and include the cost of the fittings and installation in the unit price for pipe.

- E. Rubber gasket joints shall provide adequate expansion to allow for a 50 degree change in temperature on one length of pipe. Lubrication for rubber connected couplings shall be water soluble, non-toxic, be non-objectionable in taste and odor and have no deteriorating affect on the PVC or rubber gaskets and shall be as supplied by the pipe manufacturer.
- F. All pipe and couplings shall bear identification markings that will remain legible during normal handling, storage and installation, which have been applied in a manner what will not reduce the strength of the pipe or the coupling or otherwise damage them. Pipe and coupling markings shall include the nominal size and OD base, material code designation, dimension ratio number, ASTM Pressure Class, ASTM designation number for this standard, manufacturer's name or trademark, seal (mark) of the testing agency that verified the suitability of the pipe material for potable-water service. Each marking shall be applied at intervals of not more than 5 feet for the pipe and shall be marked on each coupling.

PART 3 - EXECUTION

3.01 LAYING DEPTHS

In general, force mains shall be laid with a minimum cover of 36 inches, except as otherwise indicated on the Drawings.

3.02 WATER PIPE CROSSING CONCRETE ENCASEMENT

- A. At locations shown on the Drawings, required by the Specifications, or as directed by the Engineer, steel encasement pipe or concrete encasement shall be used when the clearance between the proposed sewage force main and any existing water pipe is 18 inches or less.
- B. Whether the proposed sewage force main is above or below the existing water pipe, if concrete encasement is utilized, the concrete encasement shall fully encase the sewer pipe and extend to the spring line of the water pipe. Concrete encasement or steel encasement pipe shall extend in each direction along the sewer pipe until the encased sewer pipe is 10 feet from the water pipe, measured perpendicular to the water pipe.

- C. Concrete shall be 3000 psi and shall be mixed sufficiently wet to permit it to flow between and under pipes to form a continuous bridge. In tamping the concrete, care shall be taken not to disturb the grade or line of either pipe or damage the joints. Steel encasement pipe shall meet the requirements of Section 02630.
- D. Concrete or Steel Encasement Pipe for this Work is not a separate pay item and will be considered incidental to sewage force main installation.

3.03 PIPE LAYING

- A. All pipe shall be laid with ends abutting and true to the lines and grades indicated on the Drawings. Pipe shall be fitted and matched so that when laid in the Work, it will provide a smooth and uniform invert. Supporting of pipe shall be as set out in Section 02225 and in no case shall the supporting of pipe on blocks be permitted.
- B. Before each piece of pipe is lowered into the trench, it shall be thoroughly swabbed out to insure it being clean. Any piece of pipe or fitting which is known to be defective shall not be laid or placed in the lines. If any defective pipe or fittings shall be discovered after the pipe is laid, it shall be removed and replaced with a satisfactory pipe or fitting without additional charge. In case a length of pipe is cut to fit in a line, it shall be so cut as to leave a smooth end at right angles to the longitudinal axis of the pipe. Bevel can be made with hand or power tools.
- C. The interior of the pipe, as the Work progresses, shall be cleaned of dirt, jointing materials, and superfluous materials of every description. When laying of pipe is stopped for any reason, the exposed end of such pipe shall be closed with a plywood plug fitted so as to exclude earth or other material and precautions taken to prevent floatation of pipe by runoff into trench.
- D. Anchorage of Bends:
 - 1. At all tees, plugs, caps and bends of 11-1/4 degrees and over, and at reducers or in fittings where changes in pipe diameter occur, movement shall be prevented by providing both a friction type restrainer gland and poured concrete thrust blocking. Thrust blocks shall be as shown on the Drawings, with sufficient volumes of concrete being provided; however care shall be taken to leave weep holes unobstructed and allow for future tightening of all nearby joints. Unless otherwise directed by the Engineer, thrust blocks shall be placed so that pipe and fitting joints will be accessible for repair. Polyethylene wrap shall be provided around all fittings, including retainer glands before pouring concrete thrust blocks. Sack concrete is not acceptable.

2. Bridles, harness or pipe ballasting shall meet with the approval of the Engineer. Steel rods and clamps shall be galvanized or otherwise rust-proofed or painted.
3. No extra pay shall be allowed for work on proper anchorage of pipe, fittings or other appurtenances. Such items shall be included in the price bid for the supported item.

3.04 JOINTING

A. Slip Jointed Pipe:

1. All pipe shall be laid with ends abutting and true to the lines and grades indicated on the plans. Pipe shall be fitted and matched so that when laid in the Work, it will provide a smooth and uniform invert. Supporting of pipe shall be as set out in Section 02225 and in no case shall the supporting of pipe on blocks be permitted.
2. Before each piece of pipe is lowered into the trench, it shall be thoroughly swabbed out to insure it being clean. Any piece of pipe or fitting which is known to be defective shall not be laid or placed in the lines. If any defective pipe or fittings shall be discovered after the pipe is laid, it shall be removed and replaced with a satisfactory pipe or fitting without additional charge. In case a length of pipe is cut to fit in a line, it shall be so cut as to leave a smooth end at right angles to the longitudinal axis of the pipe. Bevel can be made with hand or power tools.
3. The interior of the pipe, as the Work progresses, shall be cleaned of dirt, jointing materials, and superfluous materials of every description. When laying of pipe is stopped for any reason, the exposed end of such pipe shall be closed with a plywood plug fitted so as to exclude earth or other material and precautions taken to prevent floatation of pipe by runoff into trench.
4. Anchorage of Bends:
 - a. At all tees, plugs, caps and bends of 11-1/4 degrees and over, and at reducers or in fittings where changes in pipe diameter occur, movement shall be prevented by using suitable harness, thrust blocks or ballast. Thrust blocks shall be as shown on the Drawings, with sufficient volumes of concrete being provided; however, care shall be taken to leave weep holes unobstructed and allow for future tightening of all nearby joints. Unless otherwise directed by the Engineer, thrust blocks shall be placed so that pipe and fitting joints will be accessible for repair. Polyethylene wrap shall be provided around all fittings, including retainer glands before pouring concrete thrust blocks. Sack concrete is not acceptable.

- b. Bridles, harness or pipe ballasting shall meet with the approval of the Engineer. Steel rods and clamps shall be stainless steel.
 - c. No extra pay shall be allowed for work on proper anchorage of pipe, fittings or other appurtenances. Such items shall be included in the price bid for the supported item.
- B. No backfilling (except for securing pipe in place) over pipe will be allowed until the Engineer has the opportunity to make an inspection of the joints, alignment and grade in the section laid, but such inspection shall not relieve the Contractor of further liability in case of defective joints, misalignment caused by backfilling and other such deficiencies that are noted later.
- C. All joint surfaces shall be cleaned immediately before jointing the pipe. The joint shall be lubricated in accordance with the pipe manufacturer's recommendations. Each pipe unit shall then be carefully pushed into place without damage to pipe or gasket. All pipe shall be provided with home marks to insure proper gasket seating. Details of gasket installation and joint assembly shall follow the manufacturer's direction for the joint type and material of the pipe. The resulting joints shall be watertight and flexible.

3.05 TESTING OF FORCE MAINS

- A. The completed work shall comply with the provisions listed herein, or similar requirements which will insure equal or better results. Suitable test plugs, water pump or other equipment and apparatus, and all labor required to properly conduct the tests shall be furnished by the Contractor at no expense to HCWD1.
- B. Force main piping shall be pressure tested to 250 percent of the normal system operating pressure or to 100 percent of the rated pressure of the pipe, whichever is less. At no time shall the test pressure exceed 100 percent of the pipe's rated pressure. A pipe section shall be accepted if the test pressure does not fall more than 5 percent during the 4-hour period.
- C. All piping shall be tested for leakage at a pressure no less than that specified for the pressure test. The leakage shall be less than an allowable amount determined by the following equation:

$$L = \frac{ND (P)^{1/2}}{7,400}$$

- Where:
- L = allowable leakage (gallon/hour)
 - N = number of joints in length of pipeline tested
 - D = nominal diameter of pipe (inches)
 - P = test pressure (psig)

- D. Should the sections under test fail to meet the requirements, the Contractor shall do all work locating and repairing the leaks and retesting as the Engineer may require without additional compensation.
- E. If in the judgment of the Engineer, it is impracticable to follow the foregoing procedures for any reason, modifications in the procedures shall be made as required and as acceptable to the Engineer, but in any event, the Contractor shall be responsible for the ultimate tightness of the line within the above test requirements.

END OF SECTION 02732

SECTION 02735 - MANHOLES AND PRECAST SEWAGE STRUCTURES

PART 1 - GENERAL

1.01 WORK INCLUDED

The Contractor shall furnish all labor, material, and equipment necessary to construct manholes for sanitary sewers, including frames, lids, and all appurtenances as shown on the Drawings, **Standard Detail XX** and specified herein. Manhole materials shall be precast concrete as detailed on the Drawings. An internal flexible rubber frame seal and where necessary, an interlocking extension or extensions, shall be used to seal the entire chimney of all sanitary manholes.

1.02 RELATED WORK

- A. Section 02225 - Excavating, Backfilling and Compacting for Utilities.
- B. Section 02731 - Gravity Sewers.
- C. Division 3 - Concrete.

1.03 REFERENCE STANDARDS

The latest editions of the following standards shall be considered a part of these specifications. In case of conflict, these specifications shall take precedence over the listed standard.

- A. American Association of State Highway and Transportation Officials (AASHTO)
 - 1. "Standard Specifications for Highway Bridges"
- B. ACI 304 - Guide for Measuring, Mixing, Transporting and Placing Concrete.
- C. ACI 318 - Building Code Requirements for Reinforced Concrete.
- D. ASTM A48 - Standard Specification for Gray Iron Castings.
- E. ASTM C443 - Standard Specification for Joints of Circular Concrete Sewer and Culvert Pipe Using Rubber Gaskets.
- F. ASTM C478 - Specification for Precast Reinforced Concrete Manholes Sections.
- G. ASTM C857 - Standard Practice for Minimum Structural Design Loading for Underground Precast Concrete Utility Structures.
- H. ASTM C858 - Standard Specification for Underground Precast Concrete Utility Structures.

- I. ASTM C890 - Standard Practice for Minimum Structural Design Loading for Monolithic or Sectional Precast Concrete Water and Wastewater Structures.
- J. ASTM C913 - Standard Specification for Precast Concrete Water and Wastewater Structures. ASTM C923 - Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures Pipes and Laterals.
- K. ASTM C1244 - Standard Test Method for Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test Prior to Backfill.
- L. Kentucky 2000 Transportation Cabinet/Department of Highways (KDOH) - Standard Specifications for Road and Bridge Construction

1.04 QUALITY ASSURANCE

- A. Precast concrete producer shall demonstrate adherence to the standards set forth in the National Precast Concrete Association Quality Control Manual. Precast concrete producer shall meet the following requirements:
 - 1. NPCA Certification - The precast concrete producer shall be certified by the National Precast Concrete Association's Plant Certification Program prior to and during production of the products for this project.
 - 2. Qualifications, Testing and Inspection.
 - a. The precast concrete producer shall have been in the business of producing precast concrete products similar to those specified for a minimum of 5 years. The precast concrete producer shall maintain a permanent quality control department or retain an independent testing agency on a continuing basis. The agency shall issue a report, certified by a registered engineer, detailing the ability of the precast concrete producer to produce quality products consistent with industry standards.
 - a. The precast concrete producer shall show that the following tests are performed in accordance with the ASTM standards indicated. Tests shall be performed for each 150 cu. yd. of concrete placed, but not less frequently than once per week.
 - 3. Slump: C143.
 - 4. Compressive Strength: C31, C192, C39.
 - 5. Air Content (when air-entrained concrete is being used): C231 or C173.
 - 6. Unit Weight : C138.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Handling: Products shall be stored, handled shipped and unloaded in a manner to minimize damage. Lifting holes or inserts shall be consistent with industry standards. Lifting shall be accomplished with methods or devices intended for this purpose.
- B. Acceptance at Site: HCWD1's representative shall make final inspection and acceptance of the precast concrete products upon arrival at the jobsite.

PART 2 - PRODUCTS

2.01 CONCRETE MANHOLES - GENERAL

- A. Manholes: ASTM C478 shall conform, in shape, size, dimensions, materials, and other respects, to the details indicated on the Drawings.
1. Concrete manholes shall be constructed to the diameter as called for on the Drawings with precast reinforced concrete developed bases. Invert channels shall be factory constructed when the base is made. Sloping invert channels shall be constructed whenever the difference between the inlet and outlet elevation is 2 feet or less. The inverts of the developed bases shall conform accurately to the size of the adjoining pipes. Side inverts shall be curved and main inverts (where direction changes) shall be laid out in smooth curves of the longest possible radius which is tangent, within the manhole, to the centerlines of adjoining pipelines. Manholes shall have cast-in-place or plastic formed inverts which shall be installed after construction of the manhole.
 2. The concrete manhole walls (risers and cones) shall be precast concrete sections. Minimum strength of the concrete for the precast sections shall be 4,000 psi at the time of shipment.
 3. Manholes with a diameter of 5 feet or larger shall have a base slab.
 4. Joints: ASTM C443 rubber gasket.
 5. Grade Rings: ASTM C478 or ASTM D1248.
 6. Flat Slab Tops : ASTM C478. Provide with 60-inch spigot for risers on base sections for 54-inch and 60-inch sewers.
 7. No manhole steps shall be provided. .
 8. Manhole frames and lids shall be as specified hereinafter in this Section.
- B. Manholes shall be manufactured by **CONTECH, Oldcastle Precast, S&M Precast, Sherman Dixie**, or approved equivalent.

2.02 PRECAST CONCRETE SECTIONS

- A. Precast concrete sections and appurtenances: ASTM C478 with the following exceptions and additional requirements.
1. The wall sections shall be not less than 5 inches thick.
 2. Only Type II cement shall be used except as otherwise specified.
- B. Joints between sections shall be made watertight through the use of rubber O-ring gaskets or rubber profile gaskets. Gaskets shall conform to the ASTM C443. Rope mastic or butyl mastic sealant shall not be allowed except as sealant between the cone section, any adjusting sections or rings, and the frame casting.
- C. Joints between grade rings shall be sealed with ASTM C443 1-inch O-ring gasket.

2.03 MANHOLES FRAMES AND LIDS

- A. Cast-iron manhole frames and lids shall meet the requirements shown on **Standard Detail XX** and as specified below.
1. The castings shall be of good quality, durable, evengrained cast iron, smooth, free from scale, lumps, blisters, sandholes, and defects. Contact surfaces of covers and frame seats shall be machined to prevent rocking of lids.
 2. Castings ASTM A48, minimum Class 35.
 3. Minimum manhole frame opening shall be 23 inches in diameter. The lids shall have two (2) pick holes about 1-1/4 inches wide and 1/2 inches deep with 3/8-inch undercut all around. Covers shall not be perforated unless otherwise indicated
 4. All lids shall be marked in large letters "SANITARY SEWER" in the center, as shown on the Drawings.
- B. Standard frames and lids: heavy duty, non-rocking Neenah R-1733 or approved equivalent. Watertight frames and lids: heavy duty, non-rocking Neenah R-1916E or approved equivalent.

2.04 PIPE CONNECTOR SYSTEM

- A. All holes for pipe connections in manhole and wetwell barrels and bases shall have a flexible rubber pipe connector system to prevent infiltration. The pipe connector system shall conform to the latest revision of ASTM C923.
- B. For manholes of 12 feet or less in depth, without the presence of ground water, the pipe connector system shall be A-Lok Manhole Pipe Seal as manufactured by A-Lok Corporation, Trenton, NJ; Contour Seal or Kor-N-Seal as manufactured by National Pollution Control Systems, Inc., Nashua, NH; PSX as manufactured by Press-Seal Gasket Corporation, or an approved equivalent.
- C. For manholes of 12 feet or greater in depth, or when ground water is present, the pipe connector system shall be A-Lok Manhole Pipe Seal as manufactured by A-Lok Corporation, Trenton, NJ, or an approved equivalent.

2.05 POLYETHYLENE DIAPHRAGM MANHOLE FRAME INSERTS

- A. Polyethylene diaphragm manhole frame inserts shall be installed in all manholes **or those manholes which are susceptible to inflow** as indicated on the Drawings.
1. Polyethylene diaphragm manhole frame inserts shall be manufactured from corrosion-proof material suitable for atmospheres containing hydrogen sulfide and diluted sulfuric acid.
 2. The body of the manhole insert shall be made of high density polyethylene copolymer material meeting ASTM D1248, Class A, Category 5, Type 111 (the insert shall have a minimum impact brittleness temperature of minus 180 degrees Fahrenheit). The thickness shall be a uniform 1/8 inch or greater. The

manhole frame insert shall be manufactured to dimensions as shown on the Drawings to allow easy installation within the manhole frame.

3. Insert gaskets shall be made of closed cell neoprene. The gasket shall have a pressure sensitive adhesive on one side and shall be placed under the weight bearing surface of the insert by the manufacturer. The adhesive shall be compatible with the manhole insert material so as to form a long-lasting bond in either wet or dry conditions.
 4. A lift strap shall be attached to the rising edge of the bowl insert. The lift strap shall be made of 1 inch wide woven polypropylene web and shall be seared on all cut ends to prevent unraveling. The lift strap shall be attached to the manhole insert by means of a wide head stainless steel 3/16" rivet and a stainless steel 3/4-inch backup washer. Placement of the lift strap shall provide easy visual location.
 5. Standard ventilation shall be by means of vent hole on the side wall of the manhole frame insert approximately 3/4-inches below the lip. The vent hole will allow a maximum release of 5 gallons per 24 hours when the insert is full. Sewer gas is vented at one PSI or less.
 6. The manhole frame insert shall be manufactured to fit the manhole frame rim upon which the manhole cover rests. The Contractor is responsible for obtaining specific measurements of each manhole cover to insure a proper fit. The manhole frame shall be cleaned of all dirt, scale and debris before placing the manhole frame insert on the rim.
- B. The polyethylene diaphragm manhole inserts shall be Sewer Guard SD by ChemRex, No Flow In Flow or approved equivalent.

2.06 MANHOLE FRAME SEAL

- A. Manhole frame seals shall consist of a flexible internal rubber sleeve and extension and stainless steel compression bands, all conforming to the following requirements:
1. Rubber Sleeve and Extension - The flexible rubber sleeve, extensions and wedge strips shall be extruded or molded from a high grade rubber compound conforming to the applicable requirements of ASTM C923, with a minimum 1500 psi tensile strength, maximum 18 percent compression set and a hardness (durometer) of 48 ± 5 .
 2. The sleeve shall be either double or triple pleated, with a minimum unexpanded vertical height of 8-inches and 10-inches respectively and a minimum thickness of 3/16-inches. The top and bottom section of the sleeve shall contain an integrally formed expansion band recess and multiple sealing fins.
 3. The top section of the extension shall have a minimum thickness of 3/32-inches and shall be shaped to fit into the bottom band recess of the sleeve under the bottom chimney seal band and the remainder of the extension shall have a minimum thickness of 3/16-inches. The bottom section of the extension shall contain an integrally formed expansion band recess and multiple sealing fins matching that of the rubber sleeve.

4. Any splice used to fabricate the sleeve and extension shall be hot vulcanized and have a strength such that the sleeve shall withstand a 180-degree bend with no visible separation.
 5. The continuous wedge strip used to adapt the rubber sleeve to sloping surfaces shall have the slope differential needed to provide a vertical band recess surface, be shaped to fit into the band recess and have an integral band restraint. The length of the wedge strip shall be such that, when its ends are butted together, it will cover the entire inside circumference of that band recess needing slope adjustment.
 6. The expansion bands used to compress the sleeve against the manhole shall be integrally formed from 16-gauge stainless steel conforming to ASTM A240 Type 304, with no welded attachments and shall have a minimum width of 1¾-inches. The bands shall have a minimum adjustment range of 2 diameter inches and the mechanism used to expand the band shall have the capacity to develop the pressures necessary to make a watertight seal. The band shall be permanently held in this expanded position with a positive locking mechanism, any studs and nuts used for this mechanism shall be stainless steel conforming to ASTM F923 and F594, Type 304.
- B. Manhole frame seals shall be Chimney Seal manufactured by **Cretex Specialty Products** or approved equivalent.

2.07 GRADE RINGS

All grade adjustments of manhole frame and cover assemblies shall be completed utilizing reinforced concrete grade rings or injection molded High Density Polyethylene (HDPE) adjustment rings as manufactured by Ladtech, Inc. or approved equal.

- A. Reinforced Concrete Grade Adjustment Rings
1. Precast reinforced concrete grade adjustment rings shall conform to ASTM C478 and shall be free from cracks, voids and other defects.
 2. The adjustment rings shall be tested to assure compliance with impact and loading requirements per AASHTO's Standard Specification for Highway Bridges.
 3. Installation shall be according to the manufacturer's recommendations and the following procedure:
 - a. Clean the concrete cone or top slab with a whisk broom or chisel to assure a flat sealing surface free of rocks, gravel, blacktop, protruding concrete, frozen, and other debris.
 - b. Measure the distance from the cone or top slab to the projected finish grade and deduct for the cover frame. Determine the net buildup of rings necessary to come within 1/4-inch of grade with the cover frame in place.
 - c. Determine the best rings height combination to achieve necessary adjustment.

- d. Use mortar to create a flat sealable surface if the cone or top slab is too badly chipped or damaged to attain a good seal. Apply two strips of Conseal or approved equal to the cone or top slab around the entire circumference, overlapping the ends.
- e. Place the first ring down onto the cone or top slab.
- f. Apply two strips of Conseal or approved equal to the top of the first grade ring around the entire circumference, overlapping the ends.
- g. Place the second ring down onto the first ring.
- h. Continue the assembly per steps f) and g) for each adjustment ring being used.
- i. Prior to setting the cover frame in place, apply two strips of Conseal or approved equal to the last rings around the entire circumference, overlapping the ends.
- j. Set the cover frame in place, centered on the top ring.

2.08 DROP CONNECTIONS

Drop connections shall be installed in the manhole as shown on the Drawings.

2.09 ACCESSORIES

- A. Frame Anchors: Stainless steel 0.625-inch Hilti Kwik Bolt II stud version expansion anchor or equal with stainless steel washers and nuts. Verify length with connection location.
- B. Grade Ring Anchors: stainless steel 0.625-inch diameter x maximum 16-inch long threaded rod, washers and nuts with stainless steel Hilti HDI drop-in anchor or equal.

PART 3 - EXECUTION

3.01 FABRICATION - PRECAST SECTIONS

- A. No more than two (2) lift holes or inserts may be cast or drilled in the exterior of each section.
- B. Acceptance of the sections will be on the basis of material tests and inspection of the completed product and test cylinders if requested by the Engineer.

3.02 PREPARATION

- A. Excavation, Backfill and Compaction shall be in accordance with Section 02225.
- B. Foundations: Shall be obtained by removal and replacement of unsuitable material with well graded granular material; or by tightening with coarse ballast rock; or by such other means as provided for foundation preparation of the connected sanitary sewer. Where water is encountered at the site, cast-in-place base or monolithic

- structures shall be placed on a one-piece waterproof membrane, so placed as to prevent any movement of water into the fresh concrete.
- C. Bedding: Shall be a well-graded granular bedding material conforming to the requirements for sewer pipe bedding material but not less than 4 inches in thickness and extending either to the limits of the excavation or to a minimum of 12 inches outside the outside limits of the base section. In the latter case, the balance of the excavated area shall be filled with borrow well tamped to the level of the top of the bedding to positively prevent any lateral movement of the bedding when the weight of the manhole is placed upon it. The bedding material shall be firmly tamped and made smooth and level to assure uniform contact and support of the manhole.
 - D. Pipe connections to existing manholes shall be made so that finish work will conform as nearly as practicable to the applicable requirements specified for new manholes, including all necessary concrete work, cutting, and shaping. The connection shall be centered on the manhole. Holes for the new pipe shall be of sufficient diameter to allow packing cement mortar around the entire periphery of the pipe but no larger than 1.5 times the diameter of the pipe. Cutting the manhole shall be done in a manner that will cause the least damage to the walls.
 - E. Cutting into piping for connections shall not be done except in special approved cases. When the connecting pipe cannot be adequately supported on undistributed earth or tamped backfill, the pipe shall be encased in concrete backfill or supported on a concrete cradle as directed. Concrete required because of conditions resulting from faulty construction methods or negligence by the Contractor shall be installed at no additional cost to the Government. The installation of wye branches in an existing sewer shall be made by a method which does not damage the integrity of the existing sewer. One acceptable method consists of removing one pipe section, breaking off the upper half of the bell of the next lower section and half of the running bell of wye section. After placing the new section, it shall be rotated so the broken half joint packing and cement mortar.
 - F. Where indicated on the Drawings, stub-outs of the specified size for future lateral connections shall be constructed. The pipe used for stubbing out shall extend a nominal 2 feet beyond the outside of the manhole barrel and shall terminate with a bell end (or spoigot end if applicable.) The pipe shall be sealed with an approved, prefabricated plug or cap conforming to the joint detail of the pipe supplied. For large sewers, a short section of pipe (not more than 4 feet in length) sealed at one end may be installed on the manhole stub. Shop Drawings shall be submitted for approval.

3.03 SETTING PRECAST SECTIONS

- A. Construct base slab of cast-in-place concrete or use precast concrete base sections. Make inverts in cast-in-place concrete and precast concrete bases with a smooth-surfaced semi-circular bottom conforming to the inside contour of the adjacent sewer sections. For changes in direction of the sewer and entering branches into the manhole, make a circular curve in the manhole invert of as large a radius as manhole size will permit. For cast-in-place concrete construction, either place or cast bottom

slabs and walls integrally or key and bond walls to bottom slab. No parging will be permitted on interior manhole walls. For precast concrete construction, make joints between manhole sections with the gaskets specified for this purpose; install in the manner specified for installing joints in concrete piping. Parging will not be required for precast concrete manholes. Cast-in-place concrete work shall be in accordance with the requirements specified under paragraph entitled "Concrete Work" of this section. Make joints between concrete manholes and pipes entering manholes with the resilient connectors specified for this purpose; install in accordance with the recommendations of the connector manufacturer. Where a new manhole is constructed on an existing line remove existing pipe as necessary to construct the manhole. Cut existing pipe so that pipe ends are approximately flush with the interior face of the manhole wall, but not protruding into the manhole. Use resilient connectors as previously specified for pipe connectors to concrete manholes.

- B. Pre-Cast Base Section Placement: Shall be placed on the prepared bedding so as to be fully and uniformly supported in true alignment and making sure that entering pipes can be inserted on proper grade.
- C. Precast reinforced concrete sections shall be set so as to be vertical and with sections in plumb alignment.
- D. Rubber gaskets shall be installed in all section joints in accordance with the manufacturer's recommendations or epoxy grout in accordance with manhole manufacturer recommendation.
- E. All lift holes in sections shall be thoroughly plugged with rubber plugs made specifically for this purpose or epoxy grout in accordance with manhole manufacturer recommendations.
- F. The manholes shall be of watertight construction. Manhole lids shall be in place in the frames on completion of work at the manholes.
- G. Clean manhole structures of all debris prior to installation of frames and testing.

3.04 SETTING MANHOLE FRAMES AND LIDS

- A. Top of manholes shall be flush with finished lawns, landscaped areas and pavements and shall not project above the existing ground level more than 12 inches in other areas unless otherwise indicated on the plans.
- B. Properly slope and install casting to match existing pavement surface. If resurfacing of the street in which sewers are laid is scheduled within twelve (12) months, top of frame and lid shall be set 1-1/2 inches above the existing pavement surface in anticipation of the resurfacing operations, unless otherwise approved by HCWD1 and Roadway Department having jurisdiction over the roadway.

3.05 INSTALLATION OF MANHOLE FRAME SEAL

- A. The Contractor shall measure the manhole to determine the information required on the manufacturer's "Sizing and Ordering" procedure.
- B. All sealing surfaces shall be reasonably smooth, clean and free of any form offsets or excessive honeycomb. The top internal portions of the cone shall have a minimum 3-inch high vertical surface. The preparation of this vertical surface when none exists shall be in accordance with the frame seal manufacturer's instructions.
- C. The internal frame seals and extensions shall be installed in accordance with the manufacturer's instructions. The Contractor shall have a manufacturer's recommended expansion tool and all other equipment/tools necessary to install the frame seals.
- D. Manhole frame seals shall be visually inspected after installation to ensure that the seal is properly positioned, tight against the manhole and frame surfaces, that no voids or leakage points exist and that the bands are securely locked in place. Any seals failing this inspection shall be reinstalled or replaced as necessary and reinspected at no additional cost to HCWD1.

3.06 VACUUM TESTING OF MANHOLES AND PRECAST SEWAGE STRUCTURES

- A. Manholes shall be tested in accordance with ASTM C1244, after installation with all connection in place. The vacuum test method is intended to demonstrate the condition of manholes prior to backfill. It may also be used to test manholes after backfilling; however, testing should be correlated with the connector supplier.
- B. Where groundwater is present in the excavation and trenches, the Contractor shall take any necessary steps (including construction of a piezometric tube adjacent to the manhole) to determine the depth of groundwater above the invert of the manhole at the time of testing, at no additional cost to HCWD1. Information concerning groundwater levels above the invert shall be used to determine the amount of vacuum applied during the test.
- C. A vacuum test for manholes **shall** include testing of the joint seal between the cast iron frame and the concrete cone, top slab, and any grade rings. Where a hatch and cover are provided in the top of a precast sewage structure, the Contractor shall provide a means of establishing a seal over the hatch, unless the Drawings and notes indicate that the hatch is to be tested for vacuum.
- D. Prior to the test, the following items shall be complete:
 - 1. Lift holes, if any, shall be plugged with an approved, non-shrink grout prior to testing.
 - 2. Drop connections, if any, shall be installed prior to testing.

E. Testing Procedure:

1. The Contractor shall abide by the requirements of HCWD1 for notifications and visual signage at the manhole structure being plugged or blocked. See Manhole Plugging SOP and Checklist in Appendix.
2. Temporarily plug, with the plugs being braced to prevent the plugs or pipes from being drawn into the manhole, all pipes entering the manhole at least eight inches into the sewer pipe(s). The plug must be inflated at a location past the manhole/pipe gasket.
3. The test head shall be placed on the top of the conical, over the manway opening in a flat top, or (in the case of a wetwell or valve vault) over such adapter as may be required, and inflated in accordance with the manufacturer's recommendations.
4. A vacuum of 10-inches of mercury shall be drawn on the manhole, or such lesser amount of vacuum that the combined vacuum and positive external head pressure from groundwater does not exceed the recommended pressure ratings for the pipe connector system. The vacuum shall be measured by a test gauge which shall be liquid filled, having a 3.5-inch diameter face, reading from zero to thirty inches of mercury.
5. The indicated vacuum (as determined under the preceding paragraph) shall be drawn on the manhole, the valve on the vacuum line of the test head closed, and the vacuum pump shut off. The time shall be measured for the vacuum to drop 1-inch of mercury.
6. The manhole shall be considered to pass the vacuum test if the time for the vacuum reading to drop 1-inch of mercury meets or exceeds the values indicated in the following table:

Minimum Test Times for Various Manhole Diameters (seconds)					
Depth (ft)	Diameter (inches)				
	48	54	60	66	72
8	20	23	26	29	33
10	25	29	33	36	41
12	30	35	39	43	49
14	35	41	46	51	57
16	40	46	52	58	67
18	45	52	59	65	73
20	50	58	65	72	81
22	55	64	72	79	89
24	59	69	78	87	97
26	64	75	85	94	105
28	69	81	91	101	113
30	74	87	98	108	121

- 6. If a manhole fails the vacuum test, the manhole shall be repaired with a non-shrinkable grout or other suitable material based on the material of which the manhole is constructed and retested, as stated above.
- 7. Failure of this vacuum test shall not preclude acceptance by appropriate water infiltration of exfiltration testing, or such other means as may be accepted by the Engineer.
- 8. All temporary plugs and braces shall be removed after each test.

