CALL NO. 200

CONTRACT ID. 221059

BOONE COUNTY

FED/STATE PROJECT NUMBER 121GR22D059- STP

DESCRIPTION DONALDSON HIGHWAY(KY-236)

WORK TYPE GRADE & DRAIN WITH ASPHALT SURFACE

PRIMARY COMPLETION DATE 9/30/2025

LETTING DATE: December 08,2022

Sealed Bids will be received electronically through the Bid Express bidding service until 10:00 AM EASTERN STANDARD TIME December 08,2022. Bids will be publicly announced at 10:00 AM EASTERN STANDARD TIME.

PLANS AVAILABLE FOR THIS PROJECT.

DBE CERTIFICATION REQUIRED - 11.50%

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

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PART V BID ITEMS

PART I

SCOPE OF WORK

ADMINISTRATIVE DISTRICT - 06

CONTRACT ID - 221059

121GR22D059- STP

COUNTY - BOONE

PCN - DE00802362259
STP 3002(326)

DONALDSON HIGHWAY(KY-236) IMPROVE SAFETY AND REDUCE CONGESTION ALONG KY-236 (DONALDSON ROAD)
FROM KY-842 (HOUSTON ROAD) TO KY-3076 (MINEOLA PIKE), A DISTANCE OF 02.02 MILES.GRADE & DRAIN WITH ASPHALT SURFACE SYP NO. 06-00444.00.

GEOGRAPHIC COORDINATES LATITUDE 39:02:56.00 LONGITUDE 84:37:58.00

ADT

PCN - DE05903262259
STP 3002(326)

DONALDSON HIGHWAY(KY-236) IMPROVE SAFETY AND REDUCE CONGESTION ALONG KY-236 (DONALDSON ROAD)
FROM KY-842 (HOUSTON ROAD) TO KY-3076, A DISTANCE OF 0.09 MILES.GRADE & DRAIN WITH ASPHALT SURFACE SYP NO. 06-00444.00.

GEOGRAPHIC COORDINATES LATITUDE 39:02:56.00 LONGITUDE 84:37:58.00

ADT

COMPLETION DATE(S):

COMPLETED BY 09/30/2025 APPLIES TO ENTIRE PROJECT

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.

BUILD AMERICA, BUY AMERICA ACT (BABA)

On November 15, 2021, President Biden signed into law the Infrastructure Investment and Jobs Act (IIJA), Pub. L. No. 117-58, includes the Build America, Buy America Act ("the Act"). Pub. L. No. 117-58, §§70901-52. The Act strengthens the Buy America preference to include "construction materials." The current temporary waiver for **"construction materials"** will expire on November 10, 2022.

The Act will apply to construction materials as outlined in the guidance issued in OMB M-22-11.

Construction Materials – Includes an article, material, or supply – other than an item of primarily iron or steel; a manufactured product; cement and cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives – that is or consists primarily of:

- Non-ferrous metals
- Plastic/polymer-based products (including polyvinylchloride, composite building materials, and polymers used in fiber optic cables);
- Glass (including optic glass);
- Lumber; or
- Drywall.

Construction Materials only applies to items, materials, and supplies that are consumed in, incorporated into, or affixed to an infrastructure project.

Construction Materials does not apply to tools, equipment or supplies brought to the jobsite and removed before completion.

FEDERAL CONTRACT NOTES

The Kentucky Department of Highways, in accordance with the Regulations of the United States Department of Transportation 23 CFR 635.112 (h), hereby notifies all bidders that failure by a bidder to comply with all applicable sections of the current Kentucky Standard Specifications, including, but not limited to the following, may result in a bid not being considered responsive and thus not eligible to be considered for award:

102.02 Current Rating
102.13 Irregular Bid Proposals
102.09 Proposal Guaranty
102.08 Preparation and Delivery of Proposals
102.14 Disqualification of Bidders

CIVIL RIGHTS ACT OF 1964

The Kentucky Transportation Cabinet, Department of Highways, in accordance with the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252, 42 U.S.C. §§ 2000d to 2000d-4) and the Regulations, hereby notifies all bidders that it will affirmatively ensure that any contract entered into pursuant to this advertisement, disadvantaged business enterprises will be afforded full and fair opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, national origin, sex, age (over 40), religion, sexual orientation, gender identity, veteran status, disability, income- level, or Limited English Proficiency (LEP)in consideration for an award.

NOTICE TO ALL BIDDERS

To report bid rigging activities call: 1-800-424-9071.

The U.S. Department of Transportation (DOT) operates the above toll-free “hotline” Monday through Friday, 8:00 a.m. to 5:00 p.m. eastern time. Anyone with knowledge of possible bid rigging, bidder collusion, or other fraudulent activities should use the “hotline” to report such activities.

The “hotline” is part of the DOT’s continuing effort to identify and investigate highway construction contract fraud and abuse and is operated under the direction of the DOT Inspector General. All information will be treated confidentially and caller anonymity will be respected.

SECOND TIER SUBCONTRACTS

Second tier subcontracts are acceptable per Section 108.01 of the Standard Specifications for Road and Bridge Construction. Sub-Contractors fulfilling a disadvantaged business enterprise goal on a project may enter into a 2nd tier subcontract with a Non-DBE Subcontractor. However, in this instance, none of the work subcontracted to the Non-DBE Contractor will count toward fulfilling the established Disadvantaged Goal for the project.

DISADVANTAGED BUSINESS ENTERPRISE PROGRAM

It is the policy of the Kentucky Transportation Cabinet ("the Cabinet") that Disadvantaged Business Enterprises ("DBE") shall have the opportunity to participate in the performance of highway construction projects financed in whole or in part by Federal Funds in order to create a level playing field for all businesses who wish to contract with the Cabinet. To that end, the Cabinet will comply with the regulations found in 49 CFR Part 26, and the definitions and requirements contained therein shall be adopted as if set out verbatim herein.

The Cabinet, contractors, subcontractors, and sub-recipients shall not discriminate on the basis of race, color, national origin, or sex in the performance of work performed pursuant to Cabinet contracts. The contractor shall carry out applicable requirements of 49 CFR 26 in the award and administration of federally assisted highway construction projects. The contractor will include this provision in all its subcontracts and supply agreements pertaining to contracts with the Cabinet.

Failure by the contractor to carry out these requirements is a material breach of its contract with the Cabinet, which may result in the termination of the contract or such other remedy as the Cabinet deems necessary.

DBE GOAL

The Disadvantaged Business Enterprise (DBE) goal established for this contract, as listed on the front page of the proposal, is the percentage of the total value of the contract.

The contractor shall exercise all necessary and reasonable steps to ensure that Disadvantaged Business Enterprises participate in a least the percent of the contract as set forth above as goals for this contract.

OBLIGATION OF CONTRACTORS

Each contractor prequalified to perform work on Cabinet projects shall designate and make known to the Cabinet a liaison officer who is assigned the responsibility of effectively administering and promoting an active program for utilization of DBEs.

If a formal goal has not been designated for the contract, all contractors are encouraged to consider DBEs for subcontract work as well as for the supply of material and services needed to perform this work.

Contractors are encouraged to use the services of banks owned and controlled by minorities and women.

CERTIFICATION OF CONTRACT GOAL

Contractors shall include the following certification in bids for projects for which a DBE goal has been established. BIDS SUBMITTED WHICH DO NOT INCLUDE CERTIFICATION OF DBE PARTICIPATION WILL NOT BE ACCEPTED. These bids will not be considered for award by the Cabinet and they will be returned to the bidder.

"The bidder certifies that it has secured participation by Disadvantaged Business Enterprises ("DBE") in the amount of_____percent of the total value of this contract and that the DBE participation is in compliance with the requirements of 49 CFR 26 and the policies of the Kentucky Transportation Cabinet pertaining to the DBE Program."

The certification statement is located in the electronic bid file. All contractors must certify their DBE participation on that page. DBEs utilized in achieving the DBE goal must be certified and prequalified for the work items at the time the bid is submitted.