3.07 RESTORATION

- A. Grade around manhole in unpaved areas to match adjacent contours and for positive drainage away from manhole lid.
- B. Protect manholes during pavement restoration. Clean casting and lid after pavement restoration is complete.

END OF SECTION 02735

SECTION 02762 - SANITARY SEWER LINE CLEANING AND INTERNAL INSPECTION

PART 1 - GENERAL

1.01 SUMMARY

- A. The Work under this section consists of furnishing all labor, materials, and equipment required to perform sewer line cleaning and closed circuit television (CCTV) inspection of sewer lines.
- B. Debris removal and disposal shall be performed in accordance with all federal, state, and local standards.

1.02 SUBMITTALS

Contractor shall submit the following items, in accordance with the requirements of Section 01300, Submittals:

- A. A schedule for sanitary sewer cleaning and inspection.
- B. A list of equipment, materials, and personnel to be used on the project, including all permits obtained prior to commencing the work.
- C. Originals of all CCTV inspection reports.
- D. Originals of all DVD inspection disks recorded during the project.

1.03 QUALITY ASSURANCE

- A. The equipment used shall be in good working order and provide continuous operation during CCTV inspection and cleaning.
- B. DVD inspection disks shall be of good visual quality, capable of slow motion and pausing without significant reduction of visual quality.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 EQUIPMENT

A. Cleaning Equipment:

1. Selection:

- a. Clean sanitary sewer line sections and manholes using hydraulically propelled, mechanically powered, or high velocity jet sewer cleaning equipment. Selection of equipment shall be based on conditions of lines at time work commences.
- b. Equipment selected for cleaning shall be capable of removing dirt, grease, rock, and other deleterious materials and obstructions from sewer lines and manholes.
- c. Whenever lines to be cleaned show evidence of being more than one-half filled with solids, bucket machines, rodding machines, and/or vacuum machines shall be utilized to remove the major portion of material before hydraulic equipment is used for final cleaning. Bucket machines, rodding machines, and/or vacuum machines shall be provided and utilized if other types of cleaning are unable to produce specified results.
- d. Service laterals which protrude into the main line being inspected shall be cut off with a chain cutter or similar device if the service lateral prevents complete cleaning/inspection of the line.

2. Cleaning Equipment.

- a. **Hydraulically Propelled Equipment:** The equipment used shall be 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. The movable dam shall be equal in diameter to the pipe being cleaned and shall provide a flexible scraper around the outer periphery to insure removal of grease. If sewer cleaning balls or other equipment that cannot be collapsed are used, special precautions to prevent flooding of the sewers and public or private property shall be taken.
- b. **Mechanically Powered Equipment:** Bucket machines shall be in pairs with sufficient power to perform the work in an efficient manner. Machines shall be belt operated or have an overload device. Machines with direct drive that could cause damage to the pipe will not be allowed. A power rodding machine shall be either a sectional or continuous rod type capable of holding a minimum of 750 feet of rod. The rod shall be heat-treated steel. To insure safe operation, the machine shall be fully enclosed and have an automatic safety

clutch or relief valve.

- c. High-Velocity Jet (Hydro-cleaning) 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 size lines 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.
 - 1) Minimum water storage capacity shall be 600 gallons.
 - 2) Minimum delivery capacity of 30 gpm at 1,000 psi. Booster pump (positive displacement) shall be capable of 300 to 2,000 psi with a pressure regulator.
 - 3) Equipment shall be approved by the Engineer prior to commencement of cleaning.

- d. Cleaning Precautions: During sewer cleaning operations, satisfactory precautions shall be taken in the use of cleaning equipment. When hydraulically propelled cleaning tools (which depend upon water pressure to provide their cleaning force) or tools that retard the flow in the sewer line are used, precautions shall be taken to insure that the water pressure created does not damage or cause flooding of public or private property being served by the sewer. When possible, the flow of wastewater in the sewer shall be utilized to provide the necessary pressure for hydraulically propelled cleaning devices. When additional water from other sources is necessary to avoid delay in normal work procedures, the water shall be conserved and not used unnecessarily. The Contractor shall obtain permission from Owner before using fire hydrants as a source of water. No fire hydrant shall be obstructed in case of a fire in the area served by the hydrant. No hydrant shall be used by the Contractor during a known fire emergency. See Paragraph 3.01, C., Water.

B. Closed Circuit Television Camera shall meet the following requirements:

1. Specifically designed and constructed for sewer line television inspection.
2. Lighting shall be suitable to provide clear color pictures of periphery of pipe.
3. Operable in 100 percent relative humidity conditions.
4. Provide a minimum of 600 lines of resolution.
5. To achieve peak picture quality throughout all conditions encountered, variable intensity control of camera lights and remote control for focus and iris shall be located at monitoring station.

6. Focal distance shall be adjustable through range from 6 inches to infinity.
 7. Camera, television monitor, and other components of color video system shall be capable of producing picture quality to satisfaction of Engineer and if unsatisfactory, equipment shall be removed and replaced with satisfactory equipment.
 8. Camera shall have ability to rotate lens 360°, or have pan and tilt capability.
- C. Water: Contractor shall make arrangements with Owner and local water provider for use or source of water.

3.03 SEWER LINE CLEANING

A. General:

1. Cleaning shall in all cases be conducted in an upstream direction, from a downstream sewer manhole proceeding upstream.
2. If successful cleaning cannot be performed or equipment fails to traverse entire sewer line section, it shall be assumed that major blockage exists and cleaning effort shall be abandoned.
3. Determine location of major blockage by measuring length of hose or rod inserted from manholes at each end and report location of blockages to Engineer.
4. Cleaning shall not precede CCTV inspection by more than one (1) week. If more than one (1) week elapses, re-cleaning shall be required prior to CCTV inspection.

B. Protection During Cleaning Operations:

1. Protect sanitary sewer lines and sanitary sewer manholes from damage that might be inflicted by improper use of cleaning equipment.
2. Whenever hydraulically propelled cleaning tools, which depend upon water pressure to provide their cleaning force, or any tools which retard flow of water in sewer line are used, precautions shall be taken to ensure that water pressure created does not cause any damage or flooding to public or private property being served by sewer line section involved.
3. Flow of sewage in sewer lines shall be utilized to provide necessary pressures for hydraulically propelled cleaning devices whenever conditions allow. Water shall be conserved and not used unnecessarily.
4. Contractor shall be responsible for damage to public and private property as result of cleaning operations. All damage caused by Contractor shall be repaired to original condition at Contractor's expense.

- C. Acceptance of Cleaning Work: Acceptance of cleaning work in sewer line sections shall not be made until internal CCTV inspection has been completed.

3.04 INTERNAL CLOSED CIRCUIT TELEVISION (CCTV) INSPECTION

A. General:

1. After cleaning, the sewer lines shall be visually inspected by means of closed circuit television (CCTV) system. The inspection shall be done one manhole section at a time and the flow in the section being inspected shall be suitably controlled as specified in Section 3.05, Sewer Flow Control.
2. The Contractor shall maintain the necessary capabilities to CCTV inspect sewer lines ranging from 6-inches to 10-inches in diameter, with line lengths not exceeding 500 feet. The television camera used for the inspection shall meet the requirements of Paragraph 3.01, B. of this specification section

B. CCTV Inspection:

1. Contractor shall investigate the interior condition of each sewer line to verify proper cleaning has been completed and identify all observed root intrusions, structural defects, pipe sags, exfiltration, infiltration, and inflow, as well as the general condition of the sewer conveyance at the time of inspection. CCTV inspections shall be completed within one (1) week of pipe cleaning. Engineer shall be provided the opportunity to monitor the CCTV images as the sewer line is being investigated.
2. A distance meter shall be furnished on the videotape. The meter shall be checked using distances between manholes. Meter distances and actual distances shall be consistent.

C. Defect Imaging:

1. Contractor shall produce color video footage of each CCTV inspection. Video footage shall contain the following printed information at the beginning of each CCTV inspection:
 - a. Project Name and Project Number
 - b. Starting Manhole and Ending Manhole Numbers
 - c. Starting Manhole Location
 - d. Date and Time
 - e. Sewer Line Material
 - f. Sewer Line Diameter
 - g. Videotape Index Counter Number
2. Video footage of the interior of each sewer line shall provide clear and accurate images of all observed service connections, root intrusions, structural defects, pipe sags, exfiltration, infiltration, and inflow, as well

as the general condition of each line at the time of inspection.

D. Field Records.

1. DVD footage of the internal line inspections shall be delivered to the Engineer.
2. Contractor shall record the measured distance of each CCTV inspection. All distance measurements shall begin at the center of the starting manhole and end at the center of the ending manhole.
3. The Contractor shall provide the Engineer with one (1) copy of a CCTV inspection report with a brief summary of inspection activities. The inspection report shall clearly show the location in relation to an adjacent manhole of each observed root intrusion, structural defect, exfiltration, infiltration, inflow, beginning of pipe sag, end of pipe sag, building sewer, storm sewer connection, and other discernible features.

3.05 SEWER FLOW CONTROL

- A. General: When sewer line depth of flow at upstream manhole of sewer line section being worked is above maximum allowable for television inspection, flow shall be reduced to level shown below by operation of pump stations, plugging or blocking of flow, or by pumping and bypassing of flow as specified.
1. Depth of flow shall not exceed that shown below for respective pipe sizes as measured in manhole when performing television inspection.
 - a. Maximum Depth of Flow for Television Inspection:

6" - 10" Pipe	10% of pipe diameter
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 - b. During television inspection, reduce flow to within limits specified above. After work has been completed, restore flow to normal.
- B. Plugging or Blocking: Insert sewer line plug into line upstream of section being worked. Design plug so all or a portion of sewage can be released. Contractor shall abide by HCWD1 SOP for plugging manholes.
- C. Pumping and Bypassing: When pumping and bypassing is required, Contractor shall supply pumps, conduits, and other equipment to divert flow of sewage around sewer line section in which work is to be performed. Bypass system shall be of sufficient capacity to handle existing flow plus additional flow that may occur during rainstorm. Contractor shall furnish necessary

labor and supervision to set up and operate pumping and bypass system. If pumping is required on 24-hour basis, equip pump engines in a manner to keep noise to a minimum.

- D. Flow Control Precautions: When flow in sewer line is plugged, blocked, or bypassed, take precautions to protect sewer lines from damage that might result from sewer surcharging. Take precautions to insure that sewer flow control operations do not cause flooding or damage to public or private property being served by sewers involved. Contractor is responsible for damage to public and private property as result of sewer flow control operations.

3.06 USE OF EASEMENTS AND RIGHT OF WAY

- A. Public Right of Way: If the Contractor is performing work in the Public Right of Way where other utilities are located, the Contractor shall take precautions to ensure that the utilities are not damaged. Any damage to the Public Right of Way or other utilities will be the sole responsibility of the Contractor.
- B. Private Property: If at any time the Contractor must leave the Public Right of Way or HCWD1's easement area to perform work, he must first gain prior approval from HCWD1 and permission from the owner of the property he will be encroaching on. The Contractor will be solely responsible for any damages or claims resulting from work done on the private property.
- C. Special Requirements:
 - 1. Traffic Routing Plan. Cleaning and TV inspection should not require closure of streets to through traffic during work hours. Local traffic shall be maintained at all times. All drives to residences and businesses shall be maintained passable. All traffic control devices shall be in accordance with Kentucky Department of Highways (KDOH) Regulations. The Contractor shall maintain all traffic control devices in a clean and highly visible state, in good working order, and shall provide the necessary traffic control devices and flagmen as required by KDOH and HCWD1.
- D. No separate payment shall be made for the requirements of Paragraph 3.06.

3.07 GENERAL SAFETY GUIDELINES AND PROCEDURES

- A. The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the work. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:

1. All employees on the worksite and other persons and organization who may be affected thereby.
 2. All the work and materials and equipment to be incorporated therein, whether in storage on or off the site.
 3. Other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities and underground facilities not designated for removal, relocation or replacement in the course of work.
- B. All Contractors shall adhere to all applicable Federal, State, and OSHA rules and regulations while performing work for HCWD1. Contractor shall erect and maintain all necessary safeguards and protection on the job.
- C. Emergencies: In the event of an emergency affecting the safety or protection of persons or the work or property at the site, the Contractor is obligated to act to prevent and limit threatened damage, injury or loss without notice to HCWD1.
- D. Contractor shall allow potable water containing NSF-safe green dye to flow through all sewer lines to be CCTV inspected. This shall occur after cleaning and before CCTV inspection.

END OF SECTION 02762

**STANDARD SPECIFICATIONS AND DRAWINGS
HARDIN COUNTY WATER DISTRICT NO. 1**

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SECTION 02720 - STORM DRAINAGE

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. This Section includes all labor, materials, equipment and related items required to complete the work of storm drainage shown on the Drawings and specified herein.
- B. This Section does not include the following related items:
 - 1. Clearing and grubbing.
 - 2. Earthwork.
 - 3. Pavements and curbs.
 - 4. Site Utilities.

1.02 PERMITS AND CODES

The Contractor's Work shall comply with all applicable codes and regulations.

1.03 LOCAL STANDARDS

The term "local standards" as used herein means the standards of design and construction of the Kentucky Department of Highways, Fort Knox Directorate of Public Works, and City of Radcliff Public Works.

PART 2 - PRODUCTS

2.01A CIRCULAR REINFORCED CONCRETE PIPE

- A. Pipe materials shall conform to the requirements of the Kentucky Department of Highways.
- B. Reinforced concrete pipe shall meet ASTM C76 AASHTO M170, and shall be in the diameter on the Drawings and Class III unless noted otherwise.
- C. Pipe joints shall be bell and spigot construction in accordance with ASTM C443. Rubber gaskets shall be Forsheda 138 gaskets in accordance with ASTM C 443 or approved equal.
- E. Pipe shall be as manufactured by **Independent Concrete Pipe Co.** or approve equal.

2.01B CORRUGATED WALL PVC PIPE WITH SMOOTH INTERIOR

- A. Corrugated PVC pipe and fittings shall conform to the requirements of ASTM F-949. Pipe and fittings shall have a minimum cell classification of 12454B or 12454C as defined in ASTM D-1784.
- B. Joints shall be push-on bell and spigot type using elastomeric ring gaskets conforming to ASTM D 3212 and F 477. The gaskets shall be securely fixed into place in the bells so that they cannot be dislodged during joint assembly. The gaskets shall be of a composition and texture which is resistant to common ingredients of sewage and industrial waste, including oils and groundwater, and which will endure permanently under the conditions of the proposed use.
- C. Corrugated PVC pipe shall be furnished in lengths of not more than 13 feet. The centerline of each pipe section shall not deviate from a straight line drawn between the centers of the openings at the ends by more than 1/16 inch per foot of length.
- D. Corrugated PVC pipe shall have a smooth interior.
- E. Corrugated PVC pipe shall be clearly marked at intervals of 5 feet or less with the manufacturer's name or trademark, nominal pipe size, PVC cell classification, the plastic "PVC", the designation "ASTM F-949", and extrusion code, including date and location of manufacture. Fittings shall be clearly marked with the manufacturer's name or trademark, nominal size, the material designation "PVC", and the designation "ASTM F-949."
- F. Corrugated PVC pipe shall have a minimum stiffness of 50 psi when measured at 5 percent vertical ring deflection (tested in accordance with ASTM D-2412), as defined in ASTM F-949.
- G. Copies of directions for handling and installing the pipe shall be furnished to the Contractor by the manufacturer at the first delivery of pipe to the job. PVC pipe installation shall conform to ASTM D-2321 latest revision.
- H. Corrugated PVC pipe shall be A-2000 as manufactured by **CONTECH** or approved equal.

2.02 PRECAST CONCRETE BOX CULVERTS

- A. Precast reinforced concrete box culverts shall meet ASTM C789 and/or ASTM C850 and shall be in the size shown on the Drawings and Class III unless noted otherwise.

- B. Joints shall be tongue and groove construction and shall be filled with butyl mastic sealant during installation as recommended by culvert manufacturer.
- C. Precast reinforced concrete box culverts shall be as manufactured by CONTECH or approved equal.

2.03 PRECAST CONCRETE CATCH BASINS

- A. Precast reinforced concrete catch basins shall meet the requirements of ASTM C913 and C478 and shall be in the size shown on the Drawings.
- B. The grate, riser and base sections shall be designed for AASHTO HS-20 loading.
- C. Frame and lids shall be single and double inlet, single and double curb inlet and yard drain inlet as shown on the Drawings and Standard Detail XX.
- D. Precast reinforced concrete catch basins shall be as manufactured by CONTECH, Oldcastle Precast, S& M Precast, Sherman Dixie or approved equal.

2.03 PRECAST CONCRETE MANHOLES

- A. Manholes, frames, and covers shall be in accordance with Section 02735 and Standard Detail XX.

2.04 PRECAST CONCRETE HEADWALLS

- A. Precast concrete inlet/outlet headwalls shall meet the requirements of the Kentucky Department of Highways and of the type and size shown on the Drawings.

PART 3 - EXECUTION

3.01 EXISTING IMPROVEMENTS

Maintain in operating condition all active drains and other utilities encountered in the Project area. Repair to the satisfaction of the Engineer any surface or subsurface improvement damaged during the course of the Work (unless such improvement is shown to be abandoned or removed), whether or not such improvement is shown on the Drawings.

3.02 PROTECTION OF PIPING LAID IN AREAS OF FILL

Underground drains specified in this Section shall not be laid in areas of fill prior to the actual performance of the grading operation, unless the depth of the cover over such utilities below existing ground surface is at least 30 inches. Such depth of cover requirement may be reduced provided the pipe is protected by concrete cradling, encasement or other manner satisfactory to the Engineer.

3.03 TRENCHING AND BACKFILLING

- A. General: Unless otherwise directed by the Engineer, trenches in which storm drainage lines are to be laid shall be excavated in open cut to the depths shown on the Drawings. In general, this shall be interpreted to mean that machine excavation in earth shall extend to an elevation permitting minimum depth of bedding material below.
- B. Width of Trench: Excavate trenches of sufficient width to provide free working space on each side of the pipe and to permit proper backfilling around the pipe.
 - 1. Pipe trenches shall be made as narrow as practicable and shall not be widened by scraping or loosening material from the sides. Every effort shall be made to keep the sides of the trenches firm and undisturbed until backfilling has been completed and consolidated.
 - 2. Trenches shall be excavated with approximately vertical sides between the elevation of the center of the pipe and an elevation 1 foot above the top of the pipe.
- C. Sheet piling and Bracing: Sheet and brace trenches as necessary to protect workmen and adjacent structures. Comply with local regulations, or, in the absence thereof, with the "Manual of Accident Prevention in Construction", of the Associated General Contractors of America, Inc. Do not remove sheet piling until trench is backfilled sufficiently to protect pipe and prevent injurious caving.

- D. **Water Removal:** Keep trenches free from water while construction therein is in progress. Under no circumstances lay pipe or appurtenances in water. Pump or bail water from bell hole to permit proper jointing of pipes.
- E. **Disposition of Existing Utilities:** Rules and regulations governing the respective utilities shall be observed in executing all work under this heading. Active utilities not shown on the Drawings shall be protected or relocated in accordance with written instructions of the Engineer. Inactive and abandoned utilities encountered in trenching operation shall be removed, plugged, or capped. In absence of specific requirements, plug or cap such utility lines at least 3 feet from new ditch line or as required by the local regulations.
- F. **Unclassified Excavation:** Materials to be excavated shall be unclassified, and shall include the removal of earth, rock, or other materials encountered in the excavating to the depth and extent shown or indicated on the Drawings. In the case of any change in the excavation, ordered in writing by the Engineer, the resulting changes in quantities shall be accurately computed, its value shall be determined in accordance with applicable Unit Prices agreed upon between HCWD1 and Contractor or subcontractors, and the Contract sum shall be adjusted accordingly.
- G. **Pipe Bedding:** Storm drainage pipe shall be laid on a bed of granular material except when a concrete encasement situations occurs. All pipe bedding material shall be granular material approved by the Engineer and shall be placed to a depth of 4 inches in an earth trench and 6 inches in a rock trench. Granular bedding shall be graded to provide for a uniform and continuous support beneath the pipe at all points. Bell holes shall be provided so that after placement, only the barrel of the pipe receives bearing pressure from the supporting material.
1. After each pipe has been aligned, and placed in final position, granular material as shown on the Drawings, shall be deposited and densified under the pipe haunches and on each side of the pipe up to the spring line of the pipe to prevent lateral displacement and hold the pipe in proper position during subsequent pipe jointing, bedding, and backfilling operations.
 2. In wet, yielding and mucky locations where the pipe is in danger of sinking below grade, the pipe must be weighted or secured permanently in place by such means as will prove effective. In areas where a high water table exists, extreme care shall be taken in the placement of the backfill material to prevent flotation of the pipe at any time.
 3. Where an unstable (i.e. water, mud, etc.) trench bottom is encountered, stabilization of the trench bottom is required. This is to be

accomplished by undercutting the trench depth and replacing to grade with a foundation of aggregate material. The depth of the foundation is dependent upon the severity of the trench bottom. The size of aggregate used in the foundation will be determined by the condition of the unstable material. Once the trench bottom has been stabilized, the required Class I bedding can be placed.

- H. Special Supports: Whenever, in the opinion of the Engineer, the soil at or below the requisite pipe grade is unsuitable for supporting pipe and appurtenances specified in this Section after stabilization as herein before described, special supports shall be provided as the Engineer may direct, and the Contract sum will be adjusted.
- I. Backfilling: Backfill trenches only after pipe has been inspected, and locations of pipe lines and appurtenances, and rock excavation, if any, have been recorded. Pipes shall be backfilled as herein specified or as otherwise shown on the Drawings and **Standard Detail XX**.
 - 1. Initial Backfill: This backfill is defined as that material which is placed over the pipe from the spring line of the pipe, to a point 12 inches above the top of the pipe. The backfill shall be crushed stone aggregate material as detailed on the Drawings.
 - 2. Final Backfill: The trench shall be backfilled from a point 12 inches above the top of the pipe to subgrade with earth material reasonably free of any rocks. Compaction shall meet the requirements for the adjacent embankment.
 - 3. Walking or working on the completed pipelines, except as may be necessary in backfilling, will not be permitted until the trench has been backfilled to a point 6 inches above the top of the pipe.
 - 4. The aggregate material used in backfilling shall be No. 9 crushed stone or clean sand meeting the requirements of the Kentucky Department of Highways.

3.04 TESTING

- A. After the piping system has been brought to completion, and prior to final inspection, the Contractor shall rod out the entire system by pushing through each individual line in the system appropriate tools for the removal from the lines of any and all dirt, debris, and trash.
- B. During the final inspection, the Engineer will inspect each individual line, either by use of lights, television or other means at his disposal to determine whether the completed lines are true to line and grade as laid out or as shown on the Drawings.

1. The Engineer may require that the Contractor pass through the system under its own momentum a wooden ball of a diameter 1 inch less than the minimal diameter of the pipe, except that no ball larger than 8 inches in diameter shall be used.
2. All lines or sections of line that are found to be laid improperly with respect to line or grade, that are found to contain broken or leaking sections of pipe, or are obstructed in such a manner that they cannot be satisfactorily corrected otherwise, shall be removed and replaced at the Contractor's expense.

3.05 FINAL INSPECTION

At the time of final inspection of the Work performed under the Contract, the storm drainage system covered by this Section shall be complete in every respect and in perfect operating condition. All surplus materials of every character resulting from the Work of this Section shall have been removed. Pipes shall be free from sand, silt, or other obstructions. Any defects discovered in the storm drainage subsequent to this inspection shall have been corrected.

3.06 CERTIFICATES

Furnish to the Engineer affidavits from the manufacturers of pipe, furnished and installed under this Section, certifying that such materials delivered to the Project conform to the requirements of this Section.

END OF SECTION 02720

Standard Sanitary Sewer Bid Item Descriptions

S BYPASS PUMPING This item shall include all labor, equipment, and materials needed to complete a bypass pumping and/or hauling operation for diversion of sewage during sanitary sewer construction. Examples of such operations when bypass pumping and/or hauling may be necessary is during force main tie-ins, manhole invert reconstruction, insertion of new manholes into existing mains, or other similar construction. There may be more than one bypass pumping/hauling operation on a project. This item shall be paid for each separate bypass pumping/hauling operation occurrence as called out on the plans or directed by the engineer and actually performed. There will be no separate bid items defined for length, duration, or volume of sewage pumped or hauled in each occurrence. If a bypass pumping/hauling operation is called out on the plans; but, conditions are such that the bypass pumping/hauling operation is not needed or utilized, no payment will be made under this item. The contractor shall draw his own conclusions as to what labor, equipment, and materials may be needed for each bypass pumping/hauling occurrence. The contractor should be prepared to handle the maximum volume of the sewer being bypassed, even during a storm event. This item shall not be paid separately, but shall be considered incidental, when bypass pumping and/or hauling is needed during cast-in-place-pipe (CIPP) and/or point repair operations. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA).

S CIPP LATERAL SERVICE INVESTIGATION This item shall include all equipment, materials, labor and incidentals necessary to enter the sewer in compliance with all safety/confined space requirements and perform the identification, assessment and pre-measurement of all existing and abandoned laterals for the placement of Cured-In-Place-Pipe lining. This item shall be in payment for all lateral service investigation for all sewer segments to be lined as a part of this contract. This bid item shall include bypass pumping when required. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. Payment for this item shall be LUMP SUM (LS).

S CIPP LATERAL REINSTATEMENT This item is to pay for installing a Cured-In-Place-Pipe liner in service laterals and service/mainline connections to stabilize structural defects and construction inadequacies. This bid item shall include all labor, equipment, materials and incidentals necessary to perform the service lateral reinstatement in accordance with the plans and specifications. Work under this item shall include bypass pumping, sewer flow control, pre-installation cleaning, sealing connections to existing sewer main, pre- and post- construction CCTV inspection and final testing of the CIPP system. This item shall also include the "top hat" required by the specifications. All CIPP lateral reinstatements shall be paid under this item regardless of the size or length of reinstatement. No separate bid items of varying sizes or length of CIPP lateral reinstatement will be provided in the contract. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. Payment for this item shall be EACH (EA) for each CIPP lateral reinstatement complete and ready for use.

S CIPP LINER This bid Item is to pay for rehabilitation of existing sanitary sewers using the Cured-In-Place-Pipe method. This bid item description applies to all CIPP sizes included in the contract.

All CIPP Liner items of all varying sizes shall include all labor, materials, customer notification, testing, necessary permits, ingress and egress procedures, bypass pumping, pre-construction video, sediment and root removal, dewatering, traffic control, erosion and sediment control, excavation pits, removal and replacement of manhole frames and covers as necessary to facilitate the lining work, sealing at manholes and service connections, clearing and grubbing, pipeline cleaning, re-cleaning and video inspection as many times as necessary, debris collection and disposal, root removal, pre- and post-construction video inspection, all digital inspection footage, final report preparation and approval, the cost of potable water from the Owner, required compliance tests, site restoration, site cleanup, sealing of liner at manholes, acceptance testing and all other rehabilitation work and incidentals not included under other pay items necessary to complete the rehabilitation per the plans and specifications. There will be no separate payment for acceptance testing of the lined pipe; but shall be considered incidental to this item. Pay under this item shall be by each size bid in the contract. Pay measurement shall be from center of manhole to center of manhole. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LINEAR FEET (LF).

S CIPP PROTRUDING LATERAL REMOVAL This item includes all equipment, materials, labor and incidentals necessary to enter the sewer in compliance with all safety/confined space requirements, remove a sufficient amount of the protruding tap to insure a proper and safe Cured-In-Place-Pipe lining insertion and perform pre-installation CCTV. This bid item shall include bypass pumping when required. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. Payment for this item shall be EACH (EA) for each protruding lateral removed.

S CONCRETE PIPE ANCHOR This item shall be constructed on the sewer pipe at the locations shown on the plans in accordance with sanitary sewer specifications and standard drawings. Payment for concrete anchors will be made at the contract unit price each in place complete and ready for use. Each concrete anchor of sewer pipe or force main shall be paid under one bid item per contract regardless of the sizes of carrier pipe being anchored in the contract. No separate bid items will be established for size variations. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

S DIRECTIONAL BORE Payment under this item is made whenever the plans or specifications specifically show directional boring is to be utilized in order to minimize the impact of open cut for the installation of force main or gravity sewer under streets, creeks, and etc. Payment under this item shall include the specified bore pipe, labor, and equipment. No separate payment shall be made for bore pipe installed in the bore whether used as a carrier pipe or an encasement of a separate carrier pipe. This item shall also include pipe anchors at each end of the bore when specified to prevent the creep or contraction of the bore pipe. Carrier pipe installed within a bore pipe shall be paid separately under pipe items. Payment under this item shall not be size specific and no separate bid items will be established for size variations. The bore pipe sizes to be included under this item shall be as shown on the plans and/or in the specifications. Any and all directional bores in each contract shall be paid under one directional bore bid item included in the contract regardless of size. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LINEAR FEET (LF).

S ENCASEMENT CONCRETE Includes all labor, equipment, excavation, concrete, reinforcing

steel, backfill, restoration, and etc., to construct the concrete encasement of the sewer or force main as shown on the plans, and in accordance with the specifications and standard drawings. Payment under this item shall be in addition to the carrier pipe as paid under separate bid items. Carrier pipe is not included in this bid item. Any and all concrete encasement shall be paid under one bid item included in the contract regardless of the size of the carrier pipe or the volume of concrete or steel reinforcement as specified in the plans and specifications. No separate bid items will be established for size variations. Measurement of pay quantity shall be from end of concrete to end of concrete. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LINEAR FEET (LF) when complete.

S ENCASEMENT STEEL BORED This item shall include the steel encasement pipe size as specified on the plans and in the specifications, casing spacers, end seals, labor, and equipment to bore and install the encasement in accordance with the plans and specifications, complete and ready for use. The size shall be the measured internal diameter of the encasement pipe. The sizes of encasement to be paid under the size ranges specified in the bid items shall be as follows:

- Range 1 = All encasement sizes greater than 2 inches to and including 6 inches
- Range 2 = All encasement sizes greater than 6 inches to and including 10 inches
- Range 3 = All encasement sizes greater than 10 inches to and including 14 inches
- Range 4 = All encasement sizes greater than 14 inches to and including 18 inches
- Range 5 = All encasement sizes greater than 18 inches to and including 24 inches
- Range 6 = All encasement sizes greater than 24 inches

(Encasement sizes of 2 inches internal diameter or less shall not be paid separately; but, shall be considered incidental to the carrier pipe.) Payment under this bid item shall not include the carrier pipe. Carrier pipe shall be paid under a separate bid item. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LINEAR FEET (LF).

S ENCASEMENT STEEL OPEN CUT This item shall include the steel encasement pipe size as specified on the plans and in the specifications, casing spacers, end seals, labor, and equipment to open cut install the encasement in accordance with the plans and specifications, complete and ready for use. The size shall be the measured internal diameter of the encasement pipe. The size encasement to be paid under the size ranges specified in the bid items shall be as follows:

- Range 1 = All encasement sizes greater than 2 inches to and including 6 inches
- Range 2 = All encasement sizes greater than 6 inches to and including 10 inches
- Range 3 = All encasement sizes greater than 10 inches to and including 14 inches
- Range 4 = All encasement sizes greater than 14 inches to and including 18 inches
- Range 5 = All encasement sizes greater than 18 inches to and including 24 inches
- Range 6 = All encasement sizes greater than 24 inches

(Encasement sizes of 2 inches internal diameter or less shall not be paid separately; but, shall be considered incidental to the carrier pipe.) Payment under this bid item shall not include the carrier pipe. Carrier pipe shall be paid under a separate bid item. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LINEAR FEET (LF).

S FORCE MAIN This description shall apply to all PVC and ductile iron and polyethylene/plastic pipe bid items of every size and type, except those bid items defined as “Special”. This item includes the pipe specified by the plans and specifications, all fittings (including, but not limited to, bends, tees, reducers, plugs, and caps), tracing wire with test boxes (if required by specification), polyethylene wrap (when specified), labor, equipment, excavation, bedding, restoration, testing, backfill, and etc., required to install the specified new pipe and new fittings at the locations shown on the plans, or as directed, in accordance with the specifications and standard drawings complete and ready for use. No additional payment will be made for rock excavation. This bid item includes material and placement of flowable fill under existing and proposed pavement, and wherever else specified on the plans or in the specifications. This item shall also include pipe anchors on polyethylene pipe runs as shown on the plans or required by the specifications to prevent the creep or contraction of the pipe. Measurement of quantities under this item shall be through fittings, encasements, and directional bores (only when a separate carrier pipe is specified within the directional bore pipe). No separate payment will be made under pipe items when the directional bore pipe is the carrier pipe. Measurements shall be further defined to be to the center of tie-in where new pipe contacts existing pipe at the center of connecting fittings, to the outside face of vault or structure walls, or to the point of main termination at dead ends. Please refer to the Utility Company’s Specifications. If the Company does not have specifications, KYTC’s Specifications shall be referenced. This item shall be paid LINEAR FEET (LF).

S FORCE MAIN AIR RLS/VAC VLV This bid item description shall apply to all force main air release/vacuum valve installations of every size except those defined as “Special”. This item shall include the air release/vacuum valve, main to valve connecting line or piping, manhole/vault/structure, access casting or doors, tapping the main, labor, equipment, excavation, proper backfill and restoration required to install the air release/vacuum valve at the location shown on the plans or as directed in accordance with the specifications and standard drawings complete and ready for use. All air release/vacuum valves on a project shall be paid under one bid item regardless of size. No separate pay items will be established for size variations. Only in the case of the uniqueness of a particular air release/vacuum valve would a separate bid item be established. Please refer to the Utility Company’s Specifications. If the Company does not have specifications, KYTC’s Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

S FORCE MAIN DIRECTIONAL BORE Payment under this item is made whenever the plans or specifications specifically show directional boring is to be utilized in order to minimize the impact of open cut for the installation of sewer or force main under streets, buildings, creeks, and etc. Payment under this item shall include the specified bore pipe, labor, and equipment. No separate payment shall be made for bore pipe installed in the bore whether used as a carrier pipe or an encasement of a separate carrier pipe. This item shall also include pipe anchors at each end of the bore when specified to prevent the creep or contraction of the bore pipe. Carrier pipe installed within a bore pipe shall be paid separately under pipe items. Payment under this item shall not be size specific and no separate bid items will be established for size variations. The bore pipe sizes to be included under this item shall be as shown on the plans and/or in the specifications. Any and all directional bores in each contract shall be paid under one directional bore bid item included in the contract regardless of size. Please refer to the Utility Company’s Specifications. If the Company does not have specifications, KYTC’s Specifications shall be referenced. This item shall be paid LINEAR FEET (LF).

S FORCE MAIN POINT RELOCATE This item is intended for payment for horizontal and/or vertical relocation of a short length of an existing main at the locations shown on the plans. This bid item is to be used to relocate an existing force main at point locations such as to clear a conflict at a

proposed drainage structure, pipe or any other similar short relocation situation, and where the existing pipe material is to be reused. The contractor shall provide any additional pipe or fitting material needed to complete the work as shown on the plans and specifications. The materials provided shall be of the same type and specification as those that exist. Substitution of alternative materials shall be approved by the engineer in advance on a case by case basis. New polyethylene wrap is to be provided (if wrap exists or is specified in the specifications to be used). If it is necessary that the pipe be disassembled for relay, payment under this item shall also include replacement of joint gaskets as needed. Bedding and backfill shall be provided and performed the same as with any other pipe installation as detailed in the plans and specifications. Payment under this item shall be for each location requiring an existing main to be relocated horizontally or vertically regardless of pipe size or relocation length. No separate pay items will be established for pipe size variations or relocation segment length variations. Force Main Relocate shall not be paid on a linear feet basis; but shall be shall be paid EACH (EA) at each location when complete and placed in service. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced.

S FORCE MAIN TAP SLEVE/VALVE RANGE 1 OR 2 This item shall include the specified tapping sleeve, valve, valve box, concrete pad around valve box (when required in specifications or plans), labor, and equipment to install the specified tapping sleeve and valve, complete and ready for use in accordance with the plans and specifications. The size shall be the measured internal diameter of the live pipe to be tapped. The size tapping sleeve and valve to be paid under sizes 1 or 2 shall be as follows:

- Range 1 = All live tapped main sizes up to and including 8 inches
- Range 2 = All live tapped main sizes greater than 8 inches

Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

S FORCE MAIN TIE-IN This bid description shall be used for all force main tie-in bid items of every size except those defined as "Special". This item includes all labor, equipment, excavation, fittings, sleeves, reducers, couplings, blocking, anchoring, restoration, testing and backfill required to make the force main tie-in as shown on the plans and in accordance with the specifications complete and ready for use. This bid item shall include purge and sanitary disposal of any sewage from any abandoned segments of force main. Pipe for tie-ins shall be paid under separate bid items. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

S FORCE MAIN VALVE This description shall apply to all force main valves of every size required in the plans and specifications, except those bid items defined as "Special". Payment under this description is to be for gate or butterfly force main valves being installed with new force main. This item includes the valve as specified in the plans and specifications, polyethylene wrap (if required by specification), labor, equipment, excavation, anchoring (if any), valve box and valve stem extensions, backfill, concrete pad around valve box (if required by specification), restoration, testing, and etc., required to install the specified valve at the location shown on the plans in accordance with the specifications and standard drawings complete and ready for use. If required on plans and/or proposed adjoining DIP is restrained, force main valves shall be restrained. Force main valve restraint shall be considered incidental to the force main valve and adjoining pipe. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be

referenced. This item shall be paid EACH (EA) when complete.

S FORCE MAIN VALVE BOX ADJUST Includes all labor, equipment, valve box and valve stem extensions (if required), excavation, backfill, concrete pad around valve box (when specified in specifications or plans), restoration, and etc., to adjust the top of the force main valve box to finished grade complete and ready for use. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

S LATERAL CLEANOUT This item shall be for payment for installation of a cleanout in a service lateral line. This item shall include furnishing and installation of a tee, vertical pipe of whatever length required, and threaded cap. The cleanout shall extend from the lateral to final grade elevation. The size of the cleanout shall be equivalent to the size of the lateral. The cleanout materials shall meet the same specification as those for the lateral. The cleanout shall be installed at the locations shown on the plans or as directed by the engineer. Only one pay item shall be established for cleanout installation. No separate pay items shall be established for size or height variances. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

S LATERAL LOCATE This bid item is to pay for all labor, equipment, and materials needed in locating an existing sanitary sewer service lateral for tie-in of the lateral to new mainline sewers and/or for the relocation of a lateral. This bid item shall be inclusive of any and all methods and efforts required to locate the lateral for tie-in or relocation of the lateral. Locating methods to be included under this items shall include, but are not limited to, those efforts employing the use of video cameras from within an existing sanitary sewer main or lateral, electronic locating beacons and/or tracers inserted into the sanitary sewer main or lateral, careful excavation as a separate operation from mainline sewer or lateral excavation, the use of dyes to trace the flow of a lateral, or any combination of methods required to accurately locate the lateral. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA).

S LATERAL LONG SIDE This bid item description shall apply to all service lateral installations of every size up to and including 6 inch internal diameter, except those lateral bid items defined as "Special". This item includes the specified piping material, main tap, bends, clean outs, labor, equipment, excavation, backfill, testing, and restoration, at the locations shown on the plans or as directed, in accordance with the specifications and standard drawings, complete and ready for use. This bid item is to pay for service lateral installations where the ends of the lateral connection are on opposite sides of the public roadway. The new lateral must cross the centerline of the public roadway to qualify for payment as a long side lateral. The length of the service lateral is not to be specified. Payment under this item shall not be restricted by a minimum or maximum length. The contractor shall draw his own conclusions as to the length of piping that may be needed. Payment under this item shall include boring, jacking, or excavating across the public roadway for placement. Placement of a service lateral across a private residential or commercial entrance alone shall not be reason to make payment under this item. Private or commercial entrances shall not be considered a public roadway in defining payment under this item. No additional payment will be made for rock excavation or for bedding required in rock excavation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

S LATERAL SHORT SIDE This bid item description shall apply to all service lateral installations of every size up to and including 6 inch, except those lateral bid items defined as “Special”. This item includes the specified piping material, main tap tee, bends, clean outs, labor, equipment, excavation, backfill, testing, and restoration, at the locations shown on the plans or as directed, in accordance with the specifications and standard drawings, complete and ready for use. This bid item is to pay for lateral installations where both ends of the lateral connection are on the same side of the public roadway, or when an existing lateral crossing a public roadway will remain and is being extended, reconnected, or relocated with all work on one side of the public roadway centerline as shown on the plans. The length of the service lateral is not to be specified and shall not be restricted to any minimum or maximum length. Payment shall be made under this item even if the lateral crosses a private residential or commercial entrance; but, not a public roadway. Private or commercial entrances shall not be considered a public roadway in defining payment under this item. The contractor shall draw his own conclusions as to the length of piping that may be needed. No additional payment will be made for rock excavation or for bedding required in rock excavation. Please refer to the Utility Company’s Specifications. If the Company does not have specifications, KYTC’s Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

S LINE MARKER This item is for payment for furnishing and installing a sewer utility line marker as specified by the utility owner specifications and plans. A line marker may consist of a post or monument of whatever materials specified and shall include markings and/or signage on same as specified by plans or specifications. This item shall include all labor, equipment, and materials needed for complete installation of the marker. This item shall be paid EACH (EA) when complete.

S MANHOLE Payment under this item is for the installation of new 4 foot interior diameter sanitary sewer manhole. Payment for manholes will be made at the contract unit price each in place complete and ready for use at the locations shown on plans in accordance with specifications and standard drawings. Manholes shall include concrete base, barrel sections, cone section or slab top, steps, excavation, backfilling, air testing, restoration, and cleanup in accordance with the specifications and standard drawings. Payment shall be made under this item regardless of whether the base is to be precast or cast-in-place (doghouse). All materials, except casting, shall be new and unused. An existing casting from an existing abandoned or removed manhole is to be reused and shall be considered incidental to this item. When a new casting is specified, or an existing casting is unavailable, it shall be paid as a separate bid item. Anchoring of casting, new or used, shall be considered incidental to this bid item. No additional compensation will be paid for manhole height variations. No additional payment will be made for rock excavation. Please refer to the Utility Company’s Specifications. If the Company does not have specifications, KYTC’s Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

S MANHOLE ABANDON/REMOVE Payment under this item is for the partial removal and/or filling of any sanitary sewer manhole regardless of size or depth that no longer serves any purpose. Payment shall be made regardless of whether the manhole is or is not in conflict with other work. Any manhole requiring partial removal, but not total removal, in order to clear a conflict with other work shall be paid under this item. All manholes partially removed shall be removed to a point at least one foot below final grade, one foot below roadway subgrade, or one foot clear of any other underground infrastructure, whichever is lowest. If partial removal of an abandoned manhole is elected by the contractor, the remaining manhole structure shall be refilled with flowable fill. Payment for disposal of a sanitary sewer manhole will be made under this item only. Please refer to the Utility Company’s

Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

S MANHOLE ADJUST TO GRADE Payment under this item is for the adjustment of sanitary sewer casting elevation on all sizes of existing sanitary manholes. This work shall be performed in accordance with the sanitary sewer specifications. Payment shall be made under this bid item regardless of the amount of adjustment necessary to a sanitary sewer manhole casting or diameter of the manhole. Work under this pay item may be as simple as placing a bed of mortar under a casting; but, shall also be inclusive of installation of adjusting rings, and /or addition, removal, or replacement of barrel sections. The existing casting is to be reused unless a new casting is specified on the plans. New casting, when specified, shall be paid as a separate bid item. Anchoring of the casting shall be incidental to this item. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

S MANHOLE CASTING STANDARD Payment under this bid items is for furnishing of a new standard traffic baring casting for sanitary manholes meeting the requirements of the sanitary sewer specifications and standard drawings. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when installed.

S MANHOLE CASTING WATERTIGHT Payment under this bid item is for furnishing of a new watertight traffic baring casting for sanitary manholes meeting the requirements of the sanitary sewer specifications and standard drawings. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when installed.

S MANHOLE RECONSTRUCT INVERT This bid item is to pay for all labor, equipment, and material for rework of the manhole bench to redirect or eliminate flow, such as when the flow of a pipe or pipes are being removed or redirected. This work will be as specified in the plans, specifications, or directed by the engineer. This work may consist of, but is not limited to, removal of concrete and/or placement of concrete in elimination or redirect of flow. This item shall also include providing and placement of a rubber seal or boot as required by utility specification, standard drawing or plan. The contractor shall draw his own conclusions as to the effort and scope of work needed to comply with the specifications, standard drawings, and plans. No payment shall be made under this bid when MANHOLE TAP EXISTING, or MANHOLE TAP EXISTING ADD DROP are being paid at the same location, as this type of work is included in those items. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

S MANHOLE TAP EXISTING This bid item is to pay for all labor, equipment, and material for coring one opening in an existing manhole base, addition of a rubber seal as specified, and rework of the manhole bench to direct the additional pipe flow. The bid item shall be paid for each core opening added to a single manhole. This bid item shall also include any rework of the existing manhole bench due to the elimination of other existing pipes and flow. This work will be as specified in the plans, specifications, or directed by the engineer. This work may consist of, but is not limited to, removal of concrete and/or placement of concrete in the addition, elimination, or redirect of flow. The contractor shall draw his own conclusions as to the effort and scope of work needed to comply with the

specifications, standard drawings, and plans. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

S MANHOLE TAP EXISTING ADD DROP This bid item is to pay for all labor, equipment, and material for coring one opening in an existing manhole base, addition of a rubber seal as specified, addition of a vertical drop pipe to the outside of the manhole, placement of reinforcing steel and concrete to encase vertical pipe, and rework of the manhole bench to direct the additional pipe flow. The bid item shall be paid for each drop added to a single manhole. This bid item shall also include any rework of the existing manhole bench due to the elimination of other existing pipes and flow. This work will be as specified in the plans, specifications, or directed by the engineer. This work may consist of, but is not limited to, removal of concrete and/or placement of concrete in the addition, elimination, or redirect of flow. The contractor shall draw his own conclusions as to the effort and scope of work needed to comply with the specifications, standard drawings, and plans. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

S MANHOLE WITH DROP Payment under this item is for the installation of new 4 foot interior diameter sanitary sewer manhole with drop. Payment for drop manholes will be made at the contract unit price each in place complete and ready for use at the locations shown on plans in accordance with specifications and standard drawings. Drop manholes shall include concrete base, barrel sections, drop materials, cone section or slab top, steps, excavation, backfilling, air testing, restoration, and cleanup. Payment shall be made under this item regardless of whether the base is to be precast or cast-in-place (doghouse). All materials, except casting, shall be new and unused. An existing casting from an existing abandoned or removed manhole is to be reused and shall be considered incidental to this item. When a new casting is specified, or an existing casting is unavailable, it shall be paid as a separate bid item. Anchoring of casting, new or used, shall be considered incidental to this bid item. No additional compensation will be paid for manhole height variations. No additional payment will be made for rock excavation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

S MANHOLE WITH LINING Payment under this item is for the installation of new 4 foot interior diameter sanitary sewer manhole with corrosion resistant lining. Payment for manholes will be made at the contract unit price each in place complete and ready for use at the locations shown on plans in accordance with specifications and standard drawings. Manholes shall include concrete base, barrel sections, cone section or slab top, steps, lining, excavation, backfilling, air testing, restoration, and cleanup in accordance with the standard drawings. Payment shall be made under this item regardless of whether the base is to be precast or cast-in-place (doghouse). All materials, except casting, shall be new and unused. An existing casting from an existing abandoned or removed manhole is to be reused and shall be considered incidental to this item. When a new casting is specified, or an existing casting is unavailable, it shall be paid as a separate bid item. Anchoring of casting, new or used, shall be considered incidental to this bid item. No additional compensation will be paid for manhole height variations. No additional payment will be made for rock excavation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

S MANHOLE WITH TRAP Payment under this item is for the installation of a new manhole with

trap. Payment for trap manholes will be made at the contract unit price each in place complete and ready for use at the locations shown on plans in accordance with specifications and standard drawings. Trap manholes shall include concrete base, manhole structure and trap materials, cone section or slab top, steps, excavation, backfilling, air testing, restoration, and cleanup. All materials, except casting, shall be new and unused. Payment shall be made under this item regardless of whether the base is to be precast or cast-in-place (doghouse). An existing casting from an existing abandoned or removed manhole is to be reused and shall be considered incidental to this item. When a new casting is specified, or an existing casting is unavailable, it shall be paid as a separate bid item. Anchoring of casting, new or used, shall be considered incidental to this bid item. No additional compensation will be paid for manhole height variations. No additional payment will be made for rock excavation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

S PIPE This description shall apply to all PVC and ductile iron gravity sewer pipe bid items of every size and type 8 inches internal diameter and larger, except those bid items defined as "Special". This item includes the pipe specified by the plans and specifications, all fittings (including, but not limited to, tap tees and couplings for joining to existing similar or dissimilar pipes), polyethylene wrap (if required by specification), labor, equipment, excavation, bedding, restoration, pressure or vacuum testing, temporary testing materials, video inspection, backfill, and etc., required to install the specified new pipe and new fittings at the locations shown on the plans, or as directed, in accordance with the specifications and standard drawings complete and ready for use. This bid item shall include material and placement of flowable fill under existing and proposed pavement, and wherever specified on the plans or in the specifications. No additional payment will be made for rock excavation. Measurement of quantities under this item shall be through fittings and encasements to a point at the outside face of manhole barrels, or to the point of main termination at dead ends or lamp holes. Carrier pipe placed within an encasement shall be paid under this item and shall include casing spacers and end seals. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LINEAR FEET (LF).

S PIPE POINT REPAIR This item is to be used to pay for repair of short lengths of existing sanitary sewer pipe that, through prior video inspection or other means, are known to have pre-existing failure. Pipe Point Repair may be needed in preparation for installation of cured-in-place-pipe (CIPP) lining or other instances where failure is known and repair is prudent. The size of pipe shall not be defined in separate bid items. All diameter sizes of point repair shall be paid under this one item. The materials to be used to make the repair shall be as defined on the plans or in the specifications. This bid item shall include all excavation, pipe materials, joining materials to connect old and new pipe, bedding, and backfill to complete the repair at the locations shown on the plans or as directed by the engineer, complete and ready for use. This bid item shall include bypass pumping when required. Measurement shall be from contact point to contact point of old and new pipe. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LINEAR FEET (LF).

S PUMP STATION This item is for payment for installation of sanitary pump stations including above or below ground structure for housing of the pumps. This item shall include all pumps, piping, fittings, valves, electrical components, building materials, concrete, any other appurtenances, labor, equipment, excavation, and backfill, to complete the pump station installation as required by the plans, standard drawings, and specifications, complete and ready for use. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall

be referenced. This item shall be paid LUMP SUM (LS) for each when complete.

S STRUCTURE ABANDON This item is to be used to pay for abandonment of larger above or below ground sewer structures such as air release/vacuum valve vaults, pump stations, tanks, etc. Payment under this time shall not be limited to size or scope; however structures with connecting pipes of 2 inches or less shall not be paid under this item; but, shall be considered incidental to sewer construction, (i.e., abandonment of standard air release/vacuum valves up to and including 2 inches would not be paid under this item). Payment under this item shall include all labor, equipment, and compacted fill or flowable fill for abandonment of the structure in place and restoration complete. No separate bid items will be established for size or structure variations. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

S STRUCTURE REMOVAL This item is to be used to pay for removal of larger above or below ground sewer structures such as air release/vacuum valve vaults, pump stations, tanks, and etc. Payment under this time shall not be limited to size or scope; however, structures with connecting pipes of 2 inches or less shall not be paid under this item; but, shall be considered incidental to sewer construction, (i.e., removal of standard air release/vacuum valves and their structure up to and including 2 inches would not be paid under this item). Payment under this item shall include all labor, equipment, and compacted backfill for removal of the structure and restoration complete. No separate bid items will be established for size or structure variations. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

Kentucky Transportation
Cabinet Project: 4-170.00

NOTICE

DEPARTMENT OF THE ARMY

CORPS OF ENGINEERS

NATIONWIDE SECTION 404 PERMIT AUTHORIZATION

DEPARTMENT FOR ENVIRONMENTAL PROTECTION

KENTUCKY DIVISION OF WATER

SECTION 401 WATER QUALITY CERTIFICATION

PROJECT DESCRIPTION: SR 313 (Joe Prather Highway) – Widen to Four Lanes, From Patriot Parkway to Bullion Boulevard Connector (approximately four miles).

The Sections 404 and 401 activities for this project have previously been permitted under the authority of the Department of the Army, Nationwide Section 404 Permit Number 14, *Linear Transportation Projects* (with additional *Kentucky Regional General Conditions*), and the Division of Section 401 Water General Water Quality Certification. For these authorized permits to be valid, the attached conditions must be followed. The contractor shall post a copy of this Nationwide Number 14 permit and General Water Quality Certification in a conspicuous location at the project site, with unencumbered public access, for the duration of construction and comply with the general conditions required.

Locations Impacting Water Quality

Station Location	Description
93+88	Extension of 30-in pipe 41 feet that is collecting runoff from an ephemeral stream. This extension will be lined with rock at the outfall. Total impact will be 76 feet, an area of 0.004-acre. The area of the watershed is approximately two acres. Construction of this pipe extension will include

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Station Location	Description
	BMPs associated with erosion and sedimentation control. Remediation of the disturbed ground will include seeding of grass on bare surface.
105+00	Extension of 24-in pipe by 42 feet. This pipe drainage conveys water flow from an ephemeral stream. The total impact of this extension will be 52 feet, an area of 0.002-acre. The area of the watershed to point of pipe is 1.1 acres. Construction of this pipe extension will include BMPs associated with erosion and sedimentation control. Remediation of the disturbed ground will include seeding of grass on bare surfaces.
109+59	Extension of 18-in pipe by 73 feet. This pipe drainage conveys flow from roadside drainage and an ephemeral stream. The total impact of this extension will be 112 feet, an area of 0.004-acre. The area of watershed to the point of the pipe is 0.43-acre. Construction of this pipe extension will include BMPs associated with erosion and sedimentation control. Remediation of the disturbed ground will include seeding of grass on bare surfaces.
121+43	Extension of 18-in pipe by 52 feet. This pipe drainage conveys flow from an ephemeral stream. The total impact of this extension will be 102 feet, an area of 0.004-acre. The area of watershed at the pipe is about 3.3 acres. Construction of this pipe extension will include BMPs associated with erosion and sedimentation control. Remediation of the disturbed ground will include seeding of grass on bare surfaces.
136+53	Extension of 24-in pipe by 58 feet. This pipe drainage conveys flow from an ephemeral stream and small amount of roadside drainage. The total length of impact will be 69 feet, an area of 0.003-acre. The watershed area to point of the pipe is about 0.65-acre. Construction of this pipe extension will include BMPs associated with erosion and sedimentation control. Remediation of the disturbed ground will include seeding of grass on bare surfaces.
145+47	Extension of 30-in pipe by 54 feet. This pipe drainage conveys flow from an ephemeral stream and small amount of roadside drainage. The total length of impact will be 76 feet, an area of 0.004-acre. The area of this watershed to the point of pipe is approximately seven acres. Construction of this pipe extension will include BMPs associated with erosion and sedimentation control. Remediation of the disturbed ground will include seeding of grass on bare surfaces.
171+40	Extension of 54-in pipe by 90 feet; this pipe receives flow from an ephemeral UT of Brushy Fork. The total length of impact will be approximately 105 feet, an area of 0.01-acre. The area of the watershed at the point of intercept by pipe is approximately 15 acres. Construction of this pipe extension will include BMPs associated with erosion and sedimentation control. Remediation of the disturbed ground will include seeding of grass on bare surfaces.
188+42	Extension of 18-in pipe by 35 feet; this pipe receives flow from an ephemeral stream of Brushy Fork. The total length of impact will be approximately 50 feet, an area of 0.002-acre. The area of the watershed at

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Station Location	Description
	the point of intercept by the pipe is approximately 0.5-acre. Construction of this pipe extension will include BMPs associated with erosion and sedimentation control. Remediation of the disturbed ground will include seeding of grass on bare surfaces.
265+00	Extension of 30-in pipe by 57 feet; this pipe receives flow from an ephemeral UT of Brushy Fork. The total length of impact is approximately 70 feet, an area of 0.004-acre. The watershed area at the point of inflow is approximately 1.2 acres. Construction of this pipe extension will include BMPs associated with erosion and sedimentation control. Remediation of the disturbed ground will include seeding of grass on bare surfaces.
271+61	Extension of a 30-in pipe by about 40 feet; this pipe receives flow from an ephemeral UT of Brushy Fork. The total length of impact is 80 feet, an area of 0.005-acre. The watershed area at the point of inflow is approximately 5.7 acres. Construction of this pipe extension will include BMPs associated with erosion and sedimentation control. Remediation of the disturbed ground will include seeding of grass on bare surfaces.
277+37	Extension of a 24-in pipe by 79 feet; this pipe receives flow from an ephemeral UT of Brushy Fork. The total length of impact is 104 feet, an area of 0.005-acre. The watershed size at the point of pipe inflow is approximately 3.9 acres. Construction of this pipe extension will include BMPs associated with erosion and sedimentation control. Remediation of the disturbed ground will include seeding of grass on bare surfaces.
287+78	Extension of a 48-in pipe by approximately 77 feet; this pipe receives flow from an ephemeral UT of Brushy Fork. The total length of impact is about 80 feet, and area of 0.006-acre. The watershed size at the point of pipe inflow is approximately 30 acres. Construction of this pipe extension will include BMPs associated with erosion and sedimentation control. Remediation of the disturbed ground will include seeding of grass on bare surfaces.
295+32	Extension of a 24-in pipe by approximately 82 feet; this pipe receives flow from an UT of Brushy Fork. The total length of impact is about 85 feet, an area of 0.004-acre. The watershed size at the point of pipe inflow is approximately 0.1-acre. Construction of this pipe extension will include BMPs associated with erosion and sedimentation control. Remediation of the disturbed ground will include seeding of grass on bare surfaces.
299+16	Extension of an 8' × 4' RCBC by 70 feet; this pipe receives flow from an intermittent UT of Brushy Fork. The total length of impact is about 90 feet, an area of 0.017-acre. The watershed size at the point of pipe inflow is approximately 86 acres. Construction of this pipe extension will include BMPs associated with erosion and sedimentation control. Remediation of the disturbed ground will include seeding of grass on bare surfaces.
316+33	Extension of an 8' × 4' RCBC by 40 feet; this pipe receives flow from a perennial UT of Brushy Fork. The total length of impact is approximately 70 feet, an area of 0.013-acre. The watershed size at the point of pipe inflow is approximately 115 acres. Construction of this pipe extension

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Station Location	Description
	will include BMPs associated with erosion and sedimentation control. Remediation of the disturbed ground will include seeding of grass on bare surfaces.
325+27	Extension of a 24-in pipe by about 52 feet; this pipe receives flow from an ephemeral UT of Brushy Fork. The total length of impact is approximately 70 feet, an area of 0.003-acre. The watershed size at the point of pipe inflow is approximately three acres. Construction of this pipe extension will include BMPs associated with erosion and sedimentation control. Remediation of the disturbed ground will include seeding of grass on bare surfaces.
332+47	Extension of an 8' × 4' RCBC by 4 feet; this pipe receives flow from an intermittent UT of Brushy Fork. The total length of impact is approximately 39 feet, an area of about 0.004-acre. The watershed size at the point of pipe inflow is approximately 160 acres. Construction of this pipe extension will include BMPs associated with erosion and sedimentation control. Remediation of the disturbed ground will include seeding of grass on bare surfaces.
337+67	Extension of a 42-in pipe by 64 feet; this pipe receives flow from a intermittent UT of Brushy Fork. The total length of impact is about 94 feet, an area of approximately 0.009-acre. The watershed size at the point of pipe inflow is approximately 17 acres. Construction of this pipe extension will include BMPs associated with erosion and sedimentation control. Remediation of the disturbed ground will include seeding of grass on bare surfaces.
346+64	Extension of 54-in pipe by 55 feet; this pipe receives roadside drainage from an intermittent UT of Brushy Fork. The total length of impact is about 77 feet, an area of approximately 0.008 acre. The watershed size at the point of inflow is approximately 46 acres. Construction of this pipe extension will include BMPs associated with erosion and sedimentation control. Remediation of the disturbed ground will include seeding of grass on bare surfaces.
355+00	Extension of a 30-in pipe by 80 feet; this pipe receives roadside drainage from an ephemeral UT of Brushy Fork. The total length of impact is about 93 feet; an area of 0.003-acre. The watershed size at point of inflow is approximately 10 acres. Construction of this pipe extension will include BMPs associated with erosion and sedimentation control. Remediation of the disturbed ground will include seeding of grass on bare surfaces.
362+20	Extension of an 18-in pipe by 45 feet; this pipe receives roadside drainage from an ephemeral UT of Brushy Fork. The total length of impact is about 53 feet; an area of 0.002-acre. The watershed size at point of inflow is approximately two acres. Construction of this pipe extension will include BMPs associated with erosion and sedimentation control. Remediation of the disturbed ground will include seeding of grass on bare surfaces.
367+62	Extension of a 24-in pipe by 77 feet; this pipe receives roadside drainage from an ephemeral UT of Brushy Fork. The total length of impact is about

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Station Location	Description
	90 feet; an area of 0.004-acre. The watershed size at point of inflow is approximately eight acres. Construction of this pipe extension will include BMPs associated with erosion and sedimentation control. Remediation of the disturbed ground will include seeding of grass on bare surfaces.
370+00	Extension of a 30-in pipe by 28 feet; this pipe receives roadside drainage from an ephemeral UT of Brushy Fork. The total length of impact is about 48 feet; an area of 0.003-acre. The watershed size at point of inflow is approximately four acres. Construction of this pipe extension will include BMPs associated with erosion and sedimentation control. Remediation of the disturbed ground will include seeding of grass on bare surfaces.
372+63	Extension of an 18-in pipe by 17 feet; this pipe receives roadside drainage from an ephemeral UT of Brushy Fork. The total length of impact is about 33 feet; an area of 0.001-acre. The watershed size at point of inflow is approximately two acres. Construction of this pipe extension will include BMPs associated with erosion and sedimentation control. Remediation of the disturbed ground will include seeding of grass on bare surfaces.
375+17	Extension of 30-in pipe by 17 feet; this pipe receives roadside drainage from an ephemeral UT of Brushy Fork. The total length of impact is about 41 feet; an area of 0.002-acre. The watershed size at point of inflow is approximately three acres. Construction of this pipe extension will include BMPs associated with erosion and sedimentation control. Remediation of the disturbed ground will include seeding of grass on bare surfaces.
381+06	Extension of 36-in pipe by seven feet; this pipe receives roadside drainage from an ephemeral UT of Brushy Fork. The total length of impact is about 40 feet; an area of approximately six acres. Construction of this pipe extension will include BMPs associated with erosion and sedimentation control. Remediation of the disturbed ground will include seeding of grass on bare surfaces.