DBE PARTICIPATION PLAN

Lowest responsive bidders must submit the *DBE Plan/ Subcontractor Request*, form TC 14-35 DBE, within 5 days of the letting. This is necessary before the Awards Committee will review and make a recommendation. **The project will not be considered for award prior to submission and approval of the apparent low bidder's DBE Plan/Subcontractor Request.**

The DBE Participation Plan shall include the following:

1. Name and address of DBE Subcontractor(s) and/or supplier(s) intended to be used in the proposed project;
2. Description of the work each is to perform including the work item, unit, quantity, unit price and total amount of the work to be performed by the individual DBE. The Proposal Line Number, Category Number, and the Project Line Number can be found in the "material listing" on the Construction Procurement website under the specific letting;
3. The dollar value of each proposed DBE subcontract and the percentage of total project contract value this represents. DBE participation may be counted as follows;
   a. If DBE suppliers and manufactures assume actual and contractual responsibility, the dollar value of materials to be furnished will be counted toward the goal as follows:
      - The entire expenditure paid to a DBE manufacturer;
      - 60 percent of expenditures to DBE suppliers that are not manufacturers provided the supplier is a regular dealer in the product involved. A regular dealer must be engaged in, as its principal business and in its own name, the sale of products to the public, maintain an inventory and own and operate distribution equipment; and
      - The amount of fees or commissions charged by the DBE firms for a bona fide service, such as professional, technical, consultant, or managerial services and assistance in the procurement of essential personnel, facilities, equipment, materials, supplies, delivery of materials and supplies or for furnishing bonds, or insurance, providing such fees or commissions are determined to be reasonable and customary.

b) The dollar value of services provided by DBEs such as quality control testing, equipment repair and maintenance, engineering, staking, etc.;
c) The dollar value of joint ventures. DBE credit for joint ventures will be limited to the dollar amount of the work actually performed by the DBE in the joint venture;

4. Written and signed documentation of the bidder's commitment to use a DBE contractor whose participation is being utilized to meet the DBE goal; and
5. Written and signed confirmation from the DBE that it is participating in the contract as provided in the prime contractor's commitment.

UPON AWARD AND BEFORE A WORK ORDER WILL BE ISSUED

Contractors must submit the signed subcontract between the contractor and the DBE contractor, along with the DBE's certificate of insurance. If the DBE is a supplier of materials for the project, a signed purchase order must be submitted to the Division of Construction Procurement.

Changes to DBE Participation Plans must be approved by the Cabinet. The Cabinet may consider extenuating circumstances including, but not limited to, changes in the nature or scope of the project, the inability or unwillingness of a DBE to perform the work in accordance with the bid, and/or other circumstances beyond the control of the prime contractor.

CONSIDERATION OF GOOD FAITH EFFORTS REQUESTS

If the DBE participation submitted in the bid by the apparent lowest responsive bidder does not meet or exceed the DBE contract goal, the apparent lowest responsive bidder must submit a Good Faith Effort Package to satisfy the Cabinet that sufficient good faith efforts were made to meet the contract goals prior to submission of the bid. Efforts to increase the goal after bid submission will not be considered in justifying the good faith effort, unless the contractor can show that the proposed DBE was solicited prior to the letting date. DBEs utilized in achieving the DBE goal must be certified and prequalified for the work items at the time the bid is submitted. One complete set (hard copy along with an electronic copy) of this information must be received in the Division of Contract Procurement no later than 12:00 noon of the tenth calendar day after receipt of notification that they are the apparent low bidder.

Where the information submitted includes repetitious solicitation letters it will be acceptable to submit a sample representative letter along with a distribution list of the firms solicited. Documentation of DBE quotations shall be a part of the good faith effort submittal as necessary to demonstrate compliance with the factors listed below which the Cabinet considers in judging good faith efforts. This documentation may include written subcontractors' quotations, telephone log notations of verbal quotations, or other types of quotation documentation.

The Good Faith Effort Package shall include, but may not be limited to information showing evidence of the following:

1. Whether the bidder attended any pre-bid meetings that were scheduled by the Cabinet to inform DBEs of subcontracting opportunities;
2. Whether the bidder provided solicitations through all reasonable and available means;
3. Whether the bidder provided written notice to all DBEs listed in the DBE directory at the time of the letting who are prequalified in the areas of work that the bidder will be subcontracting;
4. Whether the bidder followed up initial solicitations of interest by contacting DBEs to determine with certainly whether they were interested. If a reasonable amount of DBEs within the targeted districts do not provide an intent to quote or no DBEs are prequalified in the subcontracted areas, the bidder must notify the Disadvantaged Enterprise Business Liaison Officer (DEBLO) in the Office for Civil Rights and Small Business Development to give notification of the bidder's inability to get DBE quotes;
5. Whether the bidder selected portions of the work to be performed by DBEs in order to increase the likelihood of meeting the contract goals. This includes, where appropriate, breaking out contract work items into economically feasible units to facilitate DBE participation, even when the prime contractor might otherwise perform these work items with its own forces;
6. Whether the bidder provided interested DBEs with adequate and timely information about the plans, specifications, and requirements of the contract;
7. Whether the bidder negotiated in good faith with interested DBEs not rejecting them as unqualified without sound reasons based on a thorough investigation of their capabilities. Any rejection should be so noted in writing with a description as to why an agreement could not be reached;
8. Whether quotations were received from interested DBE firms but were rejected as unacceptable without sound reasons why the quotations were considered unacceptable. The fact that the DBE firm's quotation for the work is not the lowest quotation received will not in itself be considered as a sound reason for rejecting the quotation as unacceptable. The fact that the bidder has the ability and/or desire to perform the contract work with its own forces will not be considered a sound reason for rejecting a DBE quote. Nothing in this provision shall be construed to require the bidder to accept unreasonable quotes in order to satisfy DBE goals;
9. Whether the bidder specifically negotiated with subcontractors to assume part of the responsibility to meet the contract DBE goal when the work to be subcontracted includes potential DBE participation;
10. Whether the bidder made any efforts and/or offered assistance to interested DBEs in obtaining the necessary equipment, supplies, materials, insurance and/or bonding to satisfy the work requirements of the bid proposal; and
11. Any other evidence that the bidder submits which may show that the bidder has made reasonable good faith efforts to include DBE participation.

FAILURE TO MEET GOOD FAITH REQUIREMENT

Where the apparent lowest responsive bidder fails to submit sufficient participation by DBE firms to meet the contract goal and upon a determination by the Good Faith Committee based upon the information submitted that the apparent lowest responsive bidder failed to make sufficient reasonable efforts to meet the contract goal, the bidder will be offered the opportunity to meet in person for administrative reconsideration. The bidder will be notified of the Committee's decision within 24 hours of its decision. The bidder will have 24 hours to request reconsideration of the Committee's decision. The reconsideration meeting will be held within two days of the receipt of a request by the bidder for reconsideration.

The request for reconsideration will be heard by the Office of the Secretary. The bidder will have the opportunity to present written documentation or argument concerning the issue of whether it met the goal or made an adequate good faith effort. The bidder will receive a written decision on the reconsideration explaining the basis for the finding that the bidder did or did not meet the goal or made adequate Good Faith efforts to do so.

The result of the reconsideration process is not administratively appealable to the Cabinet or to the United States Department of Transportation.

The Cabinet reserves the right to award the contract to the next lowest responsive bidder or to rebid the contract in the event that the contract is not awarded to the low bidder as the result of a failure to meet the good faith requirement.

SANCTIONS FOR FAILURE TO MEET DBE REQUIREMENTS OF THE PROJECT

Failure by the prime contractor to fulfill the DBE requirements of a project under contract or to demonstrate good faith efforts to meet the goal constitutes a breach of contract. When this occurs, the Cabinet will hold the prime contractor accountable, as would be the case with all other contract provisions. Therefore, the contractor's failure to carry out the DBE contract requirements shall constitute a breach of contract and as such the Cabinet reserves the right to exercise all administrative remedies at its disposal including, but not limited to the following:

- Suspension of Prequalification;
- Disallow credit toward the DBE goal;
- Withholding progress payments;
- Withholding payment to the prime in an amount equal to the unmet portion of the contract goal; and/or
- Termination of the contract.

PROMPT PAYMENT

The prime contractor will be required to pay the DBE and Non-DBE Subcontractors within seven (7) working days after he or she has received payment from the Kentucky Transportation Cabinet for work performed or materials furnished.