This project involves work near and/or within Jurisdictional Waters of the United States as defined by the U. S. Army Corps of Engineers; therefore, requiring a Nationwide Number 14 General Section 404 permit. The Division of Water conditionally certified this General Permit. Importantly, one of those conditions regards the use of heavy equipment in any stream channel, or streambed. If there is need to cross the stream channel with heavy equipment, or conduct work within the stream channel, a work platform or temporary crossing, is authorized. This should be constructed with clean rock (preferably sandstone or granite east of a line stretching from the McCreary-Wayne County line to the southwest, northeasterly to Lewis-Greenup County line), and sufficient pipe to allow stream flow to continue, unimpeded (refer to the attached standard drawing for low-water crossings at end of the document). Other conditions may be found under the heading, *General Certification—Nationwide Permit # 14 Linear Transportation Projects*.

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In order for this authorization to be valid, the attached conditions must be followed. The contractor shall post a copy of this Nationwide Number 14 Approval in a conspicuous location at the project site, for the duration of the construction, and comply with the general conditions as required.

To more readily expedite construction, the contractor may elect to alter the design, or perform the work in a manner different from what was originally proposed and specified. Prior to commencing such alternative work, the contractor shall obtain written permission from the Division of Construction and the Kentucky Transportation Cabinet, Division of Environmental Analysis. If such changes necessitate further permitting, then the contractor will be responsible for applying to the U. S. Army Corps of Engineers and the Kentucky Division of Water. A copy of any request to the Corps of Engineers or Division of Water to alter this proposal and subsequent responses shall be forwarded to the Division of Environmental Analysis, DA Permit Coordinator, for office records and for informational purposes.

Public Notice



**US Army Corps
of Engineers**
Louisville District ®

Public Notice No.
LRL-2016-00006

Expiration Date:
18 MAR 2022

Please address all comments and inquiries to:
U.S. Army Corps of Engineers, Louisville District
ATTN: Ms. Meagan Knuckles, CELRL-RDS
P.O. Box 59
Louisville, Kentucky 40201-0059

Phone: (502) 315-6709

PUBLIC NOTICE ANNOUNCING REGIONAL CONDITIONS AND WATER QUALITY CERTIFICATIONS FOR NATIONWIDE PERMITS

On January 6, 2017, the U.S. Army Corps of Engineers (Corps) published a notice in the *Federal Register* (82 FR 1860) announcing the reissuance of all 50 existing Nationwide Permits (NWP), general conditions, and definitions with some modifications. The Corps also issued two new NWPs, one new general condition, and five new definitions. The NWPs became effective on March 19, 2017, and will expire on March 18, 2022.

On March 17, 2017, the Great Lakes and Ohio River Division (LRD) Engineer approved Regional Conditions for the NWPs in Kentucky. These conditions apply to all activities authorized by NWPs. Regional Conditions provide additional protection for the aquatic environment by ensuring that the NWPs authorize only those activities with minimal adverse effects on the aquatic environment. The Regional Conditions for Kentucky are attached to this public notice. Additionally, the Louisville District has posted the Regional Conditions for the NWPs on its Internet home page at: <http://www.lrl.usace.army.mil/Missions/Regulatory/Obtain-a-Permit/Nationwide/>

The Kentucky Division of Water (KDOW) denied the 401 Water Quality Certification (WQC) for NWPs 16, 17, 32, 38, 43, 44, 52, 53 and 54. An individual 401 WQC from KDOW will be required for any project authorized by one of the NWPs with a 401 WQC denial. The KDOW conditioned the 401 WQC for NWPs 3, 5, 7, 12, 13, 14, 15, 18, 19, 21, 23, 25, 27, 29, 30, 31, 33, 36, 37, 39, 42, 45, 46, 49, 50, and 51. An individual 401 WQC will be required by KDOW under certain conditions. The full text of the Water Quality Certifications issued by KDOW is available on the Louisville District website at the link listed above.

Questions concerning implementation of the new and modified NWPs and conditions or the Corps Regional Conditions should be sent to the Louisville District, Corps of Engineers, ATTN: Ms. Meagan Knuckles, CELRL-RDS, P.O. Box 59, Louisville, Kentucky 40201-0059.

2017 Nationwide Permits Regional and Permit-Specific Conditions COMMONWEALTH OF KENTUCKY

These regional conditions are in addition to, but do not supersede, the requirements in the Federal Register (Volume 82, No. 4 of January 6, 2017, pp 1860).

Regulatory Division
Public Notice No. LRL-2016-00006

Notifications for all Nationwide Permits (NWP) shall be in accordance with General Condition No. 32.

1. For activities that would impact Outstanding State or National Resource Waters (OSNRWs), Exceptional Waters (EWs), Coldwater Aquatic Habitat Waters (CAHs) under the Endangered Species Act for the NWP listed below, a Pre-Construction Notification (PCN) will be required to the Corps. The Corps will coordinate with the appropriate resource agencies (see attached list) on these NWP (Section 404 activities), for impacts to these waters.

NWP 3 (Maintenance)

NWP 4 (Fish and Wildlife Harvesting, Enhancement, and Attraction Devices and Activities)

NWP 5 (Scientific Measurement Devices)

NWP 6 (Survey Activities)

NWP 7 (Outfall Structures and Associated Intake Structures)

NWP 12 (Utility Line Activities)

NWP 13 (Bank Stabilization)

NWP 14 (Linear Transportation Projects)

NWP 15 (U.S. Coast Guard Approved Bridges)

NWP 16 (Return Water from Upland Contained Disposal Areas)

NWP 17 (Hydropower Projects)

NWP 18 (Minor Discharges)

NWP 19 (Minor Dredging)

NWP 20 (Response Operations for Oil or Hazardous Substances)

NWP 21 (Surface Coal Mining Activities)

NWP 22 (Removal of Vessels)

NWP 23 (Approved Categorical Exclusions)

NWP 25 (Structural Discharges)

NWP 27 (Aquatic Habitat Restoration, Establishment, and Enhancement Activities)

NWP 29 (Residential Developments)

NWP 30 (Moist Soil Management for Wildlife)

NWP 31 (Maintenance of Existing Flood Control Facilities)

NWP 32 (Completed Enforcement Actions)

NWP 33 (Temporary Construction, Access, and Dewatering)

NWP 34 (Cranberry Production Activities)

NWP 36 (Boat Ramps)

NWP 37 (Emergency Watershed Protection and Rehabilitation)

NWP 38 (Cleanup of Hazardous and Toxic Waste)

NWP 39 (Commercial and Institutional Developments)

NWP 40 (Agricultural Activities)

NWP 41 (Reshaping Existing Drainage Ditches)

NWP 42 (Recreational Facilities)

NWP 43 (Stormwater Management Facilities)

NWP 44 (Mining Activities)

NWP 45 (Repair of Uplands Damaged by Discrete Events)

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NWP 46 (Discharges in Ditches)
NWP 48 (Commercial Shellfish Aquaculture Activities)
NWP 49 (Coal Remining Activities)
NWP 50 (Underground Coal Mining Activities)
NWP 51 (Land-Based Renewable Energy Generation Facilities)
NWP 52 (Water-Based Renewable Energy Generation Pilot Projects)
NWP 53 (Removal of Low-Head Dams)
NWP 54 (Living Shorelines)

2. In addition to the notification and agency coordination requirements in the NWPs, for impacts greater than 0.25 acres in all “waters of the U.S.” for the NWPs listed below, a PCN will be required to the Corps. The Corps will coordinate with the appropriate resource agencies (see attached list) on these NWPs:

NWP 3 (Maintenance)
NWP 7 (Outfall Structures and Associated Intake Structures)
NWP 12 (Utility Line Activities)
NWP 14 (Linear Transportation Projects)
NWP 29 (Residential Developments)
NWP 39 (Commercial and Institutional Developments)
NWP 40 (Agricultural Activities)
NWP 41 (Reshaping Existing Drainage Ditches)
NWP 42 (Recreational Facilities)
NWP 43 (Stormwater Management Facilities)
NWP 44 (Mining Activities)
NWP 51 (Land-Based Renewable Energy Generation Facilities)
NWP 52 (Water-Based Renewable Energy Generation Pilot Projects)
NWP 53 (Removal of Low-Head Dams)

3. For activities in all “waters of the U.S.” for the NWPs listed below, a PCN will be required to the Corps. The Corps will coordinate with the appropriate resource agencies (see attached list) on these NWPs:

NWP 21 (Surface Coal Mining Activities)
NWP 27 (Aquatic Habitat Restoration, Establishment & Enhancement Activities)
NWP 49 (Coal Remining Activities)
NWP 50 (Underground Coal Mining Activities)

4. Nationwide Permit No. 14 – Linear Transportation Projects.

- (a) New road alignments or realignments are limited to a permanent loss of 500 linear feet of intermittent or perennial stream length at each crossing. Road crossings with permanent losses greater than 500 linear feet of intermittent or perennial stream associated with new alignments or realignments will be evaluated as an individual permit (i.e., a Letter of Permission or as a Standard Individual Permit).

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- (b) In addition to the notification requirements contained in NWP 14, the permittee must submit a PCN to the district engineer prior to commencing the activity for the permanent loss of greater than 300 feet of ephemeral, intermittent and perennial stream of all “waters of the U.S.” (See General Condition 32 and the definition of "loss of waters of the United States" in the Nationwide Permits for further information.)
5. Notification in accordance with General Condition 32 is required to the Corps for all activities which are subject to jurisdiction under Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403).
 6. All applications are required as both a paper copy and in an electronic media format, including electronic mail or compact disc.
 7. For all activities, the applicant shall review the U.S. Fish and Wildlife Service’s IPaC website: <http://ecos.fws.gov/ipac> to determine if the activity might affect threatened and/or endangered species or designated critical habitat. If federally-listed species or designated critical habitat are identified, a PCN in accordance with General Condition 18 and 32 would be triggered and the official species list generated from the IPaC website must be submitted with the PCN.

Further information:

Outstanding State or National Resource Water (OSNRWs), Exceptional Waters (EWs), and Coldwater Aquatic Habitat Waters (CAHs) are waters designated by the Commonwealth of Kentucky, Natural Resources and Environmental Protection Cabinet. The list can be found at the following link: <http://eppcapp.ky.gov/spwaters/>

Information on Pre-Construction Notification (PCN) can be found at NWP General Condition No. 32 in the Federal Register (Volume 81, No. 105 of June 1, 2017, pp 35211).

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COORDINATING RESOURCE AGENCIES

Chief, Wetlands Regulatory Section
U.S. Environmental Protection Agency
Region IV
Atlanta Federal Center
61 Forsyth Street, SW
Atlanta, Georgia 30303

Supervisor
U.S. Fish & Wildlife Service
JC Watts Federal Building, Room 265
330 West Broadway
Frankfort, Kentucky 40601

Supervisor
401 Water Quality Certification
Kentucky Division of Water
300 Sower Boulevard, 3rd Floor
Frankfort, Kentucky 40601

Commissioner
Department of Fish and Wildlife Resources
#1 Game Farm Road
Frankfort, Kentucky 40601

Executive Director and State Historic Preservation Officer
Kentucky Heritage Council
300 Washington Street
Frankfort, Kentucky 40601

**ADDITIONAL COORDINATING RESOURCE AGENCY
FOR NWPS 21, 49, AND 50**

Kentucky Department for Natural Resources
Division of Mine Permits
300 Sower Boulevard
Frankfort, Kentucky 40601

2017 Nationwide Permit

14. Linear Transportation Projects. Activities required for crossings of waters of the United States associated with the construction, expansion, modification, or improvement of linear transportation projects (e.g., roads, highways, railways, trails, airport runways, and taxiways) in waters of the United States. For linear transportation projects in non-tidal waters, the discharge cannot cause the loss of greater than 1/2-acre of waters of the United States. For linear transportation projects in tidal waters, the discharge cannot cause the loss of greater than 1/3-acre of waters of the United States. Any stream channel modification, including bank stabilization, is limited to the minimum necessary to construct or protect the linear transportation project; such modifications must be in the immediate vicinity of the project.

This NWP also authorizes temporary structures, fills, and work, including the use of temporary mats, necessary to construct the linear transportation project. Appropriate measures must be taken to maintain normal downstream flows and minimize flooding to the maximum extent practicable, when temporary structures, work, and discharges, including cofferdams, are necessary for construction activities, access fills, or dewatering of construction sites. Temporary fills must consist of materials, and be placed in a manner, that will not be eroded by expected high flows. Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The areas affected by temporary fills must be revegetated, as appropriate.

This NWP cannot be used to authorize non-linear features commonly associated with transportation projects, such as vehicle maintenance or storage buildings, parking lots, train stations, or aircraft hangars.

Notification: The permittee must submit a pre-construction notification to the district engineer prior to commencing the activity if: (1) the loss of waters of the United States exceeds 1/10-acre; or (2) there is a discharge in a special aquatic site, including wetlands. (See general condition 32.) (Authorities: Sections 10 and 404)

Note 1: For linear transportation projects crossing a single waterbody more than one time at separate and distant locations, or multiple waterbodies at separate and distant locations, each crossing is considered a single and complete project for purposes of NWP authorization. Linear transportation projects must comply with 33 CFR 330.6(d).

Note 2: Some discharges for the construction of farm roads or forest roads, or temporary roads for moving mining equipment, may qualify for an exemption under section 404(f) of the Clean Water Act (see 33 CFR 323.4).

Note 3: For NWP 14 activities that require pre-construction notification, the PCN must include any other NWP(s), regional general permit(s), or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity, including other separate and distant crossings that require Department of the Army authorization but do not require pre-construction notification (see paragraph (b) of general condition 32). The district engineer will evaluate the PCN in accordance with Section D, "District Engineer's Decision." The district engineer may require mitigation to

ensure that the authorized activity results in no more than minimal individual and cumulative adverse environmental effects (see general condition 23).

2017 Nationwide Permit General Conditions

Note: To qualify for NWP authorization, the prospective permittee must comply with the following general conditions, as applicable, in addition to any regional or case-specific conditions imposed by the division engineer or district engineer. Prospective permittees should contact the appropriate Corps district office to determine if regional conditions have been imposed on an NWP. Prospective permittees should also contact the appropriate Corps district office to determine the status of Clean Water Act Section 401 water quality certification and/or Coastal Zone Management Act consistency for an NWP. Every person who may wish to obtain permit authorization under one or more NWPs, or who is currently relying on an existing or prior permit authorization under one or more NWPs, has been and is on notice that all of the provisions of 33 CFR 330.1 through 330.6 apply to every NWP authorization. Note especially 33 CFR 330.5 relating to the modification, suspension, or revocation of any NWP authorization.

1. Navigation. (a) No activity may cause more than a minimal adverse effect on navigation.

(b) Any safety lights and signals prescribed by the U.S. Coast Guard, through regulations or otherwise, must be installed and maintained at the permittee's expense on authorized facilities in navigable waters of the United States.

(c) The permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

2. Aquatic Life Movements. No activity may substantially disrupt the necessary life cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area, unless the activity's primary purpose is to impound water. All permanent and temporary crossings of waterbodies shall be suitably culverted, bridged, or otherwise designed and constructed to maintain low flows to sustain the movement of those aquatic species. If a bottomless culvert cannot be used, then the crossing should be designed and constructed to minimize adverse effects to aquatic life movements.

3. Spawning Areas. Activities in spawning areas during spawning seasons must be avoided to the maximum extent practicable. Activities that result in the physical destruction (e.g., through excavation, fill, or downstream smothering by substantial turbidity) of an important spawning area are not authorized.

4. Migratory Bird Breeding Areas. Activities in waters of the United States that serve as breeding areas for migratory birds must be avoided to the maximum extent practicable.

5. Shellfish Beds. No activity may occur in areas of concentrated shellfish populations, unless the activity is directly related to a shellfish harvesting activity authorized by NWP 4 and 48, or is a shellfish seeding or habitat restoration activity authorized by NWP 27.

6. Suitable Material. No activity may use unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.). Material used for construction or discharged must be free from toxic pollutants in toxic amounts (see section 307 of the Clean Water Act).

7. Water Supply Intakes. No activity may occur in the proximity of a public water supply intake, except where the activity is for the repair or improvement of public water supply intake structures or adjacent bank stabilization.

8. Adverse Effects From Impoundments. If the activity creates an impoundment of water, adverse effects to the aquatic system due to accelerating the passage of water, and/or restricting its flow must be minimized to the maximum extent practicable.

9. Management of Water Flows. To the maximum extent practicable, the pre-construction course, condition, capacity, and location of open waters must be maintained for each activity, including stream channelization, storm water management activities, and temporary and permanent road crossings, except as provided below. The activity must be constructed to withstand expected high flows. The activity must not restrict or impede the passage of normal or high flows, unless the primary purpose of the activity is to impound water or manage high flows. The activity may alter the pre-construction course, condition, capacity, and location of open waters if it benefits the aquatic environment (e.g., stream restoration or relocation activities).

10. Fills Within 100-Year Floodplains. The activity must comply with applicable FEMA-approved state or local floodplain management requirements.

11. Equipment. Heavy equipment working in wetlands or mudflats must be placed on mats, or other measures must be taken to minimize soil disturbance.

12. Soil Erosion and Sediment Controls. Appropriate soil erosion and sediment controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date. Permittees are encouraged to perform work within waters of the United States during periods of low-flow or no-flow, or during low tides.

13. Removal of Temporary Fills. Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The affected areas must be revegetated, as appropriate.

14. Proper Maintenance. Any authorized structure or fill shall be properly maintained, including maintenance to ensure public safety and compliance with applicable NWP general conditions, as well as any activity-specific conditions added by the district engineer to an NWP authorization.

15. Single and Complete Project. The activity must be a single and complete project. The same NWP cannot be used more than once for the same single and complete project.

16. Wild and Scenic Rivers. (a) No NWP activity may occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a "study river" for possible inclusion in the system while the river is in an official study status, unless the appropriate Federal agency with direct management responsibility for such river, has determined in writing that the proposed activity will not adversely affect the Wild and Scenic River designation or study status.

(b) If a proposed NWP activity will occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a "study river" for possible inclusion in the system while the river is in an official study status, the permittee must submit a pre-construction notification (see general condition 32). The district engineer will coordinate the PCN with the Federal agency with direct management responsibility for that river. The permittee shall not begin the NWP activity until notified by the district engineer that the Federal agency with direct management responsibility for that river has determined in writing that the proposed NWP activity will not adversely affect the Wild and Scenic River designation or study status.

(c) Information on Wild and Scenic Rivers may be obtained from the appropriate Federal land management agency responsible for the designated Wild and Scenic River or study river (e.g., National Park Service, U.S. Forest Service, Bureau of Land Management, U.S. Fish and Wildlife Service). Information on these rivers is also available at: <http://www.rivers.gov/>.

17. Tribal Rights. No NWP activity may cause more than minimal adverse effects on tribal rights (including treaty rights), protected tribal resources, or tribal lands.

18. Endangered Species. (a) No activity is authorized under any NWP which is likely to directly or indirectly jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act (ESA), or which will directly or indirectly destroy or adversely modify the critical habitat of such species. No activity is authorized under any NWP which “may affect” a listed species or critical habitat, unless ESA section 7 consultation addressing the effects of the proposed activity has been completed. Direct effects are the immediate effects on listed species and critical habitat caused by the NWP activity. Indirect effects are those effects on listed species and critical habitat that are caused by the NWP activity and are later in time, but still are reasonably certain to occur.

(b) Federal agencies should follow their own procedures for complying with the requirements of the ESA. If pre-construction notification is required for the proposed activity, the Federal permittee must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. The district engineer will verify that the appropriate documentation has been submitted. If the appropriate documentation has not been submitted, additional ESA section 7 consultation may be necessary for the activity and the respective federal agency would be responsible for fulfilling its obligation under section 7 of the ESA.

(c) Non-federal permittees must submit a pre-construction notification to the district engineer if any listed species or designated critical habitat might be affected or is in the vicinity of the activity, or if the activity is located in designated critical habitat, and shall not begin work on the activity until notified by the district engineer that the requirements of the ESA have been satisfied and that the activity is authorized. For activities that might affect Federally-listed endangered or threatened species or designated critical habitat, the pre-construction notification must include the name(s) of the endangered or threatened species that might be affected by the proposed activity or that utilize the designated critical habitat that might be affected by the proposed activity. The district engineer will determine whether the proposed activity “may affect” or will have “no effect” to listed species and designated critical habitat and will notify the non-Federal applicant of the Corps’ determination within 45 days of receipt of a complete pre-construction notification. In cases where the non-Federal applicant has identified listed species or critical habitat that might be affected or is in the vicinity of the activity, and has so notified the Corps, the applicant shall not begin work until the Corps has provided notification that the proposed activity will have “no effect” on listed species or critical habitat, or until ESA section 7 consultation has been completed. If the non-Federal applicant has not heard back from the Corps within 45 days, the applicant must still wait for notification from the Corps.

(d) As a result of formal or informal consultation with the FWS or NMFS the district engineer may add species-specific permit conditions to the NWPs.

(e) Authorization of an activity by an NWP does not authorize the “take” of a threatened or endangered species as defined under the ESA. In the absence of separate authorization (e.g., an ESA Section 10 Permit, a Biological Opinion with “incidental take” provisions, etc.) from the FWS or the NMFS, the Endangered Species Act prohibits any person subject to the jurisdiction of the United States to take a listed species, where “take” means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. The word “harm” in the definition of “take” means an act which actually kills or injures wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering.

(f) If the non-federal permittee has a valid ESA section 10(a)(1)(B) incidental take permit with an approved Habitat Conservation Plan for a project or a group of projects that includes the proposed NWP activity, the non-federal applicant should provide a copy of that ESA section 10(a)(1)(B) permit with the PCN required by paragraph (c) of this general condition. The district engineer will coordinate with the agency that issued the ESA section 10(a)(1)(B) permit to determine whether the proposed NWP activity and the associated incidental take were considered in the internal ESA section 7 consultation conducted for the ESA section 10(a)(1)(B) permit. If that coordination results in concurrence from the agency that the proposed NWP activity and the associated incidental take were considered in the internal ESA section 7 consultation for the ESA section 10(a)(1)(B) permit, the district engineer does not need to conduct a separate ESA section 7 consultation for the proposed NWP activity. The district engineer will notify the non-federal applicant within 45 days of receipt of a complete pre-construction notification whether the ESA section 10(a)(1)(B) permit covers the proposed NWP activity or whether additional ESA section 7 consultation is required.

(g) Information on the location of threatened and endangered species and their critical habitat can be obtained directly from the offices of the FWS and NMFS or their world wide web pages at <http://www.fws.gov/> or <http://www.fws.gov/ipac> and <http://www.nmfs.noaa.gov/pr/species/esa/> respectively.

19. Migratory Birds and Bald and Golden Eagles. The permittee is responsible for ensuring their action complies with the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. The permittee is responsible for contacting appropriate local office of the U.S. Fish and Wildlife Service to determine applicable measures to reduce impacts to migratory birds or eagles, including whether “incidental take” permits are necessary and available under the Migratory Bird Treaty Act or Bald and Golden Eagle Protection Act for a particular activity.

20. Historic Properties. (a) In cases where the district engineer determines that the activity may have the potential to cause effects to properties listed, or eligible for listing, in the National Register of Historic Places, the activity is not authorized, until the requirements of Section 106 of the National Historic Preservation Act (NHPA) have been satisfied.

(b) Federal permittees should follow their own procedures for complying with the requirements of section 106 of the National Historic Preservation Act. If pre-construction notification is required for the proposed NWP activity, the Federal permittee must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. The district engineer will verify that the appropriate documentation has been submitted. If the appropriate documentation is not submitted, then additional consultation under section 106 may be necessary. The respective federal agency is responsible for fulfilling its obligation to comply with section 106.

(c) Non-federal permittees must submit a pre-construction notification to the district engineer if the NWP activity might have the potential to cause effects to any historic properties listed on, determined to be eligible for listing on, or potentially eligible for listing on the National Register of Historic Places, including previously unidentified properties. For such activities, the pre-construction notification must state which historic properties might have the potential to be affected by the proposed NWP activity or include a vicinity map indicating the location of the historic properties or the potential for the presence of historic properties. Assistance regarding information on the location of, or potential for, the presence of historic properties can be sought from the State Historic Preservation Officer, Tribal Historic Preservation Officer, or designated tribal representative, as appropriate, and the National Register of Historic Places (see 33 CFR 330.4(g)). When reviewing pre-construction notifications, district engineers will comply with the current procedures for addressing the requirements of section 106 of the National Historic Preservation Act. The district engineer shall make a reasonable and good faith effort to carry out appropriate identification efforts, which may include background research, consultation, oral history interviews, sample field investigation, and field survey. Based on the information submitted in the PCN and these identification efforts, the district engineer shall determine whether the proposed NWP activity has the potential to cause effects on the historic properties. Section 106 consultation is not required when the district engineer determines that the activity does not have the potential to cause effects on historic properties (see 36 CFR 800.3(a)). Section 106 consultation is required when the district engineer determines that the activity has the potential to cause effects on historic properties. The district engineer will conduct consultation with consulting parties identified under 36 CFR 800.2(c) when he or she makes any of the following effect determinations for the purposes of section 106 of the NHPA: no historic properties affected, no adverse effect, or adverse effect. Where the non-Federal applicant has identified historic properties on which the activity might have the potential to cause effects and so notified the Corps, the non-Federal applicant shall not begin the activity until notified by the district engineer either that the activity has no potential to cause effects to historic properties or that NHPA section 106 consultation has been completed.

(d) For non-federal permittees, the district engineer will notify the prospective permittee within 45 days of receipt of a complete pre-construction notification whether NHPA section 106 consultation is required. If NHPA section 106 consultation is required, the district engineer will notify the non-Federal applicant that he or she cannot

begin the activity until section 106 consultation is completed. If the non-Federal applicant has not heard back from the Corps within 45 days, the applicant must still wait for notification from the Corps.

(e) Prospective permittees should be aware that section 110k of the NHPA (54 U.S.C. 306113) prevents the Corps from granting a permit or other assistance to an applicant who, with intent to avoid the requirements of section 106 of the NHPA, has intentionally significantly adversely affected a historic property to which the permit would relate, or having legal power to prevent it, allowed such significant adverse effect to occur, unless the Corps, after consultation with the Advisory Council on Historic Preservation (ACHP), determines that circumstances justify granting such assistance despite the adverse effect created or permitted by the applicant. If circumstances justify granting the assistance, the Corps is required to notify the ACHP and provide documentation specifying the circumstances, the degree of damage to the integrity of any historic properties affected, and proposed mitigation. This documentation must include any views obtained from the applicant, SHPO/THPO, appropriate Indian tribes if the undertaking occurs on or affects historic properties on tribal lands or affects properties of interest to those tribes, and other parties known to have a legitimate interest in the impacts to the permitted activity on historic properties.

21. Discovery of Previously Unknown Remains and Artifacts. If you discover any previously unknown historic, cultural or archeological remains and artifacts while accomplishing the activity authorized by this permit, you must immediately notify the district engineer of what you have found, and to the maximum extent practicable, avoid construction activities that may affect the remains and artifacts until the required coordination has been completed. The district engineer will initiate the Federal, Tribal, and state coordination required to determine if the items or remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

22. Designated Critical Resource Waters. Critical resource waters include, NOAA-managed marine sanctuaries and marine monuments, and National Estuarine Research Reserves. The district engineer may designate, after notice and opportunity for public comment, additional waters officially designated by a state as having particular environmental or ecological significance, such as outstanding national resource waters or state natural heritage sites. The district engineer may also designate additional critical resource waters after notice and opportunity for public comment.

(a) Discharges of dredged or fill material into waters of the United States are not authorized by NWPs 7, 12, 14, 16, 17, 21, 29, 31, 35, 39, 40, 42, 43, 44, 49, 50, 51, and 52 for any activity within, or directly affecting, critical resource waters, including wetlands adjacent to such waters.

(b) For NWPs 3, 8, 10, 13, 15, 18, 19, 22, 23, 25, 27, 28, 30, 33, 34, 36, 37, 38, and 54, notification is required in accordance with general condition 32, for any activity proposed in the designated critical resource waters including wetlands adjacent to those

waters. The district engineer may authorize activities under these NWP's only after it is determined that the impacts to the critical resource waters will be no more than minimal.

23. Mitigation. The district engineer will consider the following factors when determining appropriate and practicable mitigation necessary to ensure that the individual and cumulative adverse environmental effects are no more than minimal:

(a) The activity must be designed and constructed to avoid and minimize adverse effects, both temporary and permanent, to waters of the United States to the maximum extent practicable at the project site (i.e., on site).

(b) Mitigation in all its forms (avoiding, minimizing, rectifying, reducing, or compensating for resource losses) will be required to the extent necessary to ensure that the individual and cumulative adverse environmental effects are no more than minimal.

(c) Compensatory mitigation at a minimum one-for-one ratio will be required for all wetland losses that exceed 1/10-acre and require pre-construction notification, unless the district engineer determines in writing that either some other form of mitigation would be more environmentally appropriate or the adverse environmental effects of the proposed activity are no more than minimal, and provides an activity-specific waiver of this requirement. For wetland losses of 1/10-acre or less that require pre-construction notification, the district engineer may determine on a case-by-case basis that compensatory mitigation is required to ensure that the activity results in only minimal adverse environmental effects.

(d) For losses of streams or other open waters that require pre-construction notification, the district engineer may require compensatory mitigation to ensure that the activity results in no more than minimal adverse environmental effects. Compensatory mitigation for losses of streams should be provided, if practicable, through stream rehabilitation, enhancement, or preservation, since streams are difficult-to-replace resources (see 33 CFR 332.3(e)(3)).

(e) Compensatory mitigation plans for NWP activities in or near streams or other open waters will normally include a requirement for the restoration or enhancement, maintenance, and legal protection (e.g., conservation easements) of riparian areas next to open waters. In some cases, the restoration or maintenance/protection of riparian areas may be the only compensatory mitigation required. Restored riparian areas should consist of native species. The width of the required riparian area will address documented water quality or aquatic habitat loss concerns. Normally, the riparian area will be 25 to 50 feet wide on each side of the stream, but the district engineer may require slightly wider riparian areas to address documented water quality or habitat loss concerns. If it is not possible to restore or maintain/protect a riparian area on both sides of a stream, or if the waterbody is a lake or coastal waters, then restoring or maintaining/protecting a riparian area along a single bank or shoreline may be sufficient. Where both wetlands and open waters exist on the project site, the district engineer will determine the appropriate compensatory mitigation (e.g., riparian areas and/or wetlands compensation) based on

what is best for the aquatic environment on a watershed basis. In cases where riparian areas are determined to be the most appropriate form of minimization or compensatory mitigation, the district engineer may waive or reduce the requirement to provide wetland compensatory mitigation for wetland losses.

(f) Compensatory mitigation projects provided to offset losses of aquatic resources must comply with the applicable provisions of 33 CFR part 332.

(1) The prospective permittee is responsible for proposing an appropriate compensatory mitigation option if compensatory mitigation is necessary to ensure that the activity results in no more than minimal adverse environmental effects. For the NWP, the preferred mechanism for providing compensatory mitigation is mitigation bank credits or in-lieu fee program credits (see 33 CFR 332.3(b)(2) and (3)). However, if an appropriate number and type of mitigation bank or in-lieu credits are not available at the time the PCN is submitted to the district engineer, the district engineer may approve the use of permittee-responsible mitigation.

(2) The amount of compensatory mitigation required by the district engineer must be sufficient to ensure that the authorized activity results in no more than minimal individual and cumulative adverse environmental effects (see 33 CFR 330.1(e)(3)). (See also 33 CFR 332.3(f)).

(3) Since the likelihood of success is greater and the impacts to potentially valuable uplands are reduced, aquatic resource restoration should be the first compensatory mitigation option considered for permittee-responsible mitigation.

(4) If permittee-responsible mitigation is the proposed option, the prospective permittee is responsible for submitting a mitigation plan. A conceptual or detailed mitigation plan may be used by the district engineer to make the decision on the NWP verification request, but a final mitigation plan that addresses the applicable requirements of 33 CFR 332.4(c)(2) through (14) must be approved by the district engineer before the permittee begins work in waters of the United States, unless the district engineer determines that prior approval of the final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation (see 33 CFR 332.3(k)(3)).

(5) If mitigation bank or in-lieu fee program credits are the proposed option, the mitigation plan only needs to address the baseline conditions at the impact site and the number of credits to be provided.

(6) Compensatory mitigation requirements (e.g., resource type and amount to be provided as compensatory mitigation, site protection, ecological performance standards, monitoring requirements) may be addressed through conditions added to the NWP authorization, instead of components of a compensatory mitigation plan (see 33 CFR 332.4(c)(1)(ii)).

(g) Compensatory mitigation will not be used to increase the acreage losses allowed by the acreage limits of the NWPs. For example, if an NWP has an acreage limit of 1/2-acre, it cannot be used to authorize any NWP activity resulting in the loss of greater than 1/2-acre of waters of the United States, even if compensatory mitigation is provided that replaces or restores some of the lost waters. However, compensatory mitigation can and should be used, as necessary, to ensure that an NWP activity already meeting the established acreage limits also satisfies the no more than minimal impact requirement for the NWPs.

(h) Permittees may propose the use of mitigation banks, in-lieu fee programs, or permittee-responsible mitigation. When developing a compensatory mitigation proposal, the permittee must consider appropriate and practicable options consistent with the framework at 33 CFR 332.3(b). For activities resulting in the loss of marine or estuarine resources, permittee-responsible mitigation may be environmentally preferable if there are no mitigation banks or in-lieu fee programs in the area that have marine or estuarine credits available for sale or transfer to the permittee. For permittee-responsible mitigation, the special conditions of the NWP verification must clearly indicate the party or parties responsible for the implementation and performance of the compensatory mitigation project, and, if required, its long-term management.

(i) Where certain functions and services of waters of the United States are permanently adversely affected by a regulated activity, such as discharges of dredged or fill material into waters of the United States that will convert a forested or scrub-shrub wetland to a herbaceous wetland in a permanently maintained utility line right-of-way, mitigation may be required to reduce the adverse environmental effects of the activity to the no more than minimal level.

24. Safety of Impoundment Structures. To ensure that all impoundment structures are safely designed, the district engineer may require non-Federal applicants to demonstrate that the structures comply with established state dam safety criteria or have been designed by qualified persons. The district engineer may also require documentation that the design has been independently reviewed by similarly qualified persons, and appropriate modifications made to ensure safety.

25. Water Quality. Where States and authorized Tribes, or EPA where applicable, have not previously certified compliance of an NWP with CWA section 401, individual 401 Water Quality Certification must be obtained or waived (see 33 CFR 330.4(c)). The district engineer or State or Tribe may require additional water quality management measures to ensure that the authorized activity does not result in more than minimal degradation of water quality.

26. Coastal Zone Management. In coastal states where an NWP has not previously received a state coastal zone management consistency concurrence, an individual state coastal zone management consistency concurrence must be obtained, or a presumption of concurrence must occur (see 33 CFR 330.4(d)). The district engineer or a

State may require additional measures to ensure that the authorized activity is consistent with state coastal zone management requirements.

27. Regional and Case-By-Case Conditions. The activity must comply with any regional conditions that may have been added by the Division Engineer (see 33 CFR 330.4(e)) and with any case specific conditions added by the Corps or by the state, Indian Tribe, or U.S. EPA in its section 401 Water Quality Certification, or by the state in its Coastal Zone Management Act consistency determination.

28. Use of Multiple Nationwide Permits. The use of more than one NWP for a single and complete project is prohibited, except when the acreage loss of waters of the United States authorized by the NWPs does not exceed the acreage limit of the NWP with the highest specified acreage limit. For example, if a road crossing over tidal waters is constructed under NWP 14, with associated bank stabilization authorized by NWP 13, the maximum acreage loss of waters of the United States for the total project cannot exceed 1/3-acre.

29. Transfer of Nationwide Permit Verifications. If the permittee sells the property associated with a nationwide permit verification, the permittee may transfer the nationwide permit verification to the new owner by submitting a letter to the appropriate Corps district office to validate the transfer. A copy of the nationwide permit verification must be attached to the letter, and the letter must contain the following statement and signature:

“When the structures or work authorized by this nationwide permit are still in existence at the time the property is transferred, the terms and conditions of this nationwide permit, including any special conditions, will continue to be binding on the new owner(s) of the property. To validate the transfer of this nationwide permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below.”

(Transferee)

(Date)

30. Compliance Certification. Each permittee who receives an NWP verification letter from the Corps must provide a signed certification documenting completion of the authorized activity and implementation of any required compensatory mitigation. The success of any required permittee-responsible mitigation, including the achievement of ecological performance standards, will be addressed separately by the district engineer.

The Corps will provide the permittee the certification document with the NWP verification letter. The certification document will include:

(a) A statement that the authorized activity was done in accordance with the NWP authorization, including any general, regional, or activity-specific conditions;

(b) A statement that the implementation of any required compensatory mitigation was completed in accordance with the permit conditions. If credits from a mitigation bank or in-lieu fee program are used to satisfy the compensatory mitigation requirements, the certification must include the documentation required by 33 CFR 332.3(1)(3) to confirm that the permittee secured the appropriate number and resource type of credits; and

(c) The signature of the permittee certifying the completion of the activity and mitigation.

The completed certification document must be submitted to the district engineer within 30 days of completion of the authorized activity or the implementation of any required compensatory mitigation, whichever occurs later.

31. Activities Affecting Structures or Works Built by the United States. If an NWP activity also requires permission from the Corps pursuant to 33 U.S.C. 408 because it will alter or temporarily or permanently occupy or use a U.S. Army Corps of Engineers (USACE) federally authorized Civil Works project (a "USACE project"), the prospective permittee must submit a pre-construction notification. See paragraph (b)(10) of general condition 32. An activity that requires section 408 permission is not authorized by NWP until the appropriate Corps office issues the section 408 permission to alter, occupy, or use the USACE project, and the district engineer issues a written NWP verification.

32. Pre-Construction Notification. (a) Timing. Where required by the terms of the NWP, the prospective permittee must notify the district engineer by submitting a pre-construction notification (PCN) as early as possible. The district engineer must determine if the PCN is complete within 30 calendar days of the date of receipt and, if the PCN is determined to be incomplete, notify the prospective permittee within that 30 day period to request the additional information necessary to make the PCN complete. The request must specify the information needed to make the PCN complete. As a general rule, district engineers will request additional information necessary to make the PCN complete only once. However, if the prospective permittee does not provide all of the requested information, then the district engineer will notify the prospective permittee that the PCN is still incomplete and the PCN review process will not commence until all of the requested information has been received by the district engineer. The prospective permittee shall not begin the activity until either:

(1) He or she is notified in writing by the district engineer that the activity may proceed under the NWP with any special conditions imposed by the district or division engineer; or

(2) 45 calendar days have passed from the district engineer's receipt of the complete PCN and the prospective permittee has not received written notice from the district or division engineer. However, if the permittee was required to notify the Corps pursuant to general condition 18 that listed species or critical habitat might be affected or are in the vicinity of the activity, or to notify the Corps pursuant to general condition 20 that the activity might have the potential to cause effects to historic properties, the permittee cannot begin the activity until receiving written notification from the Corps that there is "no effect" on listed species or "no potential to cause effects" on historic properties, or that any consultation required under Section 7 of the Endangered Species Act (see 33 CFR 330.4(f)) and/or section 106 of the National Historic Preservation Act (see 33 CFR 330.4(g)) has been completed. Also, work cannot begin under NWPs 21, 49, or 50 until the permittee has received written approval from the Corps. If the proposed activity requires a written waiver to exceed specified limits of an NWP, the permittee may not begin the activity until the district engineer issues the waiver. If the district or division engineer notifies the permittee in writing that an individual permit is required within 45 calendar days of receipt of a complete PCN, the permittee cannot begin the activity until an individual permit has been obtained. Subsequently, the permittee's right to proceed under the NWP may be modified, suspended, or revoked only in accordance with the procedure set forth in 33 CFR 330.5(d)(2).

(b) Contents of Pre-Construction Notification: The PCN must be in writing and include the following information:

- (1) Name, address and telephone numbers of the prospective permittee;
- (2) Location of the proposed activity;
- (3) Identify the specific NWP or NWP(s) the prospective permittee wants to use to authorize the proposed activity;
- (4) A description of the proposed activity; the activity's purpose; direct and indirect adverse environmental effects the activity would cause, including the anticipated amount of loss of wetlands, other special aquatic sites, and other waters expected to result from the NWP activity, in acres, linear feet, or other appropriate unit of measure; a description of any proposed mitigation measures intended to reduce the adverse environmental effects caused by the proposed activity; and any other NWP(s), regional general permit(s), or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity, including other separate and distant crossings for linear projects that require Department of the Army authorization but do not require pre-construction notification. The description of the proposed activity and any proposed mitigation measures should be sufficiently detailed to allow the district engineer to determine that the adverse environmental effects of the activity will be no more than minimal and to determine the need for compensatory mitigation or other mitigation measures. For single and complete linear projects, the PCN must include the quantity of anticipated losses of wetlands, other special aquatic sites, and other waters for each single and complete crossing of those wetlands, other special aquatic sites, and other

waters. Sketches should be provided when necessary to show that the activity complies with the terms of the NWP. (Sketches usually clarify the activity and when provided results in a quicker decision. Sketches should contain sufficient detail to provide an illustrative description of the proposed activity (e.g., a conceptual plan), but do not need to be detailed engineering plans);

(5) The PCN must include a delineation of wetlands, other special aquatic sites, and other waters, such as lakes and ponds, and perennial, intermittent, and ephemeral streams, on the project site. Wetland delineations must be prepared in accordance with the current method required by the Corps. The permittee may ask the Corps to delineate the special aquatic sites and other waters on the project site, but there may be a delay if the Corps does the delineation, especially if the project site is large or contains many wetlands, other special aquatic sites, and other waters. Furthermore, the 45 day period will not start until the delineation has been submitted to or completed by the Corps, as appropriate;

(6) If the proposed activity will result in the loss of greater than 1/10-acre of wetlands and a PCN is required, the prospective permittee must submit a statement describing how the mitigation requirement will be satisfied, or explaining why the adverse environmental effects are no more than minimal and why compensatory mitigation should not be required. As an alternative, the prospective permittee may submit a conceptual or detailed mitigation plan.

(7) For non-Federal permittees, if any listed species or designated critical habitat might be affected or is in the vicinity of the activity, or if the activity is located in designated critical habitat, the PCN must include the name(s) of those endangered or threatened species that might be affected by the proposed activity or utilize the designated critical habitat that might be affected by the proposed activity. For NWP activities that require pre-construction notification, Federal permittees must provide documentation demonstrating compliance with the Endangered Species Act;

(8) For non-Federal permittees, if the NWP activity might have the potential to cause effects to a historic property listed on, determined to be eligible for listing on, or potentially eligible for listing on, the National Register of Historic Places, the PCN must state which historic property might have the potential to be affected by the proposed activity or include a vicinity map indicating the location of the historic property. For NWP activities that require pre-construction notification, Federal permittees must provide documentation demonstrating compliance with section 106 of the National Historic Preservation Act;

(9) For an activity that will occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a "study river" for possible inclusion in the system while the river is in an official study status, the PCN must identify the Wild and Scenic River or the "study river" (see general condition 16); and

(10) For an activity that requires permission from the Corps pursuant to 33 U.S.C. 408 because it will alter or temporarily or permanently occupy or use a U.S. Army Corps of Engineers federally authorized civil works project, the pre-construction notification must include a statement confirming that the project proponent has submitted a written request for section 408 permission from the Corps office having jurisdiction over that USACE project.

(c) Form of Pre-Construction Notification: The standard individual permit application form (Form ENG 4345) may be used, but the completed application form must clearly indicate that it is an NWP PCN and must include all of the applicable information required in paragraphs (b)(1) through (10) of this general condition. A letter containing the required information may also be used. Applicants may provide electronic files of PCNs and supporting materials if the district engineer has established tools and procedures for electronic submittals.

(d) Agency Coordination: (1) The district engineer will consider any comments from Federal and state agencies concerning the proposed activity's compliance with the terms and conditions of the NWPs and the need for mitigation to reduce the activity's adverse environmental effects so that they are no more than minimal.

(2) Agency coordination is required for: (i) all NWP activities that require pre-construction notification and result in the loss of greater than 1/2-acre of waters of the United States; (ii) NWP 21, 29, 39, 40, 42, 43, 44, 50, 51, and 52 activities that require pre-construction notification and will result in the loss of greater than 300 linear feet of stream bed; (iii) NWP 13 activities in excess of 500 linear feet, fills greater than one cubic yard per running foot, or involve discharges of dredged or fill material into special aquatic sites; and (iv) NWP 54 activities in excess of 500 linear feet, or that extend into the waterbody more than 30 feet from the mean low water line in tidal waters or the ordinary high water mark in the Great Lakes.

(3) When agency coordination is required, the district engineer will immediately provide (e.g., via e-mail, facsimile transmission, overnight mail, or other expeditious manner) a copy of the complete PCN to the appropriate Federal or state offices (FWS, state natural resource or water quality agency, EPA, and, if appropriate, the NMFS). With the exception of NWP 37, these agencies will have 10 calendar days from the date the material is transmitted to notify the district engineer via telephone, facsimile transmission, or e-mail that they intend to provide substantive, site-specific comments. The comments must explain why the agency believes the adverse environmental effects will be more than minimal. If so contacted by an agency, the district engineer will wait an additional 15 calendar days before making a decision on the pre-construction notification. The district engineer will fully consider agency comments received within the specified time frame concerning the proposed activity's compliance with the terms and conditions of the NWPs, including the need for mitigation to ensure the net adverse environmental effects of the proposed activity are no more than minimal. The district engineer will provide no response to the resource agency, except as provided below. The district engineer will indicate in the administrative record associated with each pre-construction

notification that the resource agencies' concerns were considered. For NWP 37, the emergency watershed protection and rehabilitation activity may proceed immediately in cases where there is an unacceptable hazard to life or a significant loss of property or economic hardship will occur. The district engineer will consider any comments received to decide whether the NWP 37 authorization should be modified, suspended, or revoked in accordance with the procedures at 33 CFR 330.5.

(4) In cases of where the prospective permittee is not a Federal agency, the district engineer will provide a response to NMFS within 30 calendar days of receipt of any Essential Fish Habitat conservation recommendations, as required by section 305(b)(4)(B) of the Magnuson-Stevens Fishery Conservation and Management Act.

(5) Applicants are encouraged to provide the Corps with either electronic files or multiple copies of pre-construction notifications to expedite agency coordination.



MATTHEW G. BEVIN
GOVERNOR

CHARLES G. SNAVELY
SECRETARY

**ENERGY AND ENVIRONMENT CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION**

R. BRUCE SCOTT
COMMISSIONER

300 SOWER BOULEVARD
FRANKFORT, KENTUCKY 40601

**General Certification--Nationwide Permit # 14
Linear Transportation Projects**

This General Certification is issued March 19, 2017, in conformity with the requirements of Section 401 of the Clean Water Act of 1977, as amended (33 U.S.C. §1341), as well as Kentucky Statute KRS 224.16-050.

For this and all nationwide permits, the definition of surface water is as per 401 KAR 10:001 Chapter 10, Section 1(80): Surface Waters means those waters having well-defined banks and beds, either constantly or intermittently flowing; lakes and impounded waters; marshes and wetlands; and any subterranean waters flowing in well-defined channels and having a demonstrable hydrologic connection with the surface. Lagoons used for waste treatment and effluent ditches that are situated on property owned, leased, or under valid easement by a permitted discharger are not considered to be surface waters of the commonwealth.

Agricultural operations, as defined by KRS 224.71-100(1) conducting activities pursuant to KRS 224.71-100 (3), (4), (5), (6), or 10 are deemed to have certification if they are implementing an Agriculture Water Quality Plan pursuant to KRS 224.71-145.

For all other operations, the Commonwealth of Kentucky hereby certifies under Section 401 of the Clean Water Act (CWA) that it has reasonable assurances that applicable water quality standards under Kentucky Administrative Regulations Title 401, Chapter 10, established pursuant to Sections 301, 302, 304, 306 and 307 of the CWA, will not be violated for the activity covered under NATIONWIDE PERMIT 14, namely Linear Transportation Projects, provided that the following conditions are met:

1. The activity will not occur within surface waters of the Commonwealth identified by the Kentucky Division of Water as Outstanding State or National Resource Water, Cold Water Aquatic Habitat, or Exceptional Waters.
2. The activity will not occur within surface waters of the Commonwealth identified as perpetually-protected (e.g. deed restriction, conservation easement) mitigation sites.
3. The activity will impact less than 1/2 acre of wetland/marsh.

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Linear Transportation Projects
Page 2

4. The activity will impact less than 300 linear feet of surface waters of the Commonwealth. Stream realignment greater than 100 feet and in-stream stormwater detention/retention basins are not covered under this general water quality certification.
5. For complete linear transportation projects, all impacts shall not exceed a cumulative length of 500 linear feet within each Hydrologic Unit Code (HUC) 14.
6. Any crossings must be constructed in a manner that does not impede natural water flow.
7. Stream impacts covered under this General Water Quality Certification and undertaken by those persons defined as an agricultural operation under the Agricultural Water Quality Act must be completed in compliance with the Kentucky Agricultural Water Quality Plan (KWQP).
8. The Kentucky Division of Water may require submission of a formal application for an individual certification for any project if the project has been determined to likely have a significant adverse effect upon water quality or degrade the waters of the Commonwealth so that existing uses of the water body or downstream waters are precluded.
9. Activities that do not meet the conditions of this General Water Quality Certification require an Individual Section 401 Water Quality Certification.
10. Activities qualifying for coverage under this General Water Quality Certification are subject to the following conditions:
 - Projects requiring in-stream stormwater detention/retention basins shall require individual water quality certifications.
 - Erosion and sedimentation pollution control plans and Best Management Practices must be designed, installed, and maintained in effective operating condition at all times during construction activities so that violations of state water quality standards do not occur (401 KAR 10:031 Section 2 and KRS 224.70-100).
 - Sediment and erosion control measures, such as check-dams constructed of any material, silt fencing, hay bales, etc., shall not be placed within surface waters of the Commonwealth, either temporarily or permanently, without prior approval by the Kentucky Division of Water's Water Quality Certification Section. If placement of sediment and erosion control measures in surface waters is unavoidable, design and placement of temporary erosion control measures shall not be conducted in such a manner that may result in instability of streams that are adjacent to,

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Linear Transportation Projects
Page 3

upstream, or downstream of the structures. All sediment and erosion control devices shall be removed and the natural grade restored within the completion timeline of the activities.

- Measures shall be taken to prevent or control spills of fuels, lubricants, or other toxic materials used in construction from entering the watercourse.
- Removal of riparian vegetation in the utility line right-of-way shall be limited to that necessary for equipment access.
- To the maximum extent practicable, all in-stream work under this certification shall be performed under low-flow conditions.
- Heavy equipment, e.g. bulldozers, backhoes, draglines, etc., if required for this project, should not be used or operated within the stream channel. In those instances in which such in-stream work is unavoidable, then it shall be performed in such a manner and duration as to minimize turbidity and disturbance to substrates and bank or riparian vegetation.
- Any fill shall be of such composition that it will not adversely affect the biological, chemical, or physical properties of the receiving waters and/or cause violations of water quality standards. If rip-rap is utilized, it should be of such weight and size that bank stress or slump conditions will not be created because of its placement.
- If there are water supply intakes located downstream that may be affected by increased turbidity and suspended solids, the permittee shall notify the operator when such work will be done.
- Should evidence of stream pollution or jurisdictional wetland impairment and/or violations of water quality standards occur as a result of this activity (either from a spill or other forms of water pollution), the KDOW shall be notified immediately by calling (800) 928-2380.

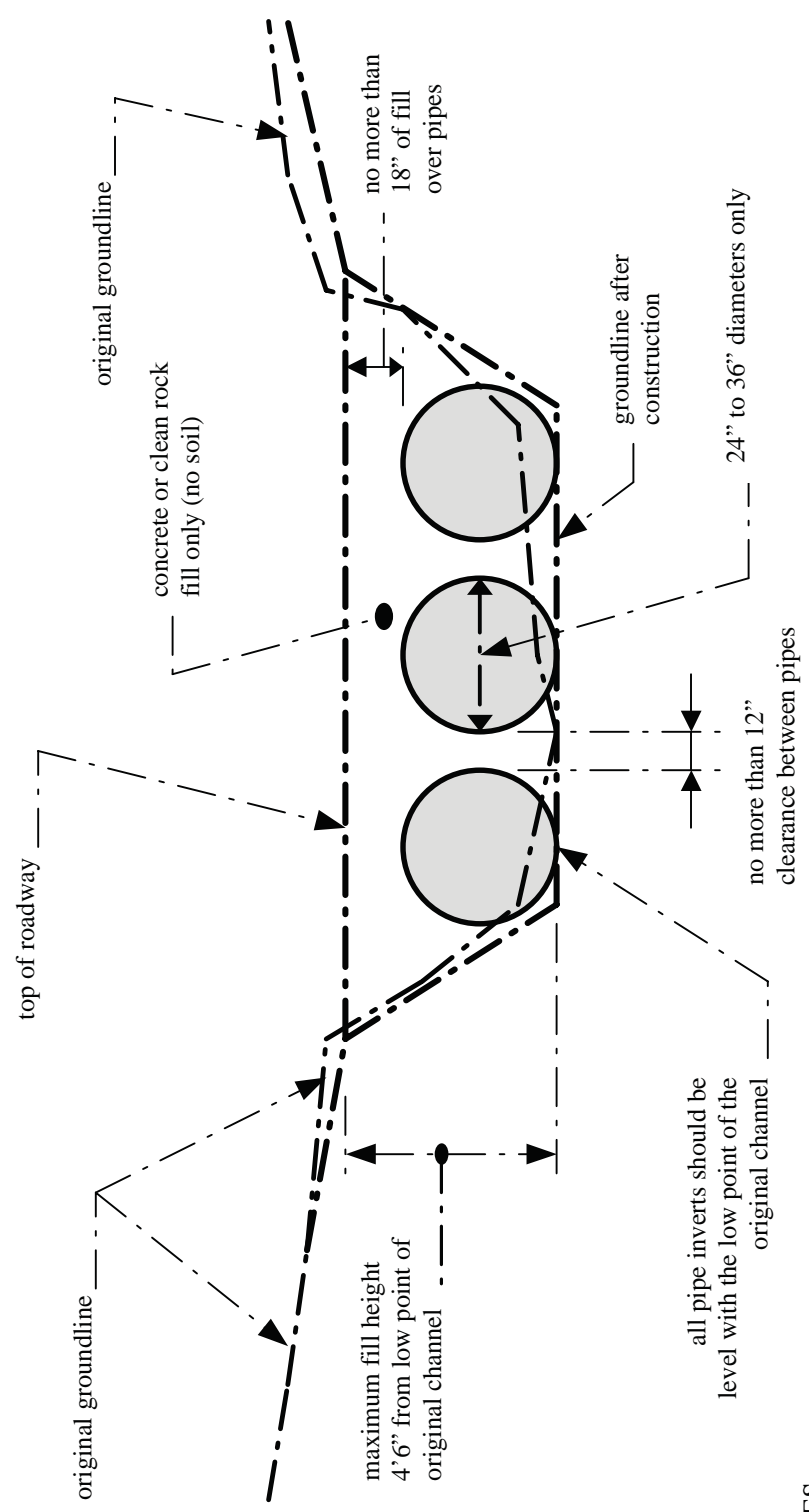
Non-compliance with the conditions of this general certification or violation of Kentucky state water quality standards may result in civil penalties.

GENERAL CONDITIONS FOR WATER QUALITY CERTIFICATION

1. The Kentucky Division of Water may require submission of a formal application for an Individual Certification for any project if the project has been determined to likely have a significant adverse effect upon water quality or degrade the waters of the Commonwealth so that existing uses of the water body or downstream waters are precluded.
2. Nationwide permits issued by the U.S. Army Corps of Engineers for projects in Outstanding State Resource Waters, Cold Water Aquatic Habitats, and Exceptional Waters as defined by 401 KAR 10:026 shall require individual water quality certifications.
3. Projects requiring in-stream stormwater detention/retention basins shall require individual water quality certifications.
4. Erosion and sedimentation pollution control plans and Best Management Practices must be designed, installed, and maintained in effective operating condition at all times during construction activities so that violations of state water quality standards do not occur.
5. Sediment and erosion control measures (e.g., check-dams, silt fencing, or hay bales) shall not be placed within surface waters of the Commonwealth, either temporarily or permanently, without prior approval by the Kentucky Division of Water's Water Quality Certification Section. If placement of sediment and erosion control measures in surface waters is unavoidable, placement shall not be conducted in such a manner that may cause instability of streams that are adjacent to, upstream, or downstream of the structures. All sediment and erosion control measures shall be removed and the natural grade restored prior to withdrawal from the site.
6. Measures shall be taken to prevent or control spills of fuels, lubricants, or other toxic materials used in construction from entering the watercourse.
7. To the maximum extent practicable, all in-stream work under this certification shall be performed during low flow.
8. Heavy equipment (e.g. bulldozers, backhoes, draglines, etc.), if required for this project, should not be used or operated within the stream channel. In those instances where such in-stream work is unavoidable, then it shall be performed in such a manner and duration as to minimize re-suspension of sediments and disturbance to the channel, banks, or riparian vegetation.
9. If there are water supply intakes located downstream that may be affected by increased turbidity, the permittee shall notify the operator when work will be performed.
10. Removal of existing riparian vegetation should be restricted to the minimum necessary for project construction.

11. Should stream pollution, wetland impairment, and/or violations of water quality standards occur as a result of this activity (either from a spill or other forms of water pollution), the Kentucky Division of Water shall be notified immediately by calling 800/564-2380.

ATTACHMENT 1



NOTES:

1. This is a conceptual drawing. The number and size of pipes and other details will vary depending on specific site conditions.
2. The pipes and backfill must be contained within the stream channel as shown above. During the construction of the approaches and access roadway across the floodplain, unstable and unconsolidated materials unsuitable for roadways may be excavated and replaced with riprap, crushed stone, or other stable road construction materials. This may only be done, however, with the following provisions: (1) the disposal of excess, unconsolidated materials thus excavated must be outside of the floodplain and (2) the finished surface of the completed road may be no more than three inches (3") above the pre-construction surface of the floodplain at any point beyond the top of banks.

LOW-WATER CROSSING

STANDARD DRAWING
Not to Scale

SPECIAL NOTE

Filing of eNOI for KPDES Construction Stormwater Permit

County: Hardin

Route: KY 313

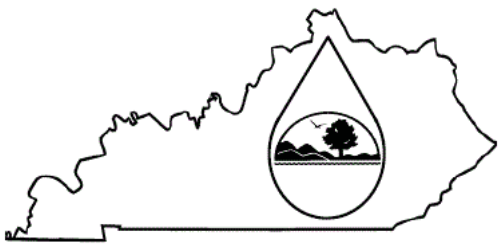
Item No.: 04-0170

KDOW Submittal ID: 2fc34bb1-2644-4a34-8ab7-
f68731e3c33b

Project Description: Widen KY 313 to 4 Lanes Between Patriot Parkway (MP 10598) and the Bullion Boulevard Connector (MP 14.534)

A Notice of Intent for obtaining coverage under the Kentucky Pollutant Discharge Elimination System (KPDES) General Permit for Stormwater Discharges Associated with Construction Activities (KYR10) has been drafted, copy of which is attached. Upon award, the Contractor will be identified in Section III of the form as the “Building Contractor” and it will be submitted for approval to the Kentucky Division of Water. The Contractor shall be responsible for advancing the work in a manner that is compliant with all applicable and appropriate KYTC specifications for sediment and erosion control as well as meeting the requirements of the KYR10 permit and the KDOW.

If there are any questions regarding this note, please contact David Waldner, Director, Division of Environmental Analysis, TCOB, 200 Mero Street, Frankfort, KY 40622, Phone: (502) 564-7250.

	<h2 style="margin: 0;">KENTUCKY POLLUTION DISCHARGE ELIMINATION SYSTEM (KPDES)</h2> <p style="margin: 5px 0;">Notice of Intent (NOI) for coverage of Storm Water Discharge Associated with Construction Activities Under the KPDES Storm Water General Permit KYR100000</p> <p style="margin: 5px 0;">Click here for Instructions (Controls/KPDES_FormKYR10_Instructions.htm)</p> <p style="margin: 5px 0;">Click here to obtain information and a copy of the KPDES General Permit. (http://dep.ky.gov/formslibrary/Documents/KYR10PermitPage.pdf)</p> <p style="margin: 5px 0; font-size: small;">(*) indicates a required field; (✓) indicates a field may be required based on user input or is an optionally required field</p>
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Reason for Submittal:(*) <input type="text" value="Application for New Permit Coverage"/>	Agency Interest ID: <input type="text" value="Agency Interest ID"/>	Permit Number:(✓) <input type="text" value="KPDES Permit Number"/>
--	--	---

If change to existing permit coverage is requested, describe the changes for which modification of coverage is being sought:(✓)

ELIGIBILITY:
 Stormwater discharges associated with construction activities disturbing individually one (1) acre or more, including, in the case of a common plan of development, contiguous construction activities that cumulatively equal one (1) acre or more of disturbance.

EXCLUSIONS:
 The following are excluded from coverage under this general permit:
 1) Are conducted at or on properties that have obtained an individual KPDES permit for the discharge of other wastewaters which requires the development and implementation of a Best Management Practices (BMP) plan;
 2) Any operation that the DOW determines an individual permit would better address the discharges from that operation;
 3) Any project that discharges to an Impaired Water listed in the most recent Integrated Report, §305(b) as impaired for sediment and for which an approved TMDL has been developed.