CONTRACTOR REPORTING

All contractors must keep detailed records and provide reports to the Cabinet on their progress in meeting the DBE requirement on any highway contract. These records may include, but shall not be limited to payroll, lease agreements, cancelled payroll checks, executed subcontracting agreements, etc. Prime contractors will be required to complete and submit a ***signed and notarized*** Affidavit of Subcontractor Payment (TC 18-7) and copies of checks for any monies paid to each DBE subcontractor or supplier utilized to meet a DBE goal. These documents must be completed and signed within 7 days of being paid by the Cabinet.

Payment information that needs to be reported includes date the payment is sent to the DBE, check number, Contract ID, amount of payment and the check date. Before Final Payment is made on this contract, the Prime Contractor will certify that all payments were made to the DBE subcontractor and/or DBE suppliers.

******* IMPORTANT *******

Please mail the original, signed and completed TC (18-7) Affidavit of Subcontractor Payment form and all copies of checks for payments listed above to the following address:

Office for Civil Rights and Small Business Development
6th Floor West 200 Mero Street
Frankfort, KY 40622

The prime contractor should notify the KYTC Office for Civil Rights and Small Business Development seven (7) days prior to DBE contractors commencing work on the project. The contact in this office is Mr. Melvin Bynes. Mr. Bynes' current contact information is email address – melvin.bynes2@ky.gov and the telephone number is (502) 564-3601.

DEFAULT OR DECERTIFICATION OF THE DBE

If the DBE subcontractor or supplier is decertified or defaults in the performance of its work, and the overall goal cannot be credited for the uncompleted work, the prime contractor may utilize a substitute DBE or elect to fulfill the DBE goal with another DBE on a different work item. If after exerting good faith effort in accordance with the Cabinet's Good Faith Effort policies and procedures, the prime contractor is unable to replace the DBE, then the unmet portion of the goal may be waived at the discretion of the Cabinet.

PROHIBITION ON TELECOMMUNICATIONS EQUIPMENT OR SERVICES

In accordance with the FY 2019 National Defense Authorization Act (NDAA), 2 CFR 200.216, and 2 CFR 200.471, Federal agencies are prohibited, after August 13, 2020, from obligating or expending financial assistance to obtain certain telecommunications and video surveillance services and equipment from specific producers. As a result of these regulations, contractors and subcontractors are prohibited, on projects with federal funding participation, from providing telecommunication or video surveillance equipment, services, or systems produced by:

- Huawei Technologies Company or ZTE Corporation (or any subsidiary or affiliate of such entities)
- Hytera Communications Corporation, Hangzhou Hikvision Digital Technology Company, or Dahua Technology Company (or any subsidiary or affiliate of such entities)

LEGAL REQUIREMENTS AND RESPONSIBILITY TO THE PUBLIC – CARGO PREFERENCE ACT (CPA).

(REV 12-17-15) (1-16)

SECTION 7 is expanded by the following new Article:

102.10 **Cargo Preference Act – Use of United States-flag vessels.**

Pursuant to Title 46CFR Part 381, the Contractor agrees

- To utilize privately owned United States-flag commercial vessels to ship at least 50 percent of the gross tonnage (computed separately for dry bulk carriers, dry cargo liners, and tankers) involved, whenever shipping any equipment, material, or commodities pursuant to this contract, to the extent such vessels are available at fair and reasonable rates for United States-flag commercial vessels.
- To furnish within 20 days following the date of loading for shipments originating within the United States or within 30 working days following the date of loading for shipments originating outside the United States, a legible copy of a rated, 'on-board' commercial ocean bill-of-lading in English for each shipment of cargo described in paragraph 1 of this section to both the Contracting Officer (through the prime contractor in the case of subcontractor bills-of-lading) and to the Division of National Cargo, Office of Market Development, Maritime Administration, Washington, DC 20590.
- To insert the substance of the provisions of this clause in all subcontracts issued pursuant to this contract.

PROJECT TRAFFIC COORDINATOR (PTC)

Be advised this project is a significant project pursuant to section 112.03.12.

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.

Kentucky Transportation Cabinet
Division of Highway Design
TRAFFIC MANAGEMENT PLAN

County: Boone Item No.: 6-444

Federal Project No.: STP 3002 (326)

Project Description:

KY 236 (Donaldson Highway) from KY 3076 (Mineola Pike) to KY 842 (Houston Road)

Roadway Classification: ☒ Urban ☐ Rural

☐ Local ☐ Collector ☒ Arterial ☐ Interstate

ADT (current) 15,000 AM Peak Current _____ PM Peak Current _____ % Trucks 3%

Project Designation: ☒ Significant ☐ Other: _____

Traffic Control Plan Design:

Taper and Diversion Design Speeds 45:1

Minimum Lane Width 10 feet Minimum Shoulder Width 2 feet

Minimum Bridge Width N/A

Minimum Radius 1295 feet Maximum Grade 5.05%

Minimum Taper Length 500 feet Minimum Intersection Level of Service F

Existing Traffic Queue Lengths 300 Projected Traffic Queue Lengths 600

Comments:

Kentucky Transportation Cabinet
Division of Highway Design
TRAFFIC MANAGEMENT PLAN

Item No. 6-444

Discussion:

1) Public Information Plan	
a) Prepare with assistance from X KYTC or _____	
b) Identify Trip Generators Referenced	f) Railroad Involvement Referenced
c) Identify Types of Road Users Referenced	g) Address Pedestrians, Bikes Mass Transit Referenced
d) Public Information Message Referenced	h) Address Timing, Frequency, Updates, Effectiveness of Plan Referenced
e) Public Information Strategies to be used Referenced	i) Police & Other Emergency Services Referenced

Kentucky Transportation Cabinet
Division of Highway Design
TRAFFIC MANAGEMENT PLAN

Item No. 6-444

2) Temporary Traffic Control Plan (For Each Phase of Construction) Phase I

Exposure Control Measures		**Positive Protection Measures**	
a) Is Road Closure Allowed Type:	Referenced	a) Address Drop Off Protection Criteria	Referenced
b) Detour Conditions	Referenced	b) Temporary Barrier Requirements	Referenced
c) Working Hour Restrictions	Referenced	c) Evaluation of Existing Guardrail Conditions	Referenced
d) Holiday or Special Event Work Restrictions	Referenced	d) Address Temporary Drainage	Referenced
e) Evaluation of Intersection LOS	Referenced	**Uniformed Law Enforcement Officers**	Referenced
f) Evaluation of Queue Lengths	Referenced	**Payment for Traffic Control***	
g) Evaluation of User Costs and Incentives/Disincentives	Referenced	a) Method of Project Bidding	Referenced
h) Address Pedestrians, Bikes, Mass Transit	Referenced	b) Special Notes	Referenced
Work Vehicles and Equipment	Referenced	*Payment for traffic control items shall be in accordance with the Kentucky Department of Highways Standard Specifications for Road and Bridge Construction	

Comments:

Kentucky Transportation Cabinet
Division of Highway Design
TRAFFIC MANAGEMENT PLAN

Item No. 6-445

2) Temporary Traffic Control Plan (For Each Phase of Construction) Phase	
Exposure Control Measures	**Positive Protection Measures**
a) Is Road Closure Allowed Type: Referenced	a) Address Drop Off Protection Criteria Referenced
b) Detour Conditions Referenced	b) Temporary Barrier Requirements Referenced
c) Working Hour Restrictions Referenced	c) Evaluation of Existing Guardrail Conditions Referenced
d) Holiday or Special Event Work Restrictions Referenced	d) Address Temporary Drainage Referenced
e) Evaluation of Intersection LOS Referenced	**Uniformed Law Enforcement Officers** Referenced
f) Evaluation of Queue Lengths Referenced	**Payment for Traffic Control***
g) Evaluation of User Costs and Incentives/Disincentives Referenced	a) Method of Project Bidding Referenced
h) Address Pedestrians, Bikes, Mass Transit Referenced	b) Special Notes Referenced
Work Vehicles and Equipment Referenced	*Payment for traffic control items shall be in accordance with the Kentucky Department of Highways Standard Specifications for Road and Bridge Construction
Comments:	