SECTION I -- FACILITY OPERATOR INFORMATION (PERMITTEE)

Company Name:(✓) <input type="text" value="KYTC District 4"/>	First Name:(✓) <input type="text" value="Paul"/>	M.I.: <input type="text" value="MI"/>	Last Name:(✓) <input type="text" value="Sanders"/>
Mailing Address:(*) <input type="text" value="634 East Dixie Ave"/>	City:(*) <input type="text" value="Elizabethtown"/>	State:(*) <input type="text" value="Kentucky"/>	Zip:(*) <input type="text" value="42701"/>
eMail Address:(*) <input type="text" value="Paul.Sanders@ky.gov"/>	Business Phone:(*) <input type="text" value="2707665066"/>	Alternate Phone: <input type="text" value="Phone"/>	

SECTION II -- GENERAL SITE LOCATION INFORMATION

Project Name:(*) <input type="text" value="4-0190"/>	Status of Owner/Operator(*) <input type="text" value="State Government"/>	SIC Code(*) <input type="text" value="1611 Highway and Street Const"/>	
Company Name:(✓) <input type="text" value="KYTC Department of Highways District 4"/>	First Name:(✓) <input type="text" value="Paul"/>	M.I.: <input type="text" value="MI"/>	Last Name:(✓) <input type="text" value="Sanders"/>
Site Physical Address:(*) <input type="text" value="KY 313"/>			
City:(*) <input type="text" value="Radcliff"/>	State:(*) <input type="text" value="Kentucky"/>	Zip:(*) <input type="text" value="40160"/>	
County:(*) <input type="text" value="Hardin"/>	Latitude(decimal degrees)(*)DMS to DD Converter <small>(https://www.fcc.gov/media/radio/dms-decimal)</small> <input type="text" value="37.811667"/>	Longitude(decimal degrees)(*) <input type="text" value="-85.951667"/>	

SECTION III -- SPECIFIC SITE ACTIVITY INFORMATION

Project Description:(*)

a. For single projects provide the following information

Total Number of Acres in Project:(√) <input style="width:95%;" type="text" value="61.63"/>	Total Number of Acres Disturbed:(√) <input style="width:95%;" type="text" value="61.63"/>
Anticipated Start Date:(√) <input style="width:95%;" type="text"/>	Anticipated Completion Date:(√) <input style="width:95%;" type="text"/>

b. For common plans of development provide the following information

Total Number of Acres in Project:(√) <input style="width:95%;" type="text" value="# Acre(s)"/>	Total Number of Acres Disturbed:(√) <input style="width:95%;" type="text" value="# Acre(s)"/>
Number of individual lots in development, if applicable:(√) <input style="width:95%;" type="text" value="# lot(s)"/>	Number of lots in development:(√) <input style="width:95%;" type="text" value="# lot(s)"/>
Total acreage of lots intended to be developed:(√) <input style="width:95%;" type="text" value="Project Acres"/>	Number of acres intended to be disturbed at any one time:(√) <input style="width:95%;" type="text" value="Disturbed Acres"/>
Anticipated Start Date:(√) <input style="width:95%;" type="text"/>	Anticipated Completion Date:(√) <input style="width:95%;" type="text"/>

List Building Contractor(s) at the time of Application:(*)

	Company Name			
+				

SECTION IV -- IF THE PERMITTED SITE DISCHARGES TO A WATER BODY THE FOLLOWING INFORMATION IS REQUIRED ?

Discharge Point(s):

	Unnamed Tributary?	Latitude	Longitude	Receiving Water Name	
1	No	37.799239	-85.933114	Brushy Fork	Delete
2	No	37.800506	-85.934217	Brushy Fork	Delete
3	No	37.80123	-85.934962	Brushy Fork	Delete
4	No	37.801769	-85.93551	Brushy Fork	Delete
5	No	37.80314	-85.937066	Brushy Fork	Delete
6	No	37.8045716	-85.939429	Brushy Fork	Delete
7	No	37.805687	-85.941498	Brushy Fork	Delete
8	No	37.806517	-85.942967	Brushy Fork	Delete
9	No	37.8071856	-85.944130	Brushy Fork	Delete
10	No	37.808021	-85.945636	Brushy Fork	Delete

SECTION V -- IF THE PERMITTED SITE DISCHARGES TO A MS4 THE FOLLOWING INFORMATION IS REQUIRED ?

Name of MS4: <input style="width:95%;" type="text" value="Hardin County Fiscal Court-HARDIN COUNTY FISCAL COURT"/>											
Date of application/notification to the MS4 for construction site permit coverage: <input style="width:95%;" type="text" value="Date"/>	Discharge Point(s):(*) <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="width:5%;"></th> <th style="width:15%;">Latitude</th> <th style="width:15%;">Longitude</th> <th style="width:10%;"></th> <th style="width:10%;"></th> </tr> </thead> <tbody> <tr> <td style="text-align:center;">+</td> <td style="height: 50px;"></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		Latitude	Longitude			+				
	Latitude	Longitude									
+											

SECTION VI -- WILL THE PROJECT REQUIRE CONSTRUCTION ACTIVITIES IN A WATER BODY OR THE RIPARIAN ZONE?

Will the project require construction activities in a water body or the riparian zone?: (*)	<input style="width:95%;" type="text" value="Yes"/>
If Yes, describe scope of activity: (√)	<input style="width:95%;" type="text" value="Culvert Extension"/>
Is a Clean Water Act 404 permit required?:(*)	<input style="width:95%;" type="text" value="Yes"/>

Is a Clean Water Act 401 Water Quality Certification required?:(*)	No
--	----

SECTION VII -- NOI PREPARER INFORMATION				
First Name:(*) Joseph	M.I.: M	Last Name:(*) Ferguson	Company Name:(*) KYTC Department of Highways District 4	
Mailing Address:(*) 634 East Dixie Ave	City:(*) Elizabethtown	State:(*) Kentucky	Zip:(*) 42701	
eMail Address:(*) joseph.ferguson@ky.gov	Business Phone:(*) 2707665066		Alternate Phone: Phone	

SECTION VIII -- ATTACHMENTS	
Facility Location Map:(*)	<input type="button" value="Upload file"/>
Supplemental Information:	<input type="button" value="Upload file"/>

SECTION IX -- CERTIFICATION			
I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.			
Signature:(*) Signature		Title:(*) Title	
First Name:(*) First Name	M.I.: MI	Last Name:(*) Last Name	
eMail Address:(*) eMail Address	Business Phone:(*) Phone	Alternate Phone: Phone	Signature Date:(*) Date

<input type="button" value="Click to Save Values for Future Retrieval"/>	<input type="button" value="Click to Submit to EEC"/>
--	---

KyTC BMP Plan for Project CID ## - #####



Kentucky Transportation Cabinet

Highway District __ (1)

And

_____ (2), Construction

Kentucky Pollutant Discharge Elimination System

Permit KYR10

Best Management Practices (BMP) plan

Groundwater protection plan

For Highway Construction Activities

For

**Widen KY 313 to 4 Lanes Between Patriot
Parkway (MP 10598) and the Bullion Boulevard
Connector (MP 14.534)**

Project: CID ## - #####

KPDES BMP Plan Page 1 of 15

Revised 3/4/2016

KyTC BMP Plan for Project CID ## - ####

Project information

Note – (1) = Design (2) = Construction (3) = Contractor

1. Owner – Kentucky Transportation Cabinet, District __ (1)
2. Resident Engineer: (2)
3. Contractor name: (2)
Address: (2)

Phone number: (2)
Contact: (2)
Contractors agent responsible for compliance with the KPDES permit requirements (3):
4. Project Control Number (2)
5. Route (Address) (1)
KY 313
Radcliff, KY
6. Latitude/Longitude (project mid-point) dd/mm/ss, dd/mm/ss (1)
37°48'42"
-85°57'06"
7. County (project mid-point) (1)
Hardin
8. Project start date (date work will begin): (2)
9. Projected completion date: (2)

KyTC BMP Plan for Project CID ## - ####

A. Site description:

1. Nature of Construction Activity (from letting project description) (1)
 Widen KY 313 to 4 Lanes Between Patriot Parkway (MP 10598) and the Bullion Boulevard Connector (MP 14.534)
2. Order of major soil disturbing activities (2) and (3)
3. Projected volume of material to be moved (1)
 260,423 Cubic Yards
4. Estimate of total project area (acres) (1)
 61.63 Acres
5. Estimate of area to be disturbed (acres) (1)
 61.63 Acres
6. Post construction runoff coefficient will be included in the project drainage folder. Persons needing information pertaining to the runoff coefficient will contact the resident engineer to request this information.(1)
7. Data describing existing soil condition (1) & (2)

Soil Group	Soil Symbol	Hydrologic Soil Group	Erosion Hazard	Roadfill Suitability
Baxter Very Gravelly Silt Loam Karst	Ba	B	Slight	Fair
Baxter Very Gravelly Silty Clay Loam	Bb	B	Slight	Fair
Bedford Silt Loam	Br	C/D	Moderate	Fair
Crider Silt Loam	Cr	B	Slight	Fair
Cumberland Silt Loam	Cs	B	Slight	Poor
Cumberland Silty Clay Loam	Ct	B	Slight	Poor
Elk Silt Loam	El	B	Slight	Fair
Lindside Silt Loam	Ln	C	Slight	Fair
Newark Silt Loam	Nb	C	Slight	Fair
Nolin Silt Loam	No	B	Slight	Fair

KyTC BMP Plan for Project CID ## - ####

Vertrees Silt Loam	Vr	B	Slight	Poor
Vertrees Silty Clay Loam	Vt	B	Moderate	Poor

8. Data describing existing discharge water quality (if any) (1) & (2)
None available

9. Receiving water name (1)
Brushy Fork

10. TMDLs and Pollutants of Concern in Receiving Waters: (1 DEA)
Not currently listed

11. Site map – Project layout sheet plus the erosion control sheets in the project plans that depict Disturbed Drainage Areas (DDAs) and related information. These sheets depict the existing project conditions with areas delineated by DDA (drainage area bounded by watershed breaks and right of way limits), the storm water discharge locations (either as a point discharge or as overland flow) and the areas that drain to each discharge point. These plans define the limits of areas to be disturbed and the location of control measures. Controls will be either site specific as designated by the designer or will be annotated by the contractor and resident engineer before disturbance commences. The project layout sheet shows the surface waters and wetlands.

12. Potential sources of pollutants:

The primary source of pollutants is solids that are mobilized during storm events. Other sources of pollutants include oil/fuel/grease from servicing and operating construction equipment, concrete washout water, sanitary wastes and trash/debris. (3)

B. Sediment and Erosion Control Measures:

1. Plans for highway construction projects will include erosion control sheets that depict Disturbed Drainage Areas (DDAs) and related information. These plan sheets will show the existing project conditions with areas delineated by DDA within the right of way limits, the discharge points and the areas that drain to each discharge point. Project managers and designers will analyze the DDAs and identify Best Management Practices (BMPs) that are site specific. The balance of the BMPs for the project will

KyTC BMP Plan for Project CID ## -

be listed in the bid documents for selection and use by the contractor on the project with approval by the resident engineer.

Projects that do not have DDAs annotated on the erosion control sheets will employ the same concepts for development and managing BMP plans.

2. Following award of the contract, the contractor and resident engineer will annotate the erosion control sheets showing location and type of BMPs for each of the DDAs that will be disturbed at the outset of the project. This annotation will be accompanied by an order of work that reflects the order or sequence of major soil moving activities. The remaining DDAs are to be designated as “Do Not Disturb” until the contractor and resident engineer prepare the plan for BMPs to be employed. The initial BMP’s shall be for the first phase (generally Clearing and Grubbing) and shall be modified as needed as the project changes phases. The BMP Plan will be modified to reflect disturbance in additional DDA’s as the work progresses. All DDA’s will have adequate BMP’s in place before being disturbed.

3. As DDAs are prepared for construction, the following will be addressed for the project as a whole or for each DDA as appropriate:
 - Construction Access – This is the first land-disturbing activity. As soon as construction begins, bare areas will be stabilized with gravel and temporary mulch and/or vegetation.
 - At the beginning of the project, all DDAs for the project will be inspected for areas that are a source of storm water pollutants. Areas that are a source of pollutants will receive appropriate cover or BMPs to arrest the introduction of pollutants into storm water. Areas that have not been opened by the contractor will be inspected periodically (once per month) to determine if there is a need to employ BMPs to keep pollutants from entering storm water.
 - Clearing and Grubbing – The following BMP’s will be considered and used where appropriate.
 - Leaving areas undisturbed when possible.
 - Silt basins to provide silt volume for large areas.
 - Silt Traps Type A for small areas.
 - Silt Traps Type C in front of existing and drop inlets which are to be saved
 - Diversion ditches to catch sheet runoff and carry it to basins or traps or to divert it around areas to be disturbed.
 - Brush and/or other barriers to slow and/or divert runoff.

KyTC BMP Plan for Project CID ## -

- Silt fences to catch sheet runoff on short slopes. For longer slopes, multiple rows of silt fence may be considered.
- Temporary Mulch for areas which are not feasible for the fore mentioned types of protections.
- Non-standard or innovative methods.
- Cut & Fill and placement of drainage structures - The BMP Plan will be modified to show additional BMP's such as:
 - Silt Traps Type B in ditches and/or drainways as they are completed
 - Silt Traps Type C in front of pipes after they are placed
 - Channel Lining
 - Erosion Control Blanket
 - Temporary mulch and/or seeding for areas where construction activities will be ceased for 21 days or more.
 - Non-standard or innovative methods
- Profile and X-Section in place – The BMP Plan will be modified to show elimination of BMP's which had to be removed and the addition of new BMP's as the roadway was shaped. Probably changes include:
 - Silt Trap Type A, Brush and/or other barriers, Temporary Mulch, and any other BMP which had to be removed for final grading to take place.
 - Additional Silt Traps Type B and Type C to be placed as final drainage patterns are put in place.
 - Additional Channel Lining and/or Erosion Control Blanket.
 - Temporary Mulch for areas where Permanent Seeding and Protection cannot be done within 21 days.
 - Special BMP's such as Karst Policy
- Finish Work (Paving, Seeding, Protect, etc.) – A final BMP Plan will result from modifications during this phase of construction. Probably changes include:
 - Removal of Silt Traps Type B from ditches and drainways if they are protected with other BMP's which are sufficient to control erosion, i.e. Erosion Control Blanket or Permanent Seeding and Protection on moderate grades.
 - Permanent Seeding and Protection
 - Placing Sod
 - Planting trees and/or shrubs where they are included in the project
- BMP's including Storm Water Management Devices such as velocity dissipation devices and Karst policy BMP's to be installed during construction to control the pollutants in storm water discharges that will occur after construction has been completed are : (1)

KyTC BMP Plan for Project CID ## -

C. Other Control Measures

1. No solid materials, including building materials, shall be discharged to waters of the commonwealth, except as authorized by a Section 404 permit.
2. Waste Materials

All waste materials that may leach pollutants (paint and paint containers, caulk tubes, oil/grease containers, liquids of any kind, soluble materials, etc.) will be collected and stored in appropriate covered waste containers. Waste containers shall be removed from the project site on a sufficiently frequent basis as to not allow wastes to become a source of pollution. All personnel will be instructed regarding the correct procedure for waste disposal. Wastes will be disposed in accordance with appropriate regulations. Notices stating these practices will be posted in the office.

3. Hazardous Waste

All hazardous waste materials will be managed and disposed of in the manner specified by local or state regulation. The contractor shall notify the Section Engineer if there any hazardous wastes being generated at the project site and how these wastes are being managed. Site personnel will be instructed with regard to proper storage and handling of hazardous wastes when required. The Transportation Cabinet will file for generator, registration when appropriate, with the Division of Waste Management and advise the contractor regarding waste management requirements.

4. Spill Prevention

The following material management practices will be used to reduce the risk of spills or other exposure of materials and substances to the weather and/or runoff.

➤ **Good Housekeeping:**

The following good housekeeping practices will be followed onsite during the construction project.

- An effort will be made to store only enough product required to do the job
- All materials stored onsite will be stored in a neat, orderly manner in their appropriate containers and, if possible, under a roof or other enclosure
- Products will be kept in their original containers with the original manufacturer's label

KyTC BMP Plan for Project CID ## -

- Substances will not be mixed with one another unless recommended by the manufacturer
- Whenever possible, all of the product will be used up before disposing of the container
- Manufacturers' recommendations for proper use and disposal will be followed
- The site contractor will inspect daily to ensure proper use and disposal of materials onsite

➤ **Hazardous Products:**

These practices will be used to reduce the risks associated with any and all hazardous materials.

- Products will be kept in original containers unless they are not resealable
- Original labels and material safety data sheets (MSDS) will be reviewed and retained
- Contractor will follow procedures recommended by the manufacturer when handling hazardous materials
- If surplus product must be disposed of, manufacturers' or state/local recommended methods for proper disposal will be followed

The following product-specific practices will be followed onsite:

➤ **Petroleum Products:**

Vehicles and equipment that are fueled and maintained on site will be monitored for leaks, and receive regular preventative maintenance to reduce the chance of leakage. Petroleum products onsite will be stored in tightly sealed containers, which are clearly labeled and will be protected from exposure to weather.

The contractor shall prepare an Oil Pollution Spill Prevention Control and Countermeasure plan when the project that involves the storage of petroleum products in 55 gallon or larger containers with a total combined storage capacity of 1,320 gallons. This is a requirement of 40 CFR 112.

This project (will / will not) (3) have over 1,320 gallons of petroleum products with a total capacity, sum of all containers 55 gallon capacity and larger.

➤ **Fertilizers:**

Fertilizers will be applied at rates prescribed by the contract, standard specifications or as directed by the resident engineer. Once applied, fertilizer will be covered with mulch or blankets or worked into the soil to limit exposure to

KyTC BMP Plan for Project CID ## -

storm water. Storage will be in a covered shed. The contents of any partially used bags of fertilizer will be transferred to a sealable plastic bin to avoid spills.

➤ **Paints:**

All containers will be tightly sealed and stored indoors or under roof when not being used. Excess paint or paint wash water will not be discharged to the drainage or storm sewer system but will be properly disposed of according to manufacturers' instructions or state and local regulations.

➤ **Concrete Truck Washout:**

Concrete truck mixers and chutes will not be washed on pavement, near storm drain inlets, or within 75 feet of any ditch, stream, wetland, lake, or sinkhole. Where possible, excess concrete and wash water will be discharged to areas prepared for pouring new concrete, flat areas to be paved that are away from ditches or drainage system features, or other locations that will not drain off site. Where this approach is not possible, a shallow earthen wash basin will be excavated away from ditches to receive the wash water

➤ **Spill Control Practices**

In addition to the good housekeeping and material management practices discussed in the previous sections of this plan, the following practices will be followed for spill prevention and cleanup:

- Manufacturers' recommended methods for spill cleanup will be clearly posted. All personnel will be made aware of procedures and the location of the information and cleanup supplies.
- Materials and equipment necessary for spill cleanup will be kept in the material storage area. Equipment and materials will include as appropriate, brooms, dust pans, mops, rags, gloves, oil absorbents, sand, sawdust, and plastic and metal trash containers.
- All spills will be cleaned up immediately after discovery.
- The spill area will be kept well ventilated and personnel will wear appropriate protective clothing to prevent injury from contact with a hazardous substance.
- Spills of toxic or hazardous material will be reported to the appropriate state/local agency as required by KRS 224 and applicable federal law.
- The spill prevention plan will be adjusted as needed to prevent spills from reoccurring and improve spill response and cleanup.
- Spills of products will be cleaned up promptly. Wastes from spill clean up will be disposed in accordance with appropriate regulations.

KyTC BMP Plan for Project CID ## -

D. Other State and Local Plans

This BMP plan shall include any requirements specified in sediment and erosion control plans, storm water management plans or permits that have been approved by other state or local officials. Upon submittal of the NOI, other requirements for surface water protection are incorporated by reference into and are enforceable under this permit (even if they are not specifically included in this BMP plan). This provision does not apply to master or comprehensive plans, non-enforceable guidelines or technical guidance documents that are not identified in a specific plan or permit issued for the construction site by state or local officials. (1)

E. Maintenance

1. The BMP plan shall include a clear description of the maintenance procedures necessary to keep the control measures in good and effective operating condition.
 - Maintenance of BMPs during construction shall be a result of weekly and post rain event inspections with action being taken by the contractor to correct deficiencies.
 - Post Construction maintenance will be a function of normal highway maintenance operations. Following final project acceptance by the cabinet, district highway crews will be responsible for identification and correction of deficiencies regarding ground cover and cleaning of storm water BMPs. The project manager shall identify any BMPs that will be for the purpose of post construction storm water management with specific guidance for any non-routine maintenance. (1)

F. Inspections

Inspection and maintenance practices that will be used to maintain erosion and sediment controls:

- All erosion prevention and sediment control measures will be inspected at least once each week and following any rain of one-half inch or more.
- Inspections will be conducted by individuals that have successfully completed the KEPSC-RI course as required by Section 213.02.02 of the Standard Specifications for Road and Bridge Construction, current edition.

KyTC BMP Plan for Project CID ## -

- Inspection reports will be written, signed, dated, and kept on file.
- Areas at final grade will be seeded and mulched within 14 days.
- Areas that are not at final grade where construction has ceased for a period of 21 days or longer and soil stock piles shall receive temporary mulch no later than 14 days from the last construction activity in that area.
- All measures will be maintained in good working order; if a repair is necessary, it will be initiated within 24 hours of being reported.
- Built-up sediment will be removed from behind the silt fence before it has reached halfway up the height of the fence.
- Silt fences will be inspected for bypassing, overtopping, undercutting, depth of sediment, tears, and to ensure attachment to secure posts.
- Sediment basins will be inspected for depth of sediment, and built-up sediment will be removed when it reaches 50 percent of the design capacity and at the end of the job.
- Diversion dikes and berms will be inspected and any breaches promptly repaired. Areas that are eroding or scouring will be repaired and re-seeded / mulched as needed.
- Temporary and permanent seeding and mulching will be inspected for bare spots, washouts, and healthy growth. Bare or eroded areas will be repaired as needed.
- All material storage and equipment servicing areas that involve the management of bulk liquids, fuels, and bulk solids will be inspected weekly for conditions that represent a release or possible release of pollutants to the environment.

G. Non – Storm Water discharges

It is expected that non-storm water discharges may occur from the site during the construction period. Examples of non-storm water discharges include:

- Water from water line flushings.
- Water from cleaning concrete trucks and equipment.
- Pavement wash waters (where no spills or leaks of toxic or hazardous materials have occurred).
- Uncontaminated groundwater and rain water (from dewatering during excavation).

All non-storm water discharges will be directed to the sediment basin or to a filter fence enclosure in a flat vegetated infiltration area or be filtered via another approved commercial product.

KyTC BMP Plan for Project CID ## - ####

H. Groundwater Protection Plan (3)

This plan serves as the groundwater protection plan as required by 401 KAR 5:037.

➤ Contractors statement: (3)

The following activities, as enumerated by 401 KAR 5:037 Section 2 that require the preparation and implementation of a groundwater protection plan, will or may be may be conducted as part of this construction project:

_____ 2. (e) land treatment or land disposal of a pollutant;

_____ 2. (f) Storing, ..., or related handling of hazardous waste, solid waste or special waste, ..., in tanks, drums, or other containers, or in piles, (This does not include wastes managed in a container placed for collection and removal of municipal solid waste for disposal off site);

_____ 2. (g) Handling of materials in bulk quantities (equal or greater than 55 gallons or 100 pounds net dry weight transported held in an individual container) that, if released to the environment, would be a pollutant;

_____ 2. (j) Storing or related handling of road oils, dust suppressants,, at a central location;

_____ 2. (k) Application or related handling of road oils, dust suppressants or deicing materials, (does not include use of chloride-based deicing materials applied to roads or parking lots);

_____ 2. (m) Installation, construction, operation, or abandonment of wells, bore holes, or core holes, (this does not include bore holes for the purpose of explosive demolition);

Or, check the following only if there are no qualifying activities

_____ There are no activities for this project as listed in 401 KAR 5:037 Section 2 that require the preparation and implementation of a groundwater protection plan.

The contractor is responsible for the preparation of a plan that addresses the

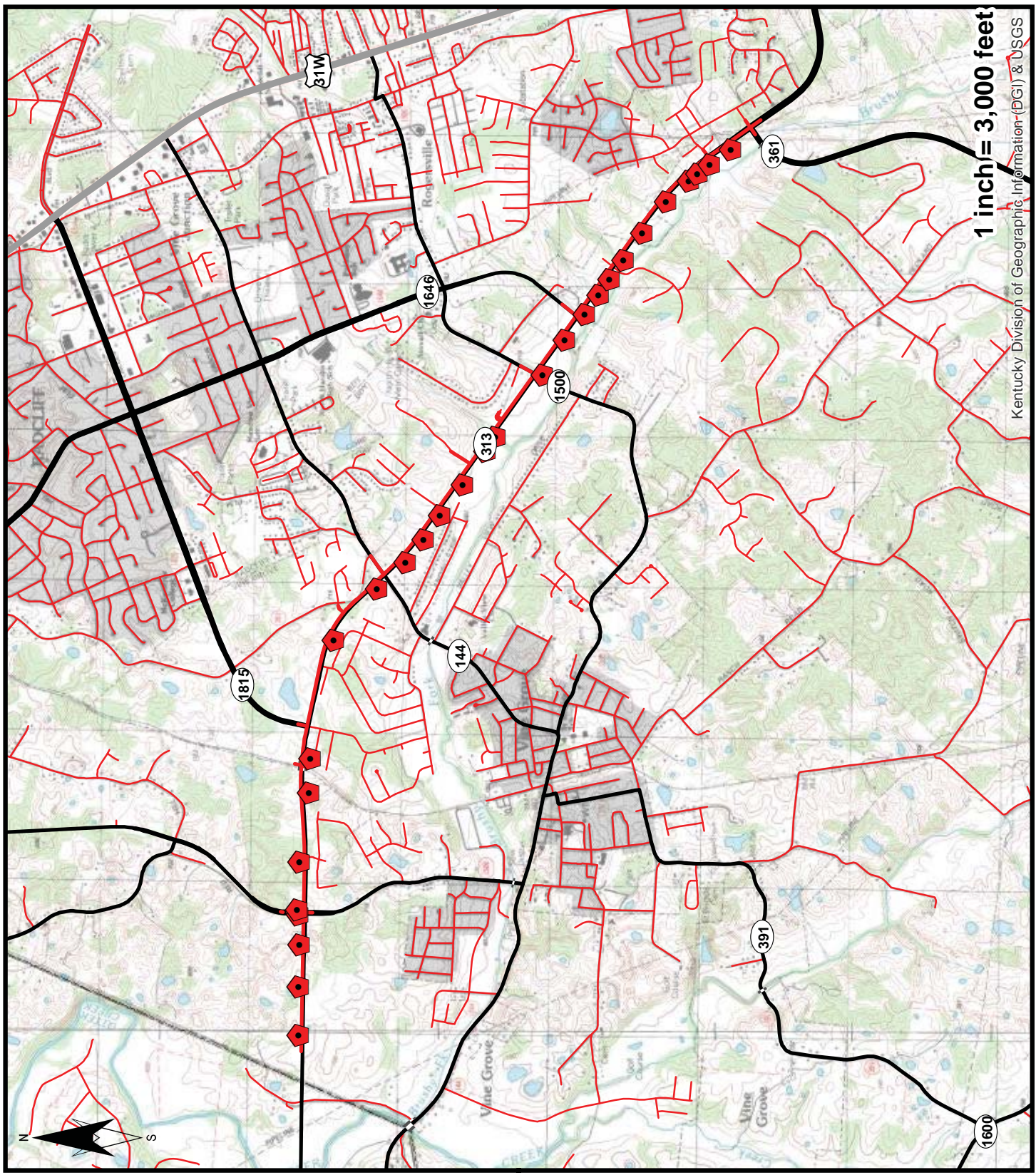
401 KAR 5:037 Section 3. (3) Elements of site specific groundwater protection plan:

(a) General information about this project is covered in the Project information;

KyTC BMP Plan for Project CID ## -

- (b) Activities that require a groundwater protection plan have been identified above;
- (c) Practices that will protect groundwater from pollution are addressed in section C. Other control measures.
- (d) Implementation schedule – all practices required to prevent pollution of groundwater are to be in place prior to conducting the activity;
- (e) Training is required as a part of the ground water protection plan. All employees of the contractor, sub-contractor and resident engineer personnel will be trained to understand the nature and requirements of this plan as they pertain to their job function(s). Training will be accomplished within one week of employment and annually thereafter. A record of training will be maintained by the contractor with a copy provide to the resident engineer.
- (f) Areas of the project and groundwater plan activities will be inspected as part of the weekly sediment and erosion control inspections
- (g) Certification (see signature page.)

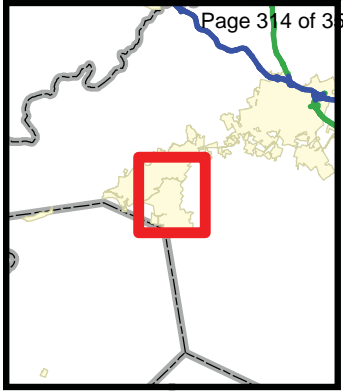
4-0170 - KY 313 4 Lane Expansion



Legend

- KPDES Points
- Proposed Centerline

Id	Latitude	Longitude
1	37.825127	-86.000357
2	37.825137	-85.996667
3	37.825089	-85.9935
4	37.825163	-85.991252
5	37.825237	-85.990858
6	37.825086	-85.987188
7	37.824455	-85.979359
8	37.824527	-85.981968
9	37.823063	-85.970378
10	37.820476	-85.96648
11	37.818768	-85.964452
12	37.817681	-85.962777
13	37.816702	-85.960896
14	37.815307	-85.958856
15	37.81397	-85.956028
16	37.813373	-85.95496
17	37.810528	-85.950208
18	37.809216	-85.947569
19	37.808021	-85.945636
20	37.807186	-85.94413
21	37.806517	-85.942967
22	37.805687	-85.941499
23	37.804572	-85.939429
24	37.803142	-85.937066
25	37.801769	-85.935508
26	37.80123	-85.934962
27	37.800506	-85.934217
28	37.79924	-85.933114



1 inch = 3,000 feet
 Kentucky Division of Geographic Information (DGI) & USGS

KENTUCKY TRANSPORTATION CABINET
COMMUNICATING ALL PROMISES (CAP)

10 APR 2018

Item No.	4 - 170			Project Mgr.	kytc\bradley.bottoms
CAP #	Date of Promise	Promise made to:	Location of Promise	County	Route
1	09-APR-18	KYTC D4	Trojan Way & KY1500	HARDIN	KY-313
CAP Description					
In order to accommodate school traffic work will only occur from June 1 to August 1 each calendar year on the school entrance at Trojan Way (STA 291+51) and the KY1500 approach (STA 315+74).					

PART II
SPECIFICATIONS AND STANDARD DRAWINGS

SPECIFICATIONS REFERENCE

Any reference in the plans or proposal to previous editions of the *Standard Specifications for Road and Bridge Construction* and *Standard Drawings* are superseded by *Standard Specifications for Road and Bridge Construction, Edition of 2012* and *Standard Drawings, Edition of 2016*.

SUPPLEMENTAL SPECIFICATIONS

The contractor shall use the Supplemental Specifications that are effective at the time of letting.
The Supplemental Specifications can be found at the following link:

<http://transportation.ky.gov/Construction/Pages/Kentucky-Standard-Specifications.aspx>

SPECIAL NOTE FOR PORTABLE CHANGEABLE MESSAGE SIGNS

This Special Note will apply when indicated on the plans or in the proposal.

1.0 DESCRIPTION. Furnish, install, operate, and maintain variable message signs at the locations shown on the plans or designated by the Engineer. Remove and retain possession of variable message signs when they are no longer needed on the project.

2.0 MATERIALS.

2.1 General. Use LED Variable Message Signs Class I, II, or III, as appropriate, from the Department's List of Approved Materials.

Unclassified signs may be submitted for approval by the Engineer. The Engineer may require a daytime and nighttime demonstration. The Engineer will make a final decision within 30 days after all required information is received.

2.2 Sign and Controls. All signs must:

- 1) Provide 3-line messages with each line being 8 characters long and at least 18 inches tall. Each character comprises 35 pixels.
- 2) Provide at least 40 preprogrammed messages available for use at any time. Provide for quick and easy change of the displayed message; editing of the message; and additions of new messages.
- 3) Provide a controller consisting of:
 - a) Keyboard or keypad.
 - b) Readout that mimics the actual sign display. (When LCD or LCD type readout is used, include backlighting and heating or otherwise arrange for viewing in cold temperatures.)
 - c) Non-volatile memory or suitable memory with battery backup for storing pre-programmed messages.
 - d) Logic circuitry to control the sequence of messages and flash rate.
- 4) Provide a serial interface that is capable of supporting complete remote control ability through land line and cellular telephone operation. Include communication software capable of immediately updating the message, providing complete sign status, and allowing message library queries and updates.
- 5) Allow a single person easily to raise the sign to a satisfactory height above the pavement during use, and lower the sign during travel.
- 6) Be Highway Orange on all exterior surfaces of the trailer, supports, and controller cabinet.
- 7) Provide operation in ambient temperatures from -30 to + 120 degrees Fahrenheit during snow, rain and other inclement weather.
- 8) Provide the driver board as part of a module. All modules are interchangeable, and have plug and socket arrangements for disconnection and reconnection. Printed circuit boards associated with driver boards have a conformable coating to protect against moisture.
- 9) Provide a sign case sealed against rain, snow, dust, insects, etc. The lens is UV stabilized clear plastic (polycarbonate, acrylic, or other approved material) angled to prevent glare.
- 10) Provide a flat black UV protected coating on the sign hardware, character PCB, and appropriate lens areas.
- 11) Provide a photocell control to provide automatic dimming.