Kentucky Transportation Cabinet
Division of Highway Design
TRAFFIC MANAGEMENT PLAN

Item No. 6-444

2) Temporary Traffic Control Plan (For Each Phase of Construction) Phase 2

Exposure Control Measures		**Positive Protection Measures**	
a) Is Road Closure Allowed Type:	Referenced	a) Address Drop Off Protection Criteria	Referenced
b) Detour Conditions	Referenced	b) Temporary Barrier Requirements	Referenced
c) Working Hour Restrictions	Referenced	c) Evaluation of Existing Guardrail Conditions	Referenced
d) Holiday or Special Event Work Restrictions	Referenced	d) Address Temporary Drainage	Referenced
e) Evaluation of Intersection LOS	Referenced	**Uniformed Law Enforcement Officers**	Referenced
f) Evaluation of Queue Lengths	Referenced	**Payment for Traffic Control***	
g) Evaluation of User Costs and Incentives/Disincentives	Referenced	a) Method of Project Bidding	Referenced
h) Address Pedestrians, Bikes, Mass Transit	Referenced	b) Special Notes	Referenced
Work Vehicles and Equipment	Referenced	*Payment for traffic control items shall be in accordance with the Kentucky Department of Highways Standard Specifications for Road and Bridge Construction	

Comments:

Kentucky Transportation Cabinet
Division of Highway Design
TRAFFIC MANAGEMENT PLAN

Item No. 6-444

APPROVAL:

Gerald Michael Bezold — 10-3-2022
Project Manager — Date

10/4/2022
Project Delivery and Preservation Manager — Date

James A. Mindlay — 10/5/2022
Engineering Support Manager — Date

FHWA Representative — Date

Revisions to the TMP require review/approval by the signatories.

SPECIAL NOTE FOR SPOT SUBGRADE STABILIZATION

This Special Note will apply when indicated on the plans or in the proposal. When this note is used a primary subgrade stabilization method will be as outlined in the project plans. This note will only apply for areas of the project where the primary subgrade selected is not feasible due to Maintenance of Traffic, entrances, narrow part-width sections, or other constraints. The locations for the use of this note and the selected alternate are subject to approval of the Engineer. Section references herein are to the current edition of the Department's Standard Specifications for Road and Bridge Construction, including Supplemental Specifications.

1.0 DESCRIPTION. Use one of the following six (6) alternates for the subgrade stabilization.

A. Eight inches of chemical stabilization using lime or cement
B. Eight inches of chemical stabilization using stockpiled, lime-stabilized soil (**Alternate "B" only allowed when lime stabilization** is the primary subgrade for the project.)
C. High-Strength Geotextile Fabric (Class 1A) with six (6) additional inches of aggregate base
D. Geogrid reinforcement and Class 2 Geotextile Fabric with six (6) additional inches of aggregate base
E. Twelve (12) inches of rock (#2's, #3's, or #23's) underlain with Class 1A Geotextile Fabric and overlain with Class 1 Geotextile Fabric on the top and sides. **Do NOT use Alternate "E" under concrete pavements.**
F. Fifteen (15) inches of rock (#2's, #3's or #23's) wrapped in Class 1 Geotextile Fabric. **Do NOT use Alternate "F" under concrete pavements**.

Stabilization should be applied from shoulder break to shoulder break.

2.0 MATERIALS

2.1 Cement, Lime, Asphalt Curing Seal, Water and Sand: Conform to Section 208.02.

2.2 Aggregate: Conform to Section 805.

2.3 Geogrid: Furnish geogrid according to Section 304.

2.4 Fabric-Geotextile, Class 2: Conform to Section 843.

2.5 Fabric-Geotextile, Class 1: Conform to Section 843.

09-29-21

2.6 Fabric-Geotextile, Class 1A (High-Strength Geotextile Fabric): Furnish a woven or non-woven fabric meeting the requirements of AASHTO M 288 for Class 1A fabric.

2.6.1 Conform to the general requirements for GEOTEXTILE FABRIC in Section 843. This requires participation in the National Transportation Product Evaluation Program (NTPEP) for Geotextiles and Geosynthetics and the produce data must be posted in the NTPEP DataMine.

2.7 Fastener Pins. Comply with all requirements of Section 843 for fastener pins for Subgrade and Embankment Stabilization, and the Geosynthetic Manufacturer's recommendations.

Packing, Identification, Shipment, Storage of Geogrid or Class 1A Geotextile. Conform to Section 7 of AASHTO M 288, current edition for Identification, Shipment, and Storage.

3.0 CONSTRUCTION

3.01 Surface Preparation. Prepare the surface according to Section 207 , 208, or 302, as applicable.

3.02 High-Strength Geotextile Fabric (See Alternates C and E). Place Fabric-Geotextile, Class 1A at the proper elevation and locations in continuous strips. Conform to requirements for CONSTRUCTION in Section 214, except that High-Strength Fabric shall be temporarily secured in place to maintain tension during aggregate placement. This may be done with staples, pins, sand bags or backfill as required by fill properties, fill placement procedures, or weather conditions as the Engineer directs.

Fabric overlaps shall be 2.5 feet, contrary to Section 214, unless a larger overlap or seaming is required by the project plan notes. Longitudinal overlaps (parallel to roadway) should not be placed within traffic wheel paths, but should be placed approximately at the centerline or the shoulder. Overlaps for the ends of fabric rolls should be shingled in the direction of aggregate/fabric construction (i.e. place the start of the new roll beneath the end of the previous roll). In curves and intersections, cut and overlap the fabric to prevent development of buckles and folds.

Commented [SET(1]: Based on table for overlap width based on CBR in AASHTO M288. (Using CBR = 2.0)

3.03 Aggregate Placement (See Alternates C, D, and E). Contrary to Section 302.03.03, if the total aggregate base thickness is less than 12 inches, the aggregate base will be placed in one lift. If greater than 12 inches, place the aggregate in 6 inch to 12 inch lifts. All other construction and density requirements of Section 302 will apply.

09-29-21

Place aggregate over the fabric or geogrid according to the Contract. Place, spread, and compact the aggregate in such a manner that minimizes the development of wrinkles and movement in the fabric or geogrid. The Department will require a minimum loose thickness of 6 inches prior to operation of tracked vehicles over the fabric or geogrid. Keep the turning of tracked vehicles to a minimum to prevent displacement of the fill and damage to the fabric or geogrid. Rubber tired equipment may pass over the fabric or geogrid at slow speeds (less than 10 mph). Avoid sudden braking and sharp turning movements. Repair any damage caused during placement or by vehicles.

Any ruts that form during aggregate placement or compaction shall be filled with aggregate to maintain adequate cover over the geosynthetic. Ruts should never be bladed down, as this would decrease aggregate cover over the geosynthetic.

3.04 Geogrid or High-Strength Fabric Representative. Ensure that a **Representative** of the High-Strength Fabric or Geogrid Manufacturer is on the project site when work begins, and **at least the first 3 days of geosynthetic construction.** The representative shall remain on call as the project progresses to advise the Engineer.

3.1 Alternate A - Chemical Stabilization: Construct a minimum 8-inch thick, chemically stabilized roadbed according to Section 208. See the geotechnical notes to determine the type of chemical used for the stabilization (lime or cement) and additional requirements.

3.2 Alternate B - Chemical Stabilization w/ Stockpiled Lime-Stabilized Soil: Construct an 8-inch thick, chemically stabilized Roadbed according to Section 208 using stockpiled lime stabilized soil. The lime shall be stockpiled offsite from the subgrade area being stabilized. The stockpiled soil shall consist of either:

1) Lime stabilized subgrade constructed in an approved borrow area, or approved area outside the typical section but within right-of-way.

2) Lime stabilized soil left over from cutting the chemically stabilized roadbed to final grade. The cuttings shall then be stored in a separate area until needed. The cuttings shall be stored in a minimum thickness of three (3) feet, and the stockpile lightly tamped when completed. The stockpile shall be covered until needed with an asphalt curing seal, or other approved method.

Follow all construction requirements of Section 208 unless otherwise noted herein. The stabilized material shall be maintained at or above optimum moisture content, which may require the addition of water prior to placement of the asphalt seal. Heavy construction traffic shall not be permitted on the pre-mixed material. Compaction requirements of Section 208 will not apply during initial placement with Option 1 (typical lime-stabilized soil from borrow area).

After sealing with an asphalt curing seal, the stabilized soil shall be left in place until needed. If ambient air temperature will drop below 32 degrees Fahrenheit for more than 2 hours, take appropriate measures to cover and protect the stabilized soils, subject to approval of the Engineer.

When ready for subgrade stabilization within the roadbed, excavate pre-stabilized soils and transport to the area to be stabilized. Place pre-stabilized material in 4 to 6-inch loose lifts at the locations determined by the Engineer. Mixing may be performed by disking or other lightweight equipment approved by the Engineer. At the time of reusing the stockpiled soil, additional water may need to be added to increase the moisture content to optimum, or slightly above.

Compaction may be performed with a vibratory sheepsfoot compactor or other approved equipment. Use caution to ensure the selected compactor and other construction equipment will not overload nearby subsurface utilities or produce excessive vibration. Test moisture content with a nuclear or Speedy Moisture gage and add water if needed to maintain a moisture content at or slightly above optimum. Place an asphalt curing seal on the constructed subgrade. Construction traffic shall not be permitted until the subgrade can support traffic without rutting.

3.3 Alternate C - High-Strength Geotextile Fabric:

Conform to all above requirements for High-Strength Geotextile Fabric in Section 3.0 of this Special Note.

High-Strength Fabric should not be completely placed before placing aggregate, but should be placed at the front of a "paving train" consisting of the fabric laydown **equipment followed no further than 50 feet by the aggregate placement equipment**.

3.4 Alternate D – Geogrid and Fabric: Place geogrid in accordance with Sections 304 and 302 of the current Standard Specifications and in accordance with the contract documents. Place the **Fabric-Geotextile, Class 2** first, then place the geogrid on top of the geotextile fabric so that they are at the bottom of the aggregate layer.

Geogrid shall be temporarily secured in place to maintain tension during aggregate placement. This may be done with staples, pins, sand bags or backfill as required by fill properties, fill placement procedures, or weather conditions as the Engineer directs. Make sure there are no buckles or folds in the geogrid.

Geogrid should not be completely placed before placing aggregate, but should be placed at the front of a "paving train" consisting of the geogrid laydown equipment

followed no further than 50 feet by the aggregate placement equipment. In curves and intersections, cut and overlap the geogrid. Place the geogrid and aggregate according to Sections 304 and 302, and in accordance with the contract documents.

3.5 Alternate E - Twelve (12) Inches of Rock and Fabric: Do ***NOT*** use this alternate for concrete pavements. Use twelve (12) inches of Coarse Aggregate #2's, #3's or #23's underlain with Class 1A geotextile fabric and wrapped in Class 1 geotextile fabric on the top and sides. This will require excavating the subgrade by twelve (12) inches more than shown on the plans. This alternate also requires positive drainage of the rock roadbed – perforated pipe discharged into weep holes in drainage boxes or headwalls or by daylighting the rock. The drainage solution and the additional 12-inch excavation are incidental to Subgrade Stabilization.

Conform to all above requirements for High-Strength Geotextile Fabric in Section 3.0 of this Special Note.

3.6 Alternate E - Fifteen (15) Inches of Rock and Fabric: Do ***NOT*** use this alternate for concrete pavements. Use fifteen (15) inches of Coarse Aggregate #2's, #3's or #23's wrapped in **Fabric-Geotextile, Class 1**. This will require excavating the subgrade by fifteen (15) inches more than shown on the plans. This alternate also requires positive drainage of the rock roadbed – perforated pipe discharged into weep holes in drainage boxes or headwalls or by daylighting the rock. The drainage solution and the additional 15-inch excavation are incidental to Subgrade Stabilization.

4.0 ACCEPTANCE. Obtain the Department's approval for all material before incorporating it into the project.

5.0 MEASUREMENT. The Department will measure the quantity of Subgrade Stabilization in square yards. The square yard price will include the additional aggregate (6 inches), the Class 2 Geotextile Fabric and the geogrid, Lime, Cement, Lime Stabilized Roadbed, Cement Stabilized Roadbed, Asphalt Curing Seal, or Sand for Blotter, Coarse Aggregate #2's, #3's or #23's, Class 1 Geotextile Fabric, Class 1A High-Strength Geotextile Fabric and drainage items. No separate payment will be made for the above items. The Department will not make payment for providing a Geogrid or High-Strength Fabric Manufacturer's representative and will consider it incidental to the bid item for Subgrade Stabilization. The Department will not measure excavation (for 12 or 15 inches of rock and fabric or an additional 6 inches of aggregate) or adjusting subgrade differences between the alternates, and will consider such excavation or adjustments as incidental to Subgrade Stabilization. The Department will not

measure hauling, extra handling, or placement of stockpiled lime stabilization soil for payment and will consider these incidental to Subgrade Stabilization. Fuel Price Adjustment does not apply to the Subgrade Stabilization bid item.

6.0 PAYMENT. The Cabinet will make payment for the completed and accepted quantities under the following:

Code	Pay Item	Pay Unit
24790EC	Subgrade Stabilization	Square Yard

The Cabinet will consider payment as full compensation for all work required in this note. If the Department determines a thicker chemical or rock stabilization section is needed once construction begins, the unit price for subgrade stabilization will be adjusted as follows:

Adjusted Unit Price = Original Unit Bid Price * (New Thickness/Original Thickness of Alternate)

Item # 23188EC Stamped Concrete 10-IN

Construct 10-inch stamped concrete in accordance with the plans and in accordance with Section 501 with the following amendments:

Preparation of Aggregate Base Course: Aggregate Base for 10-in stamped concrete shall be incidental to Item 23188EC.

Forming: Adjacent sidewalk, catch basins, curb and gutter, and ramps, and any other construction shall be complete and meet the engineer's approval prior to forming or placing stamped concrete. Previously placed items may serve as forms/boundaries for placement of stamped concrete unless otherwise directed by the engineer. Place 1/2-inch expansion joint material against all catch basins, manholes, concrete, concrete gutter, and similar structures that project through, into, or against the pavement. Where additional forms are required, forms shall meet 501.03.08. Steel reinforcement will not be required between 10-inch stamped concrete pavement and adjacent concrete.

Placing Concrete: No temporary pause or shut down shall take place during monolithic sections placement of stamped concrete to ensure uniform curing and color. Concrete must have a minimum 28-day compressive strength of 4500 psi.

Pattern and Color: Use the following patterns and colors or approved equivalents https://usa.sika.com/:

Pattern: Baltic Cabblestone, Base Color: U33, Release Color: R13

Color Hardener: Shall meet Manufacturer written Specification.

Installation:

A. Apply 2/3 of specified application rate to freshly floated concrete surface. Bleed water shall not be present during or following application of first and second shake.

B. Do not throw dry-shake; distribute evenly by hand or mechanical spreader designed to apply floor hardeners.

C. As soon as dry-shake material has absorbed moisture, indicated by uniform darkening of surface, mechanically float concrete surface a second time, just enough to bring moisture from base slab through dry-shake color hardener.

D. Immediately following second floating, apply remaining 1/3 of specified application rate. If applied by hand, broadcast in opposite direction of first application for a more uniform coverage. If a mechanical spreader is used, apply the same manner as previously described.

E. As soon as dry-shake material has absorbed moisture, mechanically float concrete surface a third time.

F. Do not add water to the surface.

G. Begin imprinting/stamping operations immediately after applying dry-shake colored hardener, according to manufacturer's written instructions, including application of powder antiquing

release agent. Imprinting/stamping pattern shall be aligned in a way to coincide with direction of control joints.

H. Control Joins shall be sawed and aligned perpendicular to adjacent sidewalk and match stamping pattern lines to extent feasible. Construct ¼-inch sawed control joint in 10-inch concrete in accordance with 501.03.17. Saw joints to a minimum of 2 inch depth.

Curing

I. Imprinted concrete shall be cured with liquid membrane [curing and sealing] compound as recommended by manufacturer.

J. As soon as possible after antiquing release has been removed and after moisture content of concrete is low enough that alkali and other salts do not become trapped beneath sealer, normally a minimum of 14 to 28 days after placement, apply 2-coats of specified [curing and sealing compound] according to manufacturer's written instructions.