- 12) Allow an on-off flashing sequence at an adjustable rate.
- 13) Provide a sight to aim the message.
- 14) Provide a LED display color of approximately 590 nm amber.
- 15) Provide a controller that is password protected.
- 16) Provide a security device that prevents unauthorized individuals from accessing the controller.
- 17) Provide the following 3-line messages preprogrammed and available for use when the sign unit begins operation:

/KEEP/RIGHT/=>=>=>/	/MIN/SPEED/**MPH/
/KEEP/LEFT/<=<=</	/ICY/BRIDGE/AHEAD/ /ONE
/LOOSE/GRAVEL/AHEAD/	LANE/BRIDGE/AHEAD/
/RD WORK/NEXT/**MILES/	/ROUGH/ROAD/AHEAD/
/TWO WAY/TRAFFIC/AHEAD/	/MERGING/TRAFFIC/AHEAD/
/PAINT/CREW/AHEAD/	/NEXT/**/MILES/
/REDUCE/SPEED/**MPH/	/HEAVY/TRAFFIC/AHEAD/
/BRIDGE/WORK/**0 FT/	/SPEED/LIMIT/**MPH/
/MAX/SPEED/**MPH/	/BUMP/AHEAD/
/SURVEY/PARTY/AHEAD/	/TWO/WAY/TRAFFIC/

*Insert numerals as directed by the Engineer.
Add other messages during the project when required by the Engineer.

2.3 Power.

- 1) Design solar panels to yield 10 percent or greater additional charge than sign consumption. Provide direct wiring for operation of the sign or arrow board from an external power source to provide energy backup for 21 days without sunlight and an on-board system charger with the ability to recharge completely discharged batteries in 24 hours.

3.0 CONSTRUCTION. Furnish and operate the variable message signs as designated on the plans or by the Engineer. Ensure the bottom of the message panel is a minimum of 7 feet above the roadway in urban areas and 5 feet above in rural areas when operating. Use Class I, II, or III signs on roads with a speed limit less than 55 mph. Use Class I or II signs on roads with speed limits 55 mph or greater.

Maintain the sign in proper working order, including repair of any damage done by others, until completion of the project. When the sign becomes inoperative, immediately repair or replace the sign. Repetitive problems with the same unit will be cause for rejection and replacement.

Use only project related messages and messages directed by the Engineer, unnecessary messages lessen the impact of the sign. Ensure the message is displayed in either one or 2 phases with each phase having no more than 3 lines of text. When no message is needed, but it is necessary to know if the sign is operable, flash only a pixel.

When the sign is not needed, move it outside the clear zone or where the Engineer directs. Variable Message Signs are the property of the Contractor and shall be removed from the project when no longer needed. The Department will not assume ownership of these signs.

4.0 MEASUREMENT. The final quantity of Variable Message Sign will be

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the actual number of individual signs acceptably furnished and operated during the project. The Department will not measure signs replaced due to damage or rejection.

5.0 PAYMENT. The Department will pay for the Variable Message Signs at the unit price each. The Department will not pay for signs replaced due to damage or rejection. Payment is full compensation for furnishing all materials, labor, equipment, and service necessary to, operate, move, repair, and maintain or replace the variable message signs. The Department will make payment for the completed and accepted quantities under the following:

<u>Code</u>	<u>Pay Item</u>	<u>Pay Unit</u>
02671	Portable Changeable Message Sign	Each

Effective June 15, 2012

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SPECIAL NOTE FOR ROADBED STABILIZATION AT BRIDGE ENDS

This Special Note will apply where indicated on the plans or in the proposal. Section references herein are to the Department's 2012 Standard Specifications for Road and Bridge Construction.

1.0 DESCRIPTION. Due to the wet and yielding embankments commonly encountered at bridge ends, undercut the existing roadbed within the limits the Contract specifies and backfill.

2.0 MATERIALS.

2.1 Geotextile Fabric. Furnish Type III fabric conforming to Section 843.

3.0 CONSTRUCTION. After removing the existing pavement and base, undercut the existing roadbed under the traffic lanes and shoulders as the Engineer directs. The minimum undercut shall be one foot, except undercut depth may be reduced where rock embankment constructed principally of limestone is encountered. Place geotextile fabric in the bottom and against the sides and ends of the undercut. The Department will not require a minimum lap between adjacent sheets of geotextile fabric for the longitudinal joint under the pavement centerline. Backfill the undercut with one or more of the following materials;

- 1) Crushed limestone size No. 1, 2, 23, or 57; or
- 2) Layered composition of several limestone sizes, with larger sizes on the bottom.

Use Dense Graded Aggregate (DGA), Crushed Stone Base (CSB), or Stabilized Aggregate Base (SAB) in the top 4 inches, and only in the top 4 inches, of the backfill.

Place geotextile fabric between the coarse backfill material and the 4-inch upper layer.

Compact the backfill material by "walking down" with equipment, or other methods the Engineer approves. See attached drawing for details of backfill placement and drainage.

Waste all removed materials, not used for purposes the Contract or Engineer specifies or permits, off the right-of-way at no expense to the Department.

4.0 MEASUREMENT.

4.1 Removing Pavement. The Department will measure the quantity in square yards. The Department will consider the pavement to include existing pavement, existing asphalt patching, and existing DGA base.

2E

4.2 Roadway Excavation. The Department will measure the quantity in cubic yards.

4.3 Backfilling Undercut. The Department will measure the quantity in cubic yards. The Department will not measure coarse aggregate for payment and will consider it incidental to this item of work.

4.4 Perforated Pipe. The Department will measure the quantity in linear feet.

4.5 Non-Perforated Pipe. The Department will measure the quantity in linear feet.

4.6 Geotextile Fabric, Type III. The Department will measure the quantity in square yards.

5.0 PAYMENT. The Department will make payment for the completed and accepted quantities under the following:

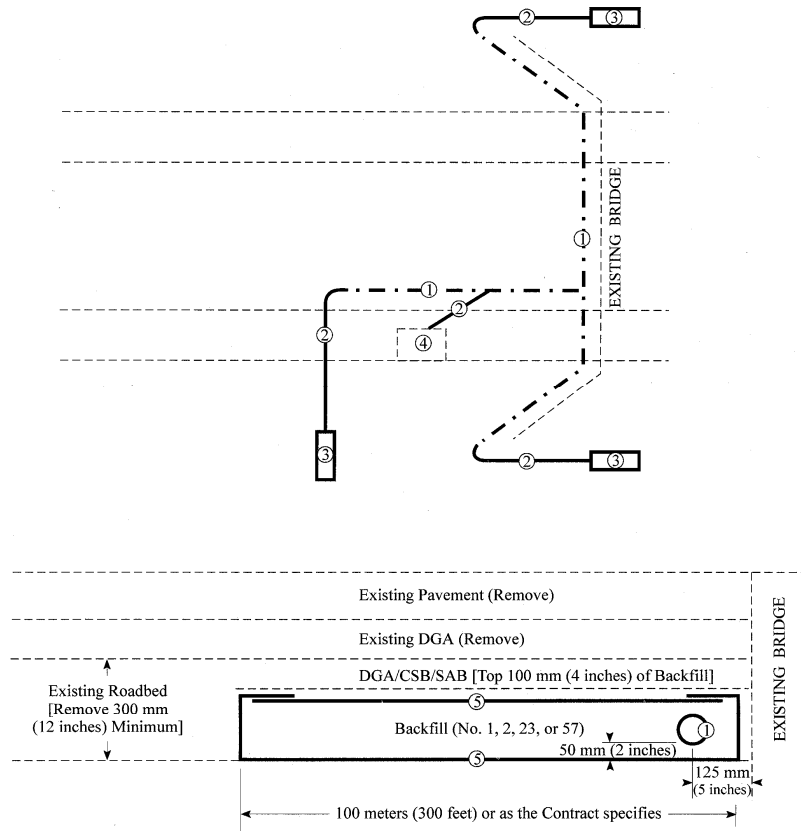
<u>Code</u>	<u>Pay Item</u>	<u>Pay Unit</u>
02091	Removing Pavement	Square Yard
01000	Perforated Pipe - 4 inches	Linear Foot
01010	Non-Perforated Pipe, 4 inches	Linear Foot
02235	Backfilling Undercut	Cubic Yard
02598	Fabric - Geotextile Type III	Square Yard

The Department will consider payment as full compensation for all work required in this note.

June 15, 2012

2E

**BRIDGE END DRAINAGE AND STABILIZATION
 (DETAILS)**



NOTES

Contrary to Section 705 of the Standard Specifications, use only coarse aggregate for trench backfill.

Slope all pipe to drain to the outside. Provide a 1:24 (1/2":1') or greater slope for the outlet pipe.

The Department may require additional transverse drains within the stabilization area.

LEGEND

- ① 100-mm (4-inch) Perforated Pipe
- ② 100-mm (4-inch) Non-perforated Pipe
- ③ Perforated Pipe Headwall
- ④ Existing Box Inlet
- ⑤ Geotextile Fabric, Type III

SPECIAL NOTE FOR BARCODE LABEL ON PERMANENT SIGNS

1.0 DESCRIPTION. Install barcode label on sheeting signs. Section references herein are to the Department’s 2012 Standard Specifications for Road and Bridge Construction.

2.0 MATERIALS. The Department will provide the Contractor with a 2 inch x 1 inch foil barcode label for each permanent sheeting sign. A unique number will be assigned to each barcode label.

The Contractor shall contact the Operations and Pavement Management Branch in the Division of Maintenance at (502) 564-4556 to obtain the barcode labels.

3.0 CONSTRUCTION. Apply foil barcode label in the lower right quadrant of the sign back. Signs where the bottom edge is not parallel to the ground, the lowest corner of the sign shall serve as the location to place the barcode label. The barcode label shall be placed no less than one-inch and no more than three inches from any edge of the sign. The barcode must be placed so that the sign post does not cover the barcode label.

Barcodes shall be applied in an indoor setting with a minimum air temperature of 50°F or higher. Prior to application of the barcode label, the back of the sign must be clean and free of dust, oil, etc. If the sign is not clean, an alcohol swab shall be used to clean the area. The area must be allowed to dry prior to placement of the barcode label.

Data for each sign shall include the barcode number, MUTCD reference number, sheeting manufacturer, sheeting type, manufacture date, color of primary reflective surface, installation date, latitude and longitude using the North American Datum of 1983 (NAD83) or the State Plane Coordinates using an x and y ordinate of the installed location.

Data should be provided electronically on the TC 71-229 Sign Details Information and TC 71-230 Sign Assembly Information forms. The Contractor may choose to present the data in a different format provided that the information submitted to the Department is equivalent to the information required on the Department TC forms. The forms must be submitted in electronic format regardless of which type of form is used. The Department will not accept PDF or handwritten forms. These completed forms must be submitted to the Department prior to final inspection of the signs. The Department will not issue formal acceptance for the project until the TC 71-229 and TC-230 electronic forms are completed for all signs and sign assemblies on the project.

4.0 MEASUREMENT. The Department will measure all work required for the installation of the barcode label and all work associated with completion and submission of the sign inventory data (TC 71-229 and TC 71-230).

The installation of the permanent sign will be measured in accordance to Section 715.

5.0 PAYMENT. The Department will make payment for the completed and accepted quantities under the following:

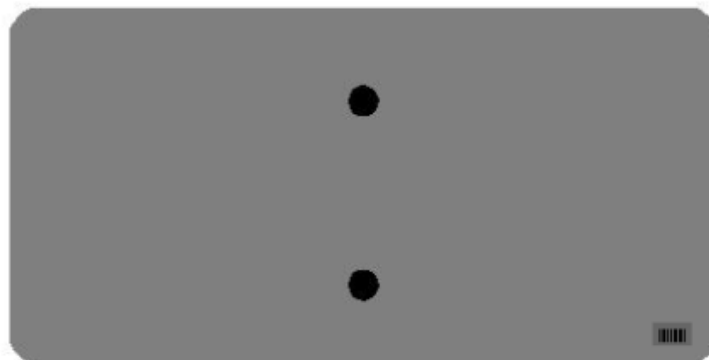
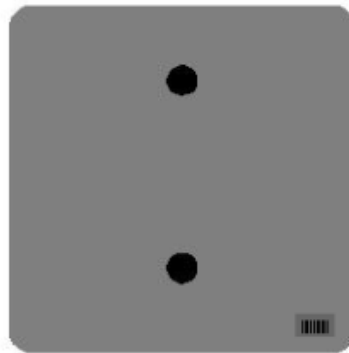
<u>Code</u>	<u>Pay Item</u>	<u>Pay Unit</u>
24631EC	Barcode Sign Inventory	Each

The Department will not make payment for this item until all barcodes are installed and sign inventory is complete on every permanent sign installed on the project. The Department will make payment for installation of the permanent sign in accordance to Section 715. The Department will consider payment as full compensation for all work required under this special note.

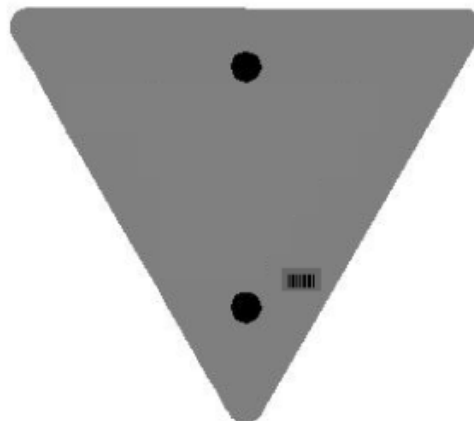
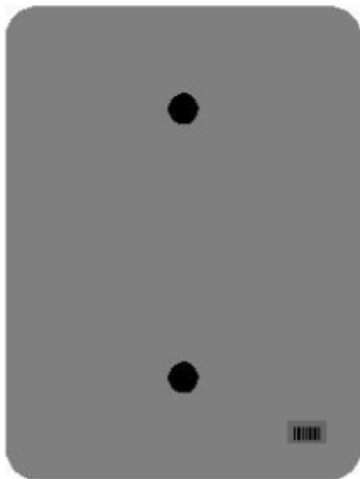
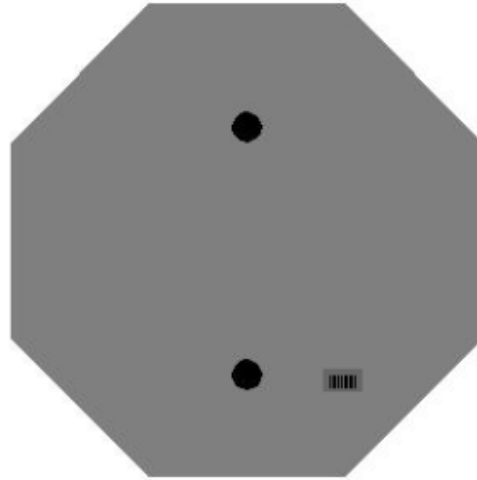
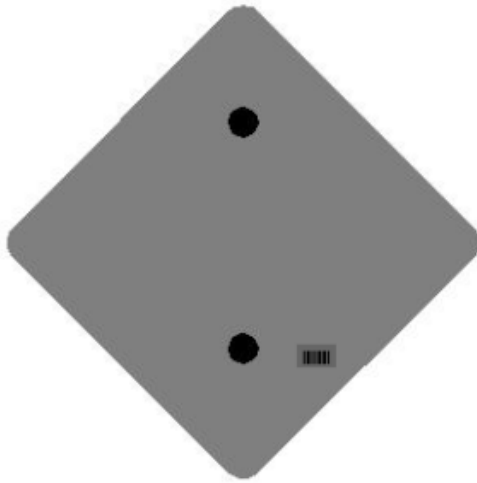
One Sign Post



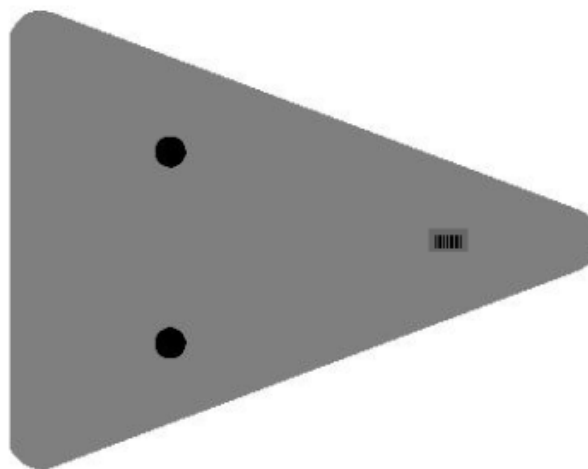
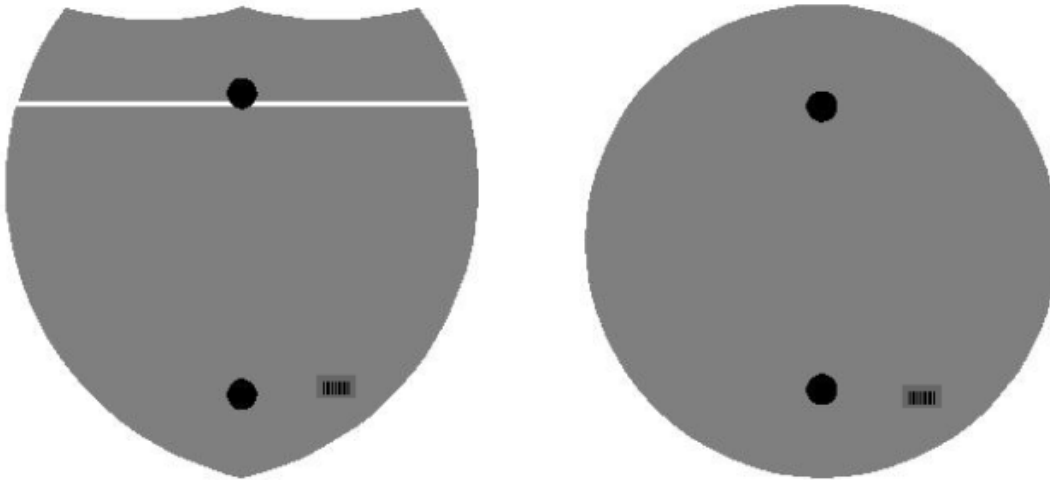
↑
2" Wide Post



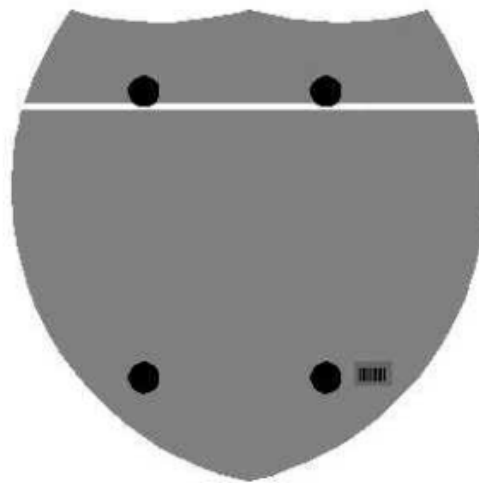
One Sign Post



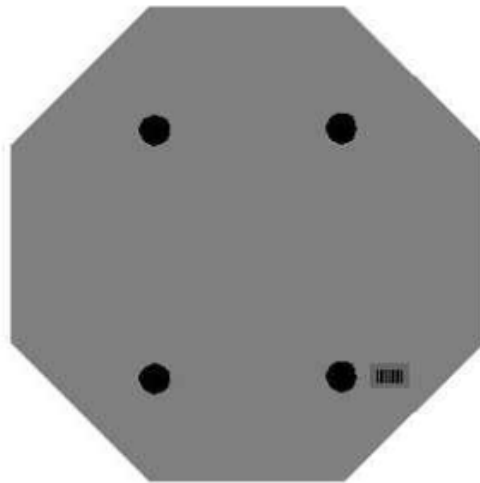
One Sign Post



Double Sign Post



Interstate
Shield

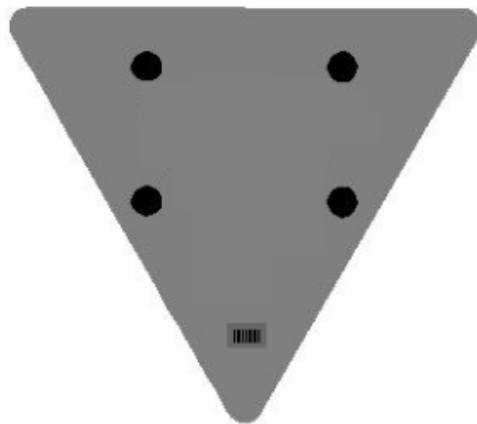


48" Stop

2 Post Signs



↑
2" Wide Post



SPECIAL NOTE FOR LONGITUDINAL PAVEMENT JOINT ADHESIVE

1. DESCRIPTION. This specification covers the requirements and practices for applying an asphalt adhesive material to the longitudinal joint of the surface course of an asphalt pavement. Apply the adhesive to the face of longitudinal joint between driving lanes for the first lane paved. Then, place and compact the adjacent lane against the treated face to produce a strong, durable, waterproof longitudinal joint.
2. MATERIALS, EQUIPMENT, AND PERSONNEL.

2.1 Joint Adhesive. Provide material conforming to Subsection 2.1.1.

2.1.1 Provide an adhesive conforming to the following requirements:

Property	Specification	Test Procedure
Viscosity, 400 ° F (Pa·s)	4.0 – 10.0	ASTM D 4402
Cone Penetration, 77 ° F	60 – 100	ASTM D 5329
Flow, 140 ° F (mm)	5.0 max.	ASTM D 5329
Resilience, 77 ° F (%)	30 min.	ASTM D 5329
Ductility, 77 ° F (cm)	30.0 min.	ASTM D 113
Ductility, 39 ° F (cm)	30.0 min.	ASTM D 113
Tensile Adhesion, 77 ° F (%)	500 min.	ASTM D 5329, Type II
Softening Point, ° F	171 min.	AASHTO T 53
Asphalt Compatibility	Pass	ASTM D 5329

Ensure the temperature of the pavement joint adhesive is between 380 and 410 °F when the material is extruded in a 0.125-inch-thick band over the entire face of the longitudinal joint.

2.2. Equipment.

2.2.1 Melter Kettle. Provide an oil-jacketed, double-boiler, melter kettle equipped with any needed agitation and recirculating systems.

2.2.2 Applicator System. Provide a pressure-feed-wand applicator system with an applicator shoe attached.

2.3 Personnel. Ensure a technical representative from the manufacturer of the pavement joint adhesive is present during the initial construction activities and available upon the request of the Engineer.

3. CONSTRUCTION.

3.1 Surface Preparation. Prior to the application of the pavement joint adhesive, ensure the face of the longitudinal joint is thoroughly dry and free from dust or any other debris that would inhibit adhesion. Clean the joint face by the use of compressed air.

11N

Ensure this preparation process occurs shortly before application to prevent the return of debris on the joint face.

3.2 Pavement Joint Adhesive Application. Ensure the ambient temperature is a minimum of 40 ° F during the application of the pavement joint adhesive. Prior to applying the adhesive, demonstrate competence in applying the adhesive according to this note to the satisfaction of the Engineer. Heat the adhesive in the melter kettle to the specified temperature range. Pump the adhesive from the melter kettle through the wand onto the vertical face of the cold joint. Apply the adhesive in a continuous band over the entire face of the longitudinal joint. Do not use excessive material in either thickness or location. Ensure the edge of the extruded adhesive material is flush with the surface of the pavement. Then, place and compact the adjacent lane against the joint face. Remove any excessive material extruded from the joint after compaction (a small line of material may remain).

3.3 Pavement Joint Adhesive Certification. Furnish the joint adhesive's certification to the Engineer stating the material conforms to all requirements herein prior to use.

3.4 Sampling and Testing. The Department will require a random sample of pavement joint adhesive from each manufacturer's lot of material. Extrude two 5 lb. samples of the heated material and forward the sample to the Division of Materials for testing. Reynolds oven bags, turkey size, placed inside small cardboard boxes or cement cylinder molds have been found suitable. Ensure the product temperature is 400°F or below at the time of sampling.

4. MEASUREMENT. The Department will measure the quantity of Pavement Joint Adhesive in linear feet. The Department will not measure for payment any extra materials, labor, methods, equipment, or construction techniques used to satisfy the requirements of this note. The Department will not measure for payment any trial applications of Pavement Joint Adhesive, the cleaning of the joint face, or furnishing and placing the adhesive. The Department will consider all such items incidental to the Pavement Joint Adhesive.
5. PAYMENT. The Department will pay for the Pavement Joint Adhesive at the Contract unit bid price and apply an adjustment for each manufacturer's lot of material based on the degree of compliance as defined in the following schedule. When a sample fails on two or more tests, the Department may add the deductions, but the total deduction will not exceed 100 percent.

Pavement Joint Adhesive Price Adjustment Schedule						
Test	Specification	100% Pay	90% Pay	80% Pay	50% Pay	0% Pay
Joint Adhesive Referenced in Subsection 2.1.1						
Viscosity, 400 ° F (Pa•s) ASTM D 3236	4.0-10.0	3.5-10.5	3.0-3.4 10.6-11.0	2.5-2.9 11.1-11.5	2.0-2.4 11.6-12.0	≤1.9 ≥ 12.1
Cone Penetration, 77 ° F ASTM D 5329	60-100	57-103	54-56 104-106	51-53 107-109	48-50 110-112	≤ 47 ≥ 113
Flow, 140 ° F (mm) ASTM D 5329	≤ 5.0	≤ 5.5	5.6-6.0	6.1-6.5	6.6-7.0	≥ 7.1
Resilience, 77 ° F (%) ASTM D 5329	≥ 30	≥ 28	26-27	24-25	22-23	≤ 21
Tensile Adhesion, 77 ° F (%) ASTM D 5329	≥ 500	≥ 490	480-489	470-479	460-469	≤ 459
Softening Point, ° F AASHTO T 53	≥ 171	≥ 169	166-168	163-165	160-162	≤ 159
Ductility, 77 ° F (cm) ASTM D 113	≥ 30.0	≥ 29.0	28.0-28.9	27.0-27.9	26.0-26.9	≤ 25.9
Ductility, 39 ° F (cm) ASTM D 113	≥ 30.0	≥ 29.0	28.0-28.9	27.0-27.9	26.0-26.9	≤ 25.9

Code
20071EC

Pay Item
Joint Adhesive

Pay Unit
Linear Foot

May 7, 2014

SPECIAL PROVISION FOR EMBANKMENT AT BRIDGE END BENT STRUCTURES

This Special Provision will apply when indicated on the plans or in the proposal. Section references herein are to the Department's Standard Specifications for Road and Bridge Construction, Current Edition.

1.0 DESCRIPTION. Construct a soil, granular, or rock embankment with soil, granular or cohesive pile core and place structure granular backfill, as the Plans require. Construct the embankment according to the requirements of this Special Provision, the Plans, Standard Drawing RGX 100 and 105, and the Standard Specifications, Current Edition.

2.0 MATERIALS.

2.1 Granular Embankment. Conform to Subsection 805.10. When Granular Embankment materials are erodible or unstable according to Subsection 805.03.04, use the Special Construction Methods found in 3.2 of the Special Provision.

2.2 Rock Embankment. Provide durable rock from roadway excavation that consists principally of Unweathered Limestone, Durable Shale (SDI equal to or greater than 95 according to KM 64-513), or Durable Sandstone.

2.3 Pile Core. Provide a pile core in the area of the embankments where deep foundations are to be installed unless otherwise specified. The Pile Core is the zone indicated on Standard Drawings RGX 100 and 105 designated as Pile Core. Material control of the pile core area during embankment construction is always required. Proper Pile Core construction is required for installation of foundation elements such as drilled or driven piles or drilled shafts. The type of material used to construct the pile core is as directed in the plans or below. Typically, the pile core area will be constructed from the same material used to construct the surrounding embankment. Pile Core can be classified as one of three types:

A) Pile Core - Conform to Section 206 of the Standard Specifications. Provide pile core material consisting of the same material as the adjacent embankment except the material in the pile core area shall be free of boulders or particle sizes larger than 4 inches in any dimension or any other obstructions that may hinder pile driving operations. If the pile core material hinders pile driving operations, take the appropriate means necessary to reach the required pile tip elevation, at no expense to the Department.

B) Granular Pile Core. Granular pile core is required only when specified in the plans. Select a gradation of durable rock to facilitate pile driving that conforms to Subsection 805.11. If granular pile core material hinders pile driving operations, take appropriate means necessary to reach the required pile tip elevation, at no expense to the Department.

C) Cohesive Pile Core. Cohesive Pile Core is required only when specified in the plans. Conform to Section 206 of the Standard Specifications and use soil with at least 50 percent passing a No. 4 sieve having a minimum Plasticity Index (PI) of 10. In addition, keep the cohesive pile core free of boulders, larger than 4 inches in any dimension, or any other obstructions, which would interfere with drilling operations. If cohesive pile core material interferes with drilling operations, take appropriate means necessary to maintain

excavation stability, at no expense to the Department.

2.4 Structure Granular Backfill. Conform to Subsection 805.11

2.5 Geotextile Fabric. Conform to Type I or Type IV in Section 214 and 843.

3.0 CONSTRUCTION.

3.1 General. Construct roadway embankments at end bents according to Section 206 and in accordance with the Special Provision, the Plans, and Standard Drawings for the full embankment section. In some instances, granular or rock embankment will be required for embankment construction for stability purposes, but this special provision does not prevent the use of soil when appropriate. Refer to the plans for specific details regarding material requirements for embankment construction.

Place and compact the pile core and structure granular backfill according to the applicable density requirements for the project. If the embankment and pile core are dissimilar materials (i.e., a granular pile core is used with a soil embankment or a cohesive pile core is used with a granular embankment), a Geotextile Fabric, Type IV, will be required between the pile core and embankment in accordance with Sections 214 and 843 of the Standard Specifications.

When granular or rock embankment is required for embankment construction, conform to the general requirements of Subsection 206.03.02 B. In addition, place the material in no greater than 2-foot loose lifts and compact with a vibrating smooth wheel roller capable of producing a minimum centrifugal force of 15 tons. Apply these requirements to the full width of the embankment for a distance of half the embankment height or 50 feet, whichever is greater, as shown on Standard Drawing RGX-105.

When using granular pile core, install 8-inch perforated underdrain pipe at or near the elevation of the original ground in the approximate locations depicted on the standard drawing, and as the Engineer directs, to ensure positive drainage of the embankment. Wrap the perforated pipe with a fabric of a type recommended by the pipe manufacturer.

After constructing the embankment, excavate for the end bent cap, drive piling, install shafts or other foundation elements, place the mortar bed, construct the end bent, and complete the embankment to finish grade according to the construction sequence shown on the Plans or Standard Drawings and as specified hereinafter.

Certain projects may require widening of existing embankments and the removal of substructures. Construct embankment according to the plans. Substructure removal shall be completed according to the plans and Section 203. Excavation may be required at the existing embankment in order to place the structure granular backfill as shown in the Standard Drawings.

After piles are driven or shafts installed (see design drawings), slope the bottom of the excavation towards the ends of the trench as noted on the plans for drainage. Using a separate pour, place concrete mortar, or any class concrete, to provide a base for forming and placing the cap. Place side forms for the end bent after the mortar has set sufficiently to support workmen and forms without being disturbed.