K. There should be no free water on the surface at time of application.

Protection of Finished Work

Prohibit foot or vehicular traffic on the newly imprinted concrete surface. Barricade area to protect newly imprinted concrete.

Payment: All materials and labor, including base construction, forming, finishing, coloring, protection, and form removal are incidental item 23188EC SQYD.

SPECIAL NOTE

For Tree Removal

Boone County
KY-236 Major Widening Project
Item No. 6-444.00

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 Danny Peake, Director, Division of Environmental Analysis, 200 Mero Street, Frankfort, KY 40601, Phone: (502) 564-7250.

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 36inches 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 Standard Specifications for Road and Bridge Construction, current edition.

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	AASHTO Nominal Diameter	Max. Deflection Limit	
		5.0%	10.0%
(inches)	(inches)	(inches)	
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:

% Deflection = [(AASHTO Nominal Diameter - D2) / AASHTO Nominal Diameter] x 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:

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

SPECIAL NOTE FOR NON-TRACKING TACK COAT

1. DESCRIPTION AND USEAGE. This specification covers the requirements and practices for applying a non-tracking tack asphalt coating. Place this material on the existing pavement course, prior to placement of a new asphalt pavement layer. Use when expedited paving is necessary or when asphalt tracking would negatively impact the surrounding area. This material is not suitable for other uses. Ensure material can "break" within 15 minutes under conditions listed in 3.2.

2. MATERIALS, EQUIPMENT, AND PERSONNEL.

2.1 Non-Tracking Tack. Provide material conforming to Subsection 2.1.1.

2.1.1 Provide a tack conforming to the following material requirements:

Property	Specification	Test Procedure
Viscosity, SFS, 77 ˚ F	20 – 100	AASHTO T 72
Sieve, %	0.3 max.	AASHTO T 59
Asphalt Residue[1], %	50 min.	AASHTO T 59
Oil Distillate, %	1.0 max.	AASHTO T 59
Residue Penetration, 77 ˚ F	0 - 30	AASHTO T 49
Original Dynamic Shear (G*/sin δ), 82 ˚ C	1.0 min.	AASHTO T 315
Softening Point, ˚ F	149 min.	AASHTO T 53
Solubility, %	97.5 min.	AASHTO T 44

[1] Bring sample to 212 ˚F over a 10-15 minute period. Maintain 212 ˚F for 15-20 minutes or until 30-40 mL of water has distilled. Continue distillation as specified in T59.

2.2. Equipment. Provide a distributor truck capable of heating, circulating, and spraying the tack between 170 ˚F and 180 ˚F. Do not exceed 180 ˚F. Circulate the material while heating. Provide the correct nozzles that is recommend by the producer to ensure proper coverage of tack is obtained. Ensure the bar can be raised to between 14" and 18" from the roadway.

2.3. Personnel. Ensure the tack supplier has provided training to the contractor on the installation procedures for this product. Make a technical representative from the supplier available at the request of the Engineer.

3. CONSTRUCTION.

3.1 Surface Preparation. Prior to the application of the non-tracking tack, ensure the pavement surface is thoroughly dry and free from dust or any other debris that would inhibit adhesion. Clean the surface by scraping, sweeping, and the use of compressed air. Ensure this preparation process occurs shortly before application to prevent the return of debris on to the pavement. If rain is expected within one hour after application, do not apply material. Apply material only when the surface is dry, and no precipitation is expected.

3.2 Non-tracking Tack Application. Placement of non-tracking tack is not permitted from October 1st to May 15th. When applying material, ensure the roadway temperature is a minimum of 40˚F and rising. Prior to application, demonstrate competence in applying the tack according to this note to the satisfaction of the Engineer. Heat the tack in the distributor to between 170 – 180 ˚F. After the initial heating, between 170 – 180 ˚F, the material may be sprayed between 165 ˚F and 180 ˚F. Do not apply outside this temperature range. Apply material at a minimum rate of 0.70 pounds (0.08 gallons) per square yard. Ensure full coverage of the material on the pavement surface. Full coverage of this material is critical. Increase material application rate if needed to achieve full coverage. Schedule the work so that, at the end of the day's production, all non-tracking tack is covered with the asphalt mixture. If for some reason the non-tracking tack cannot be covered by an asphalt mixture, ensure the non-tracking tack material is clean and reapply the non-tracking tack prior to placing the asphalt mixture. Do not heat material more than twice in one day.

3.3 Non-tracking Tack Certification. Furnish the tack 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 sample of non-tracking tack be taken from the distributor at a rate of one sample per 15,000 tons of mix. Take two 1 gallon samples of the heated material and forward the sample to the Division of Materials for testing within 7 days. Ensure the product temperature is between 170 and 180 °F at the time of sampling.

4. MEASUREMENT. The Department will measure the quantity of non-tracking tack in tons. 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 non-tracking tack, the cleaning of the pavement surface, or furnishing and placing the non-tracking tack. The Department will consider all such items incidental to the non-tracking tack.

5. PAYMENT. The Department will pay for the non-tracking tack 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. Non-tracking tack will not be permitted for use from October 1st to May 15th. During this timeframe, the department will allow the use of an approved asphalt emulsion in lieu of a non-tracking tack product but will not adjust the unit bid price of the material. When a sample fails on two or more tests, the Department may add the deductions, but the total deduction will not exceed 100 percent.

Non-Tracking Tack Price Adjustment Schedule						
Test	Specification	100% Pay	90% Pay	80% Pay	50% Pay	0% Pay
Viscosity, SFS, 77 ˚ F	20 – 100	19 - 102	17 - 18 103 - 105	15 - 16 106 - 107	14 108 - 109	≤13 ≥ 110
Sieve, %	0.30 max.	≤ 0.40	0.41 - 0.50	0.51 - 0.60	0.61 - 0.70	≥ 0.71
Asphalt Residue, %	50 min.	≥49.0	48.5 – 48.9	48.0 – 48.4	47.5-47.9	≤ 47.4
Oil Distillate, %	1.0 max.	≤1.0	1.1-1.5	1.6 - 1.7	1.8-1.9	>2.0
Residue Penetration, 77 ° F.	30 max.	≤ 31	32 - 33	34 - 35	36 - 37	≥ 38
Original Dynamic Shear (G*/sin δ), 82 ˚ C	1.0 min.	≥0.95	0.92 – 0.94	0.90 – 0.91	0.85 - 0.89	≤ 0.84
Softening Point, º F	149 min.	≥145	142 - 144	140 - 141	138 - 139	≤ 137
Solubility, %	97.5 min.	≥ 97.0	96.8 – 96.9	96.6 – 96.7	96.4 – 96.5	≤ 96.3

Code	Pay Item	Pay Unit
24970EC	Asphalt Material for Tack Non-Tracking	Ton

Revised: May 23, 2022

SPECIAL NOTE FOR EXPERIMENTAL KYCT AND HAMBURG TESTING

1.0 General

1.1 Description. The KYCT (Kentucky Method for Cracking Test) and the Hamburg test results will help determine if the mixture is susceptible to cracking and rutting. During the experimental phase, data will be gathered and analyzed by the Department to determine the durability of the bituminous mixes. Additionally, the data will help the Department to create future performance-based specifications which will include the KYCT and Hamburg test methods.

2.0 Equipment

2.1 KYCT Testing Equipment. The Department will require a Marshall Test Press with digital recordation capabilities. Other CT testing equipment may be used for testing with prior approval by the Department.

2.2 Water Baths. One or more water baths will be required that can maintain a temperature of 77^{o} +/- 1.8^{o} F with a digital thermometer showing the water bath temperature. Also, one water bath shall have the ability to suspend gyratory specimen fully submerged in water in accordance with AASHTO T-166, current edition.

2.3 Hamburg Wheel Track Testing. The department encourages the use of the PTI APA/Hamburg Jr. test equipment to perform the loaded wheel testing. The Department will allow different equipment for the Hamburg testing, but the testing device must be approved by the Department prior to testing.

2.4 Gyratory Molds. Gyratory molds will be required to assist in the production of gyratory specimens in accordance with AASHTO T-312, current edition.

2.5 Ovens. Adequate (minimum of two ovens) will be required to accommodate the additional molds and asphalt mixture necessary to perform the acceptance testing as outlined in Section 402 of the Kentucky Standard Specifications for Road and Bridge Construction, current edition.

2.6 Department Equipment. The Department will provide gyratory molds, PINE 850 Test Press with digital recordation, and CT testing equipment to assist during this experimental phase so data can be gathered. Hamburg test specimens will be submitted to the Division of Materials for testing on the PTI APA/Hamburg Jr if the asphalt contractor or district materials office does not have an approved Hamburg testing device.

3.0 Testing Requirements

3.1 Acceptance Testing. Perform all acceptance testing and aggregate gradation as according with Section 402 and Section 403 of the Kentucky Standard Specifications for Road and Bridge Construction, current edition.

3.2 KYCT Testing. Perform crack resistance analysis (KYCT) in accordance with the current Kentucky Method for KYCT Index Testing during the mix design phase and during the plant production of all surface mixtures. For mix design approvals, submit KYCT results on the Department MixPack. For Class 4 mixtures, submit ingredient materials to the Division of Materials for verification.

3.2.1 KYCT Frequency. Obtain an adequate sample of hot mix asphalt to ensure the acceptance testing, gradation, and KYCT gyratory samples can be fabricated and is representative of the bituminous mixture. Acceptance specimens shall be fabricated first, then immediately after, fabricate the KYCT samples with the gyratory compactor in accordance with Section 2.4 of this Special Note. Analysis of the KYCT specimens and gradation will be required one per sublot produced from the same asphalt material and at the same time as the acceptance specimen is sampled and tested.

3.2.2 Number of Specimens and Conditioning. Fabricate specimens in accordance with the Kentucky Method for KYCT Index Testing. Contrary to the method, for field specimens, fabricate a minimum of 3 and up to 6 test specimens. The specimens shall be compacted at the temperature in accordance with KM 64-411. KYCT mix design specimens shall be short-term conditioned uncovered for four hours at compaction temperature in accordance with KM 64-411. Contrary to the Kentucky Method, plant produced bituminous material shall be short-term conditioned immediately after sampling for two hours uncovered in the oven at compaction temperature in accordance with KM 64-411. Additionally, fabricated specimens shall be allowed to cool in air (fan is permissible) for 30 minutes +/- 5 minutes and conditioned in a 77 °F water bath for 30 minutes +/- 5 minutes. To ensure confidence and reliability of the test results provided by KYCT testing and Hamburg testing, reheating of the asphalt mixture is prohibited.

3.2.3 Record Times. For each sublot, record the time required between drying aggregates in the plant to KYCT specimen fabrication. The production time may vary due to the time that the bituminous material is held in the silo. Record the preconditioning time when the time exceeds the one-hour specimen cool down time as required in accordance with The Kentucky Method for KYCT Index Testing. The preconditioning time may exceed an hour if the technician is unable to complete the test on the same day or within the specified times as outlined in The Kentucky Method for KYCT Index Testing. The production time and the preconditioning time shall be recorded on the AMAW.

3.2.4 File Name. As according to section 7.12 of The Kentucky Method for KYCT Index Testing, save the filename with the following format: “CID_Approved Mix Number_Lot Number_Sublot Number_ Date”

3.3 Hamburg Testing. Perform the rut resistance analysis (Hamburg) in accordance with AASTHO T-324, not to exceed 20,000 passes for all bituminous mixtures during the mix design phase and production. For mix design approvals, submit Hamburg results on the Department MixPack. For Class 4 mixtures, submit ingredient materials to the Division of Materials for informational verification.

3.3.1 Hamburg Testing Frequency. Perform testing and analysis per lot of material. The plant produced bituminous material sampled for the Hamburg test does not have to be obtained at the same time as the acceptance and KYCT sample. If the Hamburg test sample is not obtained at the same time as the KYCT sample, determine the Maximum Specific Gravity of the KYCT sample in accordance with AASHTO T-209 coinciding with the Hamburg specimens.

3.3.2 Record Times. Record the production time as according to section 3.2.3 in this special note. Also record the time that the specimens were fabricated and the time the Hamburg testing was started. All times shall be recorded on the AMAW.

3.3.3 File Name. Save the Excel spreadsheet with the following file name; "Hamburg_CID_Approved Mix Number_Lot Number_Sublot Number_Date" and upload the file into the AMAW.

4.0 Data

Submit the AMAW and all test data that was obtained for acceptance, gradation, KYCT, and Hamburg testing within five working days once all testing has been completed for a lot to Central Materials Lab and the District Materials Engineer. Also, any data and or comments that the asphalt contractor or district personnel deem informational during this experimental phase, shall also be submitted to the Central Materials Lab and the District Materials Engineer. Any questions or comments regarding any item in this Special Note can be directed to the Central Office, Division of Materials, Asphalt Branch.

5.0 Payment

Any additional labor and testing equipment that is required to fabricate and test the KYCT and Hamburg specimens shall be considered incidental to the asphalt surface line item. The Department will perform the testing for the KYCT and Hamburg specimens if a producer does not possess the proper equipment.

June 15th, 2022

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

TC 62-226
Rev. 01/2016
Page 1 of 1

RIGHT OF WAY CERTIFICATION

☒ **Original** ☐ **Re-Certification** — **RIGHT OF WAY CERTIFICATION**

ITEM #	COUNTY	PROJECT # (STATE)	PROJECT # (FEDERAL)
6-444.00	Boone	12F0 FD52 008 9441001R	STP 3002 (326)

PROJECT DESCRIPTION

Improve safety and reduce congestion along KY 236 (Donaldson Rd) from KY 842 (Houston Rd) to KY 3076 (Mineola Pike)

☐ **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.

☒ **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.

☐ **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

☐ **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	44	EXCEPTION (S) Parcel #	ANTICIPATED DATE OF POSSESSION WITH EXPLANATION
Number of Parcels That Have Been Acquired			
Signed Deed	36		
Condemnation	8		
Signed ROE	8		.

Notes/ Comments (Text is limited. Use additional sheet if necessary.)

Improvement Removal Process has begun on Parcels 56, 62, 66, 150, 163, 168, 169, 170, 173, and 209. Anticipated removal of all improvements is November 30, 2022. All Displacees are removed from the aforementioned parcels.

LPA RW Project Manager		Right of Way Supervisor	
Printed Name		Printed Name	
Signature		Signature	Lynn Whalen Date: 2022.10.12 13:15:18 -04'00'
Date		Date	

Right of Way Director		FHWA	
Printed Name		Printed Name	
Signature	Kelly R. Divine Digitally signed by Kelly Divine Date: 2022.10.12 12:28:03 -05'00'	Signature	No Signature Required as per FHWA-KYTC Current Stewardship Agreement
Date		Date	

UTILITIES AND RAIL CERTIFICATION NOTE

Boone County
Federal Number STP 3002326
State Number FD52 008 94410 01U
Mile point: 0.000 TO 1.594
KY-236 (DONALDSON ROAD) FROM KY-842 (HOUSTON ROAD) TO KY-3076 (MINEOLA PIKE)
ITEM NUMBER: 06-444.00

PROJECT NOTES ON UTILITIES

The contractor should be aware that there is UTILITY WORK INCLUDED IN THIS ROAD CONSTRUCTION CONTRACT. The Contractor shall review the GENERAL UTILITY NOTES AND INSTRUCTIONS which may include KYTC Utility Bid Item Descriptions, utility owner supplied specifications, plans, list of utility owner preapproved subcontractors, and other instructions. Utility contractors may be added to preapproved lists via addendum if KYTC is instructed to do so by the utility owner. Potential contractors must seek prequalification from the utility owner. Any revisions must be sent from the utility owner to KYTC a minimum of one week prior to bid opening.