Install 4-inch perforated pipe in accordance with the plans and Standard Drawings. In the event slope protection extends above the elevation of the perforated pipe, extend the pipe through the slope protection.

After placing the end bent cap and achieving required concrete cylinder strengths, remove adjacent forms and fill the excavation with compacted structure granular backfill material (maximum 1' loose lifts) to the level of the berm prior to placing beams for the bridge. Place Type IV geotextile fabric between embankment material and structure granular backfill. After completing the end bent backwall, or after completing the span end

wall, place the compacted structure granular backfill (maximum 1' loose lifts) to subgrade elevation. If the original excavation is enlarged, fill the entire volume with compacted structure granular backfill (maximum 1' loose lifts) at no expense to the Department. Do not place backfill before removing adjacent form work. Place structure granular backfill material in trench ditches at the ends of the excavation. Place Geotextile Fabric, Type IV over the surface of the compacted structure granular backfill prior to placing aggregate base course.

Tamp the backfill with hand tampers, pneumatic tampers, or other means approved by the Engineer. Thoroughly compact the backfill under the overhanging portions of the structure to ensure that the backfill is in intimate contact with the sides of the structure.

Do not apply seeding, sodding, or other vegetation to the exposed granular embankment.

3.2 Special Construction Methods. Erodible or unstable materials may erode even when protected by riprap or channel lining; use the special construction method described below when using these materials.

Use fine aggregates or friable sandstone granular embankment at "dry land" structures only. Do not use them at stream crossings or locations subject to flood waters.

For erodible or unstable materials having 50 percent or more passing the No. 4 sieve, protect with geotextile fabric. Extend the fabric from the original ground to the top of slope over the entire area of the embankment slopes on each side of, and in front of, the end bent. Cover the fabric with at least 12 inches of non-erodible material.

For erodible or unstable materials having less than 50 percent passing a No. 4 sieve, cover with at least 12 inches of non-erodible material.

Where erodible or unstable granular embankment will be protected by riprap or channel lining, place Type IV geotextile fabric between the embankment and the specified slope protection.

4.0 MEASUREMENT.

4.1 Granular Embankment. The Department will measure the quantity in cubic yards using the plan quantity, increased or decreased by authorized adjustments as specified in Section 204. The Department will not measure for payment any Granular Embankment that is not called for in the plans.

The Department will not measure for payment any special construction caused by using erodible or unstable materials and will consider it incidental to the Granular Embankment regardless of whether the erodible or unstable material was specified or permitted.

4.2 Rock Embankment. The Department will not measure for payment any rock embankment and will consider it incidental to roadway excavation or embankment in place, as applicable. Rock embankments will be constructed using granular embankment on projects where there is no available rock present within the excavation limits of the project.

4.3 Pile Core. Pile core will be measured and paid under roadway excavation or embankment in place, as applicable. The Department will not measure the pile core for separate payment. The Department will not measure for payment the 8-inch perforated underdrain pipe and will consider it incidental to the Pile Core.

4.4 Structure Granular Backfill. The Department will measure the quantity in cubic yards using the plan quantity, increased or decreased by authorized adjustments as specified in Section 204. The Department will not measure any additional material required for backfill outside the limits shown on the Plans and Standard Drawings for payment and will

consider it incidental to the work.

The Department will not measure for payment the 4-inch perforated underdrain pipe and will consider it incidental to the Structure Granular Backfill.

4.5 Geotextile Fabric. The Department will not measure the quantity of fabric used for separating dissimilar materials when constructing the embankment and pile core and will consider it incidental to embankment construction.

The Department will not measure for payment the Geotextile Fabric used to separate the Structure Granular Backfill from the embankment and aggregate base course and will consider it incidental to Structure Granular Backfill.

The Department will not measure for payment the Geotextile Fabric required for construction with erodible or unstable materials and will consider it incidental to embankment construction.

4.6 End Bent. The Department will measure the quantities according to the Contract. The Department will not measure furnishing and placing the 2-inch mortar or concrete bed for payment and will consider it incidental to the end bent construction.

4.7 Structure Excavation. The Department will not measure structure excavation on new embankments for payment and will consider it incidental to the Structure Granular Backfill or Concrete as applicable.

5.0 PAYMENT. The Department will make payment for the completed and accepted quantities under the following:

<u>Code</u>	<u>Pay Item</u>	<u>Pay Unit</u>
02223	Granular Embankment	Cubic Yards
02231	Structure Granular Backfill	Cubic Yards

The Department will consider payment as full compensation for all work required in this provision.

September 16, 2016

PART III

EMPLOYMENT, WAGE AND RECORD REQUIREMENTS

**TRANSPORTATION CABINET
DEPARTMENT OF HIGHWAYS**

**LABOR AND WAGE REQUIREMENTS
APPLICABLE TO OTHER THAN FEDERAL-AID SYSTEM PROJECTS**

- I. Application
- II. Nondiscrimination of Employees (KRS 344)

I. APPLICATION

1. These contract provisions shall apply to all work performed on the contract by the contractor with his own organization and with the assistance of workmen under his immediate superintendence and to all work performed on the contract by piecework, station work or by subcontract. The contractor's organization shall be construed to include only workmen employed and paid directly by the contractor and equipment owned or rented by him, with or without operators.

2. The contractor shall insert in each of his subcontracts all of the stipulations contained in these Required Provisions and such other stipulations as may be required.

3. A breach of any of the stipulations contained in these Required Provisions may be grounds for termination of the contract.

3. If the contractor is in control of apprenticeship or other training or retraining, including on-the-job training programs, he shall not discriminate against an individual because of his race, color, religion, national origin, sex, disability or age forty (40) and over, in admission to, or employment in any program established to provide apprenticeship or other training.

4. The contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or workers' representative of the contractor's commitments under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment. The contractor will take such action with respect to any subcontract or purchase order as the administrating agency may direct as a means of enforcing such provisions, including sanctions for non-compliance.

Revised: January 25, 2017

II. NONDISCRIMINATION OF EMPLOYEES

**AN ACT OF THE KENTUCKY
GENERAL ASSEMBLY TO PREVENT
DISCRIMINATION IN EMPLOYMENT
KRS CHAPTER 344
EFFECTIVE JUNE 16, 1972**

The contract on this project, in accordance with KRS Chapter 344, provides that during the performance of this contract, the contractor agrees as follows:

1. The contractor shall not fail or refuse to hire, or shall not discharge any individual, or otherwise discriminate against an individual with respect to his compensation, terms, conditions, or privileges of employment, because of such individual's race, color, religion, national origin, sex, disability or age (forty and above); or limit, segregate, or classify his employees in any way which would deprive or tend to deprive an individual of employment opportunities or otherwise adversely affect his status as an employee, because of such individual's race, color, religion, national origin, sex, disability or age forty (40) and over. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.

2. The contractor shall not print or publish or cause to be printed or published a notice or advertisement relating to employment by such an employer or membership in or any classification or referral for employment by the employment agency, indicating any preference, limitation, specification, or discrimination, based on race, color, religion, national origin, sex, or age forty (40) and over, or because the person is a qualified individual with a disability, except that such a notice or advertisement may indicate a preference, limitation, or specification based on religion, national origin, sex, or age forty (40) and over, or because the person is a qualified individual with a disability, when religion, national origin, sex, or age forty (40) and over, or because the person is a qualified individual with a disability, is a bona fide occupational qualification for employment.

EXECUTIVE BRANCH CODE OF ETHICS

In the 1992 regular legislative session, the General Assembly passed and Governor Brereton Jones signed Senate Bill 63 (codified as KRS 11A), the Executive Branch Code of Ethics, which states, in part:

KRS 11A.040 (7) provides:

No present or former public servant shall, within six (6) months following termination of his office or employment, accept employment, compensation, or other economic benefit from any person or business that contracts or does business with, or is regulated by, the state in matters in which he was directly involved during the last thirty-six (36) months of his tenure. This provision shall not prohibit an individual from returning to the same business, firm, occupation, or profession in which he was involved prior to taking office or beginning his term of employment, or for which he received, prior to his state employment, a professional degree or license, provided that, for a period of six (6) months, he personally refrains from working on any matter in which he was directly involved during the last thirty-six (36) months of his tenure in state government. This subsection shall not prohibit the performance of ministerial functions, including but not limited to filing tax returns, filing applications for permits or licenses, or filing incorporation papers, nor shall it prohibit the former officer or public servant from receiving public funds disbursed through entitlement programs.

KRS 11A.040 (9) states:

A former public servant shall not represent a person or business before a state agency in a matter in which the former public servant was directly involved during the last thirty-six (36) months of his tenure, for a period of one (1) year after the latter of:

- a) The date of leaving office or termination of employment; or
- b) The date the term of office expires to which the public servant was elected.

This law is intended to promote public confidence in the integrity of state government and to declare as public policy the idea that state employees should view their work as a public trust and not as a way to obtain private benefits.

If you have worked for the executive branch of state government within the past six months, you may be subject to the law's prohibitions. The law's applicability may be different if you hold elected office or are contemplating representation of another before a state agency.

Also, if you are affiliated with a firm which does business with the state and which employs former state executive-branch employees, you should be aware that the law may apply to them.

In case of doubt, the law permits you to request an advisory opinion from the Executive Branch Ethics Commission, 3 Fountain Place, Frankfort, Kentucky 40601; telephone (502) 564-7954.

Revised: January 27, 2017

Kentucky Equal Employment Opportunity Act of 1978

The requirements of the Kentucky Equal Employment Opportunity Act of 1978 (KRS 45.560-45.640) shall apply to this Contract. The apparent low Bidder will be required to submit EEO forms to the Division of Construction Procurement, which will then forward to the Finance and Administration Cabinet for review and approval. No award will become effective until all forms are submitted and EEO/CC has certified compliance. The required EEO forms are as follows:

- EEO-1: Employer Information Report
- Affidavit of Intent to Comply
- Employee Data Sheet
- Subcontractor Report

These forms are available on the Finance and Administration's web page under ***Vendor Information, Standard Attachments and General Terms*** at the following address:
<https://www.eProcurement.ky.gov>.

Bidders currently certified as being in compliance by the Finance and Administration Cabinet may submit a copy of their approval letter in lieu of the referenced EEO forms.

For questions or assistance please contact the Finance and Administration Cabinet by email at **finance.contractcompliance@ky.gov** or by phone at 502-564-2874.

EMPLOYEE RIGHTS

UNDER THE FAIR LABOR STANDARDS ACT

THE UNITED STATES DEPARTMENT OF LABOR WAGE AND HOUR DIVISION

FEDERAL MINIMUM WAGE

\$7.25

 PER HOUR

BEGINNING JULY 24, 2009

OVERTIME PAY

At least 1½ times your regular rate of pay for all hours worked over 40 in a workweek.

CHILD LABOR

An employee must be at least **16** years old to work in most non-farm jobs and at least **18** to work in non-farm jobs declared hazardous by the Secretary of Labor.

Youths **14** and **15** years old may work outside school hours in various non-manufacturing, non-mining, non-hazardous jobs under the following conditions:

No more than

- **3** hours on a school day or **18** hours in a school week;
- **8** hours on a non-school day or **40** hours in a non-school week.

Also, work may not begin before **7 a.m.** or end after **7 p.m.**, except from June 1 through Labor Day, when evening hours are extended to **9 p.m.** Different rules apply in agricultural employment.

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TIP CREDIT

Employers of “tipped employees” must pay a cash wage of at least \$2.13 per hour if they claim a tip credit against their minimum wage obligation. If an employee's tips combined with the employer's cash wage of at least \$2.13 per hour do not equal the minimum hourly wage, the employer must make up the difference. Certain other conditions must also be met.

ENFORCEMENT

The Department of Labor may recover back wages either administratively or through court action, for the employees that have been underpaid in violation of the law. Violations may result in civil or criminal action.

Employers may be assessed civil money penalties of up to \$1,100 for each willful or repeated violation of the minimum wage or overtime pay provisions of the law and up to \$11,000 for each employee who is the subject of a violation of the Act's child labor provisions. In addition, a civil money penalty of up to \$50,000 may be assessed for each child labor violation that causes the death or serious injury of any minor employee, and such assessments may be doubled, up to \$100,000, when the violations are determined to be willful or repeated. The law also prohibits discriminating against or discharging workers who file a complaint or participate in any proceeding under the Act.

ADDITIONAL INFORMATION

- Certain occupations and establishments are exempt from the minimum wage and/or overtime pay provisions.
- Special provisions apply to workers in American Samoa and the Commonwealth of the Northern Mariana Islands.
- Some state laws provide greater employee protections; employers must comply with both.
- The law requires employers to display this poster where employees can readily see it.
- Employees under 20 years of age may be paid \$4.25 per hour during their first 90 consecutive calendar days of employment with an employer.
- Certain full-time students, student learners, apprentices, and workers with disabilities may be paid less than the minimum wage under special certificates issued by the Department of Labor.

For additional information:



1-866-4-USWAGE

(1-866-487-9243)

TTY: 1-877-889-5627



WWW.WAGEHOUR.DOL.GOV

U.S. Department of Labor | Wage and Hour Division

PART IV
INSURANCE

INSURANCE

The Contractor shall procure and maintain the following insurance in addition to the insurance required by law:

- 1) Commercial General Liability-Occurrence form – not less than \$2,000,000 General aggregate, \$2,000,000 Products & Completed Aggregate, \$1,000,000 Personal & Advertising, \$1,000,000 each occurrence.
- 2) Automobile Liability- \$1,000,000 per accident
- 3) Employers Liability:
 - a) \$100,000 Each Accident Bodily Injury
 - b) \$500,000 Policy limit Bodily Injury by Disease
 - c) \$100,000 Each Employee Bodily Injury by Disease
- 4) The insurance required above must be evidenced by a Certificate of Insurance and this Certificate of Insurance must contain one of the following statements:
 - a) "policy contains no deductible clauses."
 - b) "policy contains _____ (amount) deductible property damage clause but company will pay claim and collect the deductible from the insured."
- 5) **KENTUCKY WORKMEN'S COMPENSATION INSURANCE.** The contractor shall furnish evidence of coverage of all his employees or give evidence of self-insurance by submitting a copy of a certificate issued by the Workmen's Compensation Board.

The cost of insurance is incidental to all contract items. All subcontractors must meet the same minimum insurance requirements.

PART V
BID ITEMS

PROPOSAL BID ITEMS

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Section: 0001 - PAVING

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
0010	00003		CRUSHED STONE BASE	88,018.00	TON		\$	
0020	00013		LIME STABILIZED ROADBED	127,063.00	SQYD		\$	
0030	00014		LIME	2,402.00	TON		\$	
0040	00100		ASPHALT SEAL AGGREGATE	467.00	TON		\$	
0050	00103		ASPHALT SEAL COAT	56.00	TON		\$	
0060	00190		LEVELING & WEDGING PG64-22	920.00	TON		\$	
0070	00212		CL2 ASPH BASE 1.00D PG64-22	7,477.00	TON		\$	
0080	00214		CL3 ASPH BASE 1.00D PG64-22	36,221.00	TON		\$	
0090	00301		CL2 ASPH SURF 0.38D PG64-22	4,216.00	TON		\$	
0100	00356		ASPHALT MATERIAL FOR TACK	50.00	TON		\$	
0110	00358		ASPHALT CURING SEAL	127.00	TON		\$	
0120	00388		CL3 ASPH SURF 0.38B PG64-22	10,448.00	TON		\$	
0130	02677		ASPHALT PAVE MILLING & TEXTURING	3,919.00	TON		\$	
0140	02702		SAND FOR BLOTTER	318.00	TON		\$	
0150	23307EC		CL3 ASPH SURF NO.4B PG64-22	2,627.00	TON		\$	
0160	24785EC		FIBER REINFORCEMENT FOR HMA	1,705.00	TON		\$	

Section: 0002 - ROADWAY

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
0170	00078		CRUSHED AGGREGATE SIZE NO 2	20,000.00	TON		\$	
0180	01891		ISLAND HEADER CURB TYPE 2	150.00	LF		\$	
0190	01904		REMOVE CURB	93.00	LF		\$	
0200	01917		STANDARD BARRIER MEDIAN TYPE 2	58.00	SQYD		\$	
0210	01923		STANDARD BARRIER MEDIAN TYPE 5	719.00	SQYD		\$	
0220	01982		DELINEATOR FOR GUARDRAIL MONO DIRECTIONAL WHITE	34.00	EACH		\$	
0230	01983		DELINEATOR FOR GUARDRAIL MONO DIRECTIONAL YELLOW	3.00	EACH		\$	
0240	02014		BARRICADE-TYPE III	50.00	EACH		\$	
0250	02058		REMOVE PCC PAVEMENT	299.00	SQYD		\$	
0260	02159		TEMP DITCH	12,784.00	LF		\$	
0270	02160		CLEAN TEMP DITCH	5,642.00	LF		\$	
0280	02200		ROADWAY EXCAVATION	260,756.00	CUYD		\$	
0290	02231		STRUCTURE GRANULAR BACKFILL	208.00	CUYD		\$	
0300	02242		WATER (FOR DUST CONTROL)	1,850.00	MGAL		\$	
0310	02262		FENCE-WOVEN WIRE TYPE 1	2,500.00	LF		\$	
0320	02351		GUARDRAIL-STEEL W BEAM-S FACE	2,200.00	LF		\$	
0330	02360		GUARDRAIL TERMINAL SECTION NO 1	2.00	EACH		\$	
0340	02363		GUARDRAIL CONNECTOR TO BRIDGE END TY A	4.00	EACH		\$	
0350	02367		GUARDRAIL END TREATMENT TYPE 1	5.00	EACH		\$	
0360	02381		REMOVE GUARDRAIL	1,861.00	LF		\$	
0370	02383		REMOVE & RESET GUARDRAIL	100.00	LF		\$	
0380	02387		GUARDRAIL CONNECTOR TO BRIDGE END TY A-1	3.00	EACH		\$	

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LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
0390	02429		RIGHT-OF-WAY MONUMENT TYPE 1	4.00	EACH		\$	
0400	02432		WITNESS POST	4.00	EACH		\$	
0410	02471		FILL AND CAP SINKHOLE	2.00	EACH		\$	
0420	02483		CHANNEL LINING CLASS II	4,240.00	TON		\$	
0430	02484		CHANNEL LINING CLASS III	4,117.00	TON		\$	
0440	02545		CLEARING AND GRUBBING (APPROXIMATELY 61.63 ACRES)	1.00	LS		\$	
0450	02555		CONCRETE-CLASS B	1.00	CUYD		\$	
0460	02562		TEMPORARY SIGNS	650.00	SQFT		\$	
0470	02585		EDGE KEY	1,144.00	LF		\$	
0480	02596		FABRIC-GEOTEXTILE TYPE I	8,527.00	SQYD		\$	
0490	02599		FABRIC-GEOTEXTILE TYPE IV	49,280.00	SQYD		\$	
0500	02650		MAINTAIN & CONTROL TRAFFIC	1.00	LS		\$	
0510	02671		PORTABLE CHANGEABLE MESSAGE SIGN	6.00	EACH		\$	
0520	02676		MOBILIZATION FOR MILL & TEXT	1.00	LS		\$	
0530	02690		SAFELOADING	4.00	CUYD		\$	
0540	02696		SHOULDER RUMBLE STRIPS	80,000.00	LF		\$	
0550	02700		SAND	1.00	TON		\$	
0560	02701		TEMP SILT FENCE	12,784.00	LF		\$	
0570	02703		SILT TRAP TYPE A	83.00	EACH		\$	
0580	02704		SILT TRAP TYPE B	83.00	EACH		\$	
0590	02705		SILT TRAP TYPE C	83.00	EACH		\$	
0600	02706		CLEAN SILT TRAP TYPE A	83.00	EACH		\$	
0610	02707		CLEAN SILT TRAP TYPE B	83.00	EACH		\$	
0620	02708		CLEAN SILT TRAP TYPE C	83.00	EACH		\$	
0630	02726		STAKING	1.00	LS		\$	
0640	05950		EROSION CONTROL BLANKET	60,484.00	SQYD		\$	
0650	05952		TEMP MULCH	267,265.00	SQYD		\$	
0660	05953		TEMP SEEDING AND PROTECTION	200,449.00	SQYD		\$	
0670	05963		INITIAL FERTILIZER	9.00	TON		\$	
0680	05964		20-10-10 FERTILIZER	14.00	TON		\$	
0690	05985		SEEDING AND PROTECTION	209,810.00	SQYD		\$	
0700	05989		SPECIAL SEEDING CROWN VETCH	20,361.00	SQYD		\$	
0710	05992		AGRICULTURAL LIMESTONE	168.00	TON		\$	
0720	06510		PAVE STRIPING-TEMP PAINT-4 IN	51,134.00	LF		\$	
0730	06514		PAVE STRIPING-PERM PAINT-4 IN	125,530.00	LF		\$	
0740	06568		PAVE MARKING-THERMO STOP BAR-24IN	767.00	LF		\$	
0750	06569		PAVE MARKING-THERMO CROSS-HATCH	46,956.00	SQFT		\$	
0760	06572		PAVE MARKING-DOTTED LANE EXTEN	588.00	LF		\$	
0770	06574		PAVE MARKING-THERMO CURV ARROW	91.00	EACH		\$	
0780	06575		PAVE MARKING-THERMO COMB ARROW	1.00	EACH		\$	
0790	06589		PAVEMENT MARKER TYPE V-MW	222.00	EACH		\$	
0800	06591		PAVEMENT MARKER TYPE V-BY	176.00	EACH		\$	
0810	06592		PAVEMENT MARKER TYPE V-B W/R	323.00	EACH		\$	
0820	10020NS		FUEL ADJUSTMENT	222,111.00	DOLL	\$1.00	\$	\$222,111.00
0830	10030NS		ASPHALT ADJUSTMENT	244,307.00	DOLL	\$1.00	\$	\$244,307.00
0840	20071EC		JOINT ADHESIVE	12,040.00	LF		\$	
0850	20191ED		OBJECT MARKER TY 3	5.00	EACH		\$	
0860	20360ES818		WOOD POST	2.00	EACH		\$	
0870	20550ND		SAWCUT PAVEMENT	13,030.00	LF		\$	

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LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
0880	21289ED		LONGITUDINAL EDGE KEY	12,040.00	LF		\$	
0890	22045NN		FLUME INLET TY 2-MOD	2.00	EACH		\$	
0900	22664EN		WATER BLASTING EXISTING STRIPE	25,567.00	LF		\$	
0910	23607EC		PAVE MARK THERMO-LANE REDUCTION ARROW	3.00	EACH		\$	
0920	23911EC		GROUT	78.00	CUYD		\$	
0930	24489EC		INLAID PAVEMENT MARKER	721.00	EACH		\$	
0940	24679ED		PAVE MARK THERMO CHEVRON	65,783.00	SQFT		\$	

Section: 0003 - DRAINAGE

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
0950	00078		CRUSHED AGGREGATE SIZE NO 2	8.00	TON		\$	
0960	00440		ENTRANCE PIPE-15 IN	74.00	LF		\$	
0970	00445		ENTRANCE PIPE-30 IN	173.00	LF		\$	
0980	00462		CULVERT PIPE-18 IN	303.00	LF		\$	
0990	00464		CULVERT PIPE-24 IN	293.00	LF		\$	
1000	00466		CULVERT PIPE-30 IN	551.00	LF		\$	
1010	00468		CULVERT PIPE-36 IN	16.00	LF		\$	
1020	00469		CULVERT PIPE-42 IN	76.00	LF		\$	
1030	00470		CULVERT PIPE-48 IN	59.00	LF		\$	
1040	00471		CULVERT PIPE-54 IN	162.00	LF		\$	
1050	00521		STORM SEWER PIPE-15 IN	5,132.00	LF		\$	
1060	00522		STORM SEWER PIPE-18 IN	2,970.00	LF		\$	
1070	00524		STORM SEWER PIPE-24 IN	3,427.00	LF		\$	
1080	00526		STORM SEWER PIPE-30 IN	94.00	LF		\$	
1090	00528		STORM SEWER PIPE-36 IN	79.00	LF		\$	
1100	01000		PERFORATED PIPE-4 IN	17,442.00	LF		\$	
1110	01010		NON-PERFORATED PIPE-4 IN	5,338.00	LF		\$	
1115	01015		INSPECT & CERTIFY EDGE DRAIN SYSTEM (ADDED: 5-17-18)	1.00	LS		\$	
1120	01028		PERF PIPE HEADWALL TY 3-4 IN	8.00	EACH		\$	
1130	01204		PIPE CULVERT HEADWALL-18 IN	7.00	EACH		\$	
1140	01208		PIPE CULVERT HEADWALL-24 IN	7.00	EACH		\$	
1150	01210		PIPE CULVERT HEADWALL-30 IN	9.00	EACH		\$	
1160	01212		PIPE CULVERT HEADWALL-36 IN	2.00	EACH		\$	
1170	01214		PIPE CULVERT HEADWALL-42 IN	1.00	EACH		\$	
1180	01216		PIPE CULVERT HEADWALL-48 IN	1.00	EACH		\$	
1190	01370		METAL END SECTION TY 1-15 IN	4.00	EACH		\$	
1200	01374		METAL END SECTION TY 1-30 IN	8.00	EACH		\$	
1210	01433		SLOPED BOX OUTLET TYPE 1-18 IN	3.00	EACH		\$	
1220	01444		SLOPED AND PARALLEL HEADWALL-18 IN	1.00	EACH		\$	
1230	01450		S & F BOX INLET-OUTLET-18 IN	1.00	EACH		\$	
1240	01456		CURB BOX INLET TYPE A	9.00	EACH		\$	
1250	01490		DROP BOX INLET TYPE 1	3.00	EACH		\$	
1260	01494		DROP BOX INLET TYPE 2 MOD	1.00	EACH		\$	
1270	01508		DROP BOX INLET TYPE 5C	31.00	EACH		\$	
1280	01509		DROP BOX INLET TYPE 5C MOD	6.00	EACH		\$	
1290	01538		DROP BOX INLET TYPE 7	1.00	EACH		\$	

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LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
1300	01539		DROP BOX INLET TYPE 7 MOD	3.00	EACH		\$	
1310	01542		DROP BOX INLET TYPE 10 MOD	43.00	EACH		\$	
1320	01650		JUNCTION BOX	2.00	EACH		\$	
1330	01720		RECONSTRUCT INLET	1.00	EACH		\$	
1340	01740		CORED HOLE DRAINAGE BOX CON-4 IN	46.00	EACH		\$	
1350	02600		FABRIC GEOTEXTILE TY IV FOR PIPE	15,720.00	SQYD	\$2.00	\$	\$31,440.00
1360	08100		CONCRETE-CLASS A	19.00	CUYD		\$	
1370	21799EN		BORE AND JACK PIPE-24 IN	105.00	LF		\$	
1380	21800EN		BORE AND JACK PIPE-30 IN	74.00	LF		\$	
1390	24026EC		PIPE CULVERT HEADWALL-54 IN	2.00	EACH		\$	
1400	24186EC		BORE AND JACK PIPE-36 IN	66.00	LF		\$	
1410	24668EC		STEEL ENCASEMENT PIPE (24-IN)	105.00	LF		\$	
1420	24668EC		STEEL ENCASEMENT PIPE (30-IN)	74.00	LF		\$	
1430	24668EC		STEEL ENCASEMENT PIPE (36-IN)	66.00	LF		\$	
1440	24814EC		PIPELINE INSPECTION	15,678.00	LF		\$	

Section: 0004 - BRIDGE - P & L RR - DWG. 27738

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
1450	02231		STRUCTURE GRANULAR BACKFILL	215.00	CUYD		\$	
1460	02998		MASONRY COATING	437.00	SQYD		\$	
1470	03299		ARMORED EDGE FOR CONCRETE	79.70	LF		\$	
1480	08001		STRUCTURE EXCAVATION-COMMON	225.00	CUYD		\$	
1490	08016		REINF CONC SLOPE WALL-6 IN	677.00	SQYD		\$	
1500	08033		TEST PILES	229.00	LF		\$	
1510	08046		PILES-STEEL HP12X53	1,827.00	LF		\$	
1520	08094		PILE POINTS-12 IN	40.00	EACH		\$	
1530	08100		CONCRETE-CLASS A	204.90	CUYD		\$	
1540	08104		CONCRETE-CLASS AA	238.20	CUYD		\$	
1550	08150		STEEL REINFORCEMENT	24,917.00	LB		\$	
1560	08151		STEEL REINFORCEMENT-EPOXY COATED	73,369.00	LB		\$	
1570	08632		PRECAST PC I BEAM TYPE 2	799.20	LF		\$	
1580	21532ED		RAIL SYSTEM TYPE III	326.10	LF		\$	
1590	23813EC		DECK DRAIN	6.00	EACH		\$	

Section: 0005 - BRIDGE - CULVERT #1 - RCBC 8' X 4' - STA. 299+15 - DWG. 27786

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
1600	02403		REMOVE CONCRETE MASONRY	1.00	CUYD		\$	
1610	08002		STRUCTURE EXCAV-SOLID ROCK	33.00	CUYD		\$	
1620	08003		FOUNDATION PREPARATION	1.00	LS		\$	
1630	08100		CONCRETE-CLASS A	60.30	CUYD		\$	
1640	08150		STEEL REINFORCEMENT	4,697.00	LB		\$	

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Section: 0006 - BRIDGE - CULVERT #2 - RCBC 8' X 4' - STA. 316+41.9 - DWG. 27787

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
1650	02403		REMOVE CONCRETE MASONRY	1.00	CUYD		\$	
1660	08002		STRUCTURE EXCAV-SOLID ROCK	24.00	CUYD		\$	
1670	08003		FOUNDATION PREPARATION	1.00	LS		\$	
1680	08100		CONCRETE-CLASS A	41.30	CUYD		\$	
1690	08150		STEEL REINFORCEMENT	3,038.00	LB		\$	

Section: 0007 - BRIDGE - CULVERT #3 - RCBC 8' X 6' - STA. 332+46.6 - DWG. 27788

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
1700	02403		REMOVE CONCRETE MASONRY	1.00	CUYD		\$	
1710	08002		STRUCTURE EXCAV-SOLID ROCK	5.00	CUYD		\$	
1720	08003		FOUNDATION PREPARATION	1.00	LS		\$	
1730	08100		CONCRETE-CLASS A	60.50	CUYD		\$	
1740	08150		STEEL REINFORCEMENT	4,394.00	LB		\$	

Section: 0008 - SEWER

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
1750	15094		S MANHOLE ADJUST TO GRADE	1.00	EACH		\$	
1760	15503		S ENCASMENT STEEL OPEN CUT RANGE 3 INST	639.00	LF		\$	
1770	15504		S ENCASMENT STEEL OPEN CUT RANGE 4 INST	335.00	LF		\$	
1780	15505		S ENCASMENT STEEL OPEN CUT RANGE 5 INST	122.00	LF		\$	

Section: 0009 - WATERLINE

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
1790	14002		W AIR RELEASE VALVE SPECIAL	1.00	EACH		\$	
1800	14014		W ENCASMENT STEEL OPEN CUT RANGE 3	90.00	LF		\$	
1810	14016		W ENCASMENT STEEL OPEN CUT RANGE 5	76.00	LF		\$	
1820	14040		W PIPE DUCTILE IRON 16 INCH	700.00	LF		\$	
1830	14098		W TIE-IN 16 INCH	2.00	EACH		\$	
1840	14109		W VALVE 16 INCH	2.00	EACH		\$	

Section: 0010 - DEMOBILIZATION &/OR MOBILIZATION

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
1850	02568		MOBILIZATION	1.00	LS		\$	
1860	02569		DEMOBILIZATION	1.00	LS		\$	