For all projects under 2000 Linear feet which require a normal excavation locate request pursuant to KRS 367.4901-4917, the awarded contractor shall field mark the proposed excavation or construction boundaries of the project (also called white lining) using the procedure set forth in KRS 367.4909(9)(k). For all projects over 2000 linear feet, which are defined as a “Large Project” in KRS 367.4903(18), the awarded contractor shall initially mark the first 2000 linear feet minimally of proposed excavation or construction boundaries of the project to be worked using the procedure set forth in KRS 367.4909(9)(k). This temporary field locating of the project excavation boundary shall take place prior to submitting an excavation location request to the underground utility protection Kentucky Contact Center. For large projects, the awarded contractor shall work with the impacted utilities to determine when additional white lining of the remainder of the project site will take place. This provision shall not alter or relieve the awarded contractor from complying with requirements of KRS 367.4905 to 367.4917 in their entirety.

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

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. Where conflicts with utility facilities are unavoidable, the contractor will coordinate any necessary relocation work with the facility owner and the KYTC Section 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 following section(s) have been determined using data garnered by varied means and with varying degrees of accuracy: from the facility owners, as result of subsurface utility engineering, field inspections, and/or reviews of record drawings. The

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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.

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. 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.

Damage to Utilities

Any intentional or accidental disruption of service due to damage to any utility service mains caused by any of the contractor's operations without three days advance notice to the utility owner shall be cause for the Cabinet to charge liquidated damages in the amount of five thousand dollars per day ($5000/day) per occurrence against the contractor until such time as the utility service is restored.

Any intentional or accidental disruption of any individual utility service caused by any of the contractor's operations without three days advance notice to the utility owner shall be cause for the Cabinet to charge liquidated damages in the amount of five hundred dollars per day ($500/day) per occurrence against the contractor until such time as service is restored.

In the case of a main disruption or electric service, liquidated damages shall be charged at the main and/or electric service disruption rate only. Liquidated damages shall not be charged in addition for service disruptions when a main disruption is involved.

Flowable Fill Requirement

The road contractor MUST use flowable fill as the backfill media any place gas, water or sewer lines cross under existing or proposed roadway surfaces. It should also be noted that the cost of the flowable fill shall

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be incidental to the cost of the gas, water or sewer line being installed.

External Utility Permits

Kentucky Division of Water permits for water and sewer relocation construction were not available before bidding. These items will be distributed at the preconstruction meeting.

Abandoned Utilities

The contractor shall safeload the entire length of all abandoned pipes 6 inches in diameter and larger under proposed pavement and under any existing pavement that is to remain. The contractor shall safeload the entire length of all abandoned pipes 15 inches and larger which will be located outside of proposed pavement but within project limits. Appropriate bid items have been included in the road contract. The safeloading criteria above shall be observed unless otherwise directed by the Section Engineer or his representative.

Utility Phasing

The contractor should be aware that some utilities will need to be relocated first to accommodate the relocation of others. The contractor should review the plans and draw his own conclusions as to the phasing of the work of various utilities. The contractor should pay close attention to the proximity of construction of new facilities when working in the vicinity of existing water mains to prevent blow outs.

Road Construction Field Adjustments To Accommodate Utilities

Some minor adjustments to road work may be required in the field to work around some poles and other utility infrastructure. The road contractor should discuss any adjustments with the Section Engineer or his inspector as they arise. The adjustments anticipated are to ditches and other such minor items so that poles and such are not in the center bottom of ditches where debris may collect.

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

Boone-Florence Water Commission has a 42 inch water main that will remain under pavement without relocation starting in the Turfway Road area and extending to Houston Road. As with any utility, especially with a main of this size, every precaution needs to be taken to avoid damage to this main.

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CenturyLink Communications LLC dba Lumen Technologies Group – Communication has a small underground presence in the Turfway Road area. Their facilities are expected to remain.

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

THE FOLLOWING FACILITY OWNERS ARE RELOCATING/ADJUSTING THEIR FACILITIES WITHIN THE PROJECT LIMITS AND WILL BE COMPLETE PRIOR TO CONSTRUCTION

Overhead and communications utility owners are expected to be present on the project relocating facilities prior to contractor arrival on the project. None of these utilities are expected to complete work prior to contractor arrival.

THE FOLLOWING FACILITY OWNERS HAVE FACILITIES TO BE RELOCATED/ADJUSTED BY THE OWNER OR THEIR SUBCONTRACTOR AND IS TO BE COORDINATED WITH THE ROAD CONTRACT

Duke Electric, Windstream Communications, Lumen, Spectrum and Alta Fiber (f.n.a. Cincinnati Bell) all have overhead and underground facilities that require relocation in order to accommodate road construction. It is estimated these utilities will not complete their overall relocation until April 1, 2024. The road contractor is to coordinate and cooperate with these utility owners to facilitate relocations until they are complete.

The road contractor should note that these utility owners are dependent on the expeditious installation of the duct facilities included in the road contract. The road contractor should make every effort to construct these duct facilities soon after arrival on the project. Failure to promptly install these duct facilities may delay utility relocations by these utility owners. Specifications for duct installation are included at the end of the duct plans.

Duke Energy Electric has existing underground facilities in various areas of the project. Duke intends to maintain these facilities in their current location. Duke intends to lower their duct facilities in various areas of grade conflict utilizing their own contractors. The road contractor is expected to coordinate and cooperate with Duke's contractors to facilitate these relocations.

Alta Fiber (f.n.a. Cincinnati Bell) has existing underground duct facilities throughout the project. Alta intends to abandon the vast majority of their existing duct facilities. However, these facilities cannot be abandoned until new overhead facilities are constructed on Duke Electric poles, new cabling is installed on duct to be constructed by the road contractor and facilities are tied-in.

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Alta will be maintaining some existing duct by lowering grade to eliminate conflict in current alignment in some minor areas. Alta will also have to make some minor duct additions in various areas to facilitate their relocation and abandonment. The road contractor is expected to coordinate and cooperate with Alta's contractors to facilitate these relocations.

Windstream, Lumen and Spectrum relocations are dependent on being able to attach to relocated Duke poles and being able to install cable in duct to be installed by the road contractor. These utility owners cannot start substantial relocation work until these pole and duct facilities are made available to them. Their existing facilities cannot be removed until relocation facilities are completed and tied-in.

Additional utility relocation plans for work to be performed by the electric and communications utility owners will be provided on a later date. These plans are in the final development stage and unavailable at the time of the generation of this certification.

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

Boone County Water District, Northern Kentucky Water District, Sanitation District No. 1 and Duke Gas facilities will be relocated by the road contractor using plans inserted into roadway plans and specifications inserted into the contract proposal. Appropriate bid items for these relocations have been included in the road contract.

Note: Relocation of the Northern Kentucky Water District 24 inch main includes installation of cathodic protection. Installation of the cathodic protection is considered incidental to the installation of the 24 inch main. Specifications and instructions for installation are included in the contract proposal. All materials are to be provided by the contractor.

Duke gas tie-ins will be performed by Duke personnel. Advance coordination of tie-ins will be required between Duke, the road contractor and gas sub-contractor as required to facilitate project schedule.

Duke gas relocations in the area of the intersection of Donaldson Road and Mineola Pike will be performed by a Duke contractor and is not a part of gas relocation included in this contract. These facilities should be relocated by July 1, 2023. The road contractor is expected to coordinate and cooperate with Duke's contractor in this area until this work is complete.

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A "**Gas Utility Coordination**" item is shown on the General Summary Sheet and has been established in the road contract for consideration by the road contractor. This item is provided, if needed, as compensation for any additional coordination to accommodate the inclusion of gas utility work with the roadway construction. The road contractor can freely bid this item.

RAIL COMPANIES HAVE FACILITIES IN CONJUNCTION WITH THIS PROJECT AS NOTED

☒ **No Rail Involvement** ☐ **Rail Involved** ☐ **Rail Adjacent**

AREA FACILITY OWNER CONTACT LIST

Utility owner contacts will be provided at the preconstruction conference.

THIS IS A PLACEHOLDER ONLY.

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:

*(The district utility agent shall list here utility owners requiring prequalified or preapproved contractors to perform work on their facilities. The utility agent shall place appropriate list(s) of prequalified or preapproved contractors at the end of these notes with each list identified with the utility owner name, utility type and appropriate heading at the top. If there are some utility owners that require prequalified or preapproved contractors and others that do not within this same contract, it may be prudent to list here each utility owner with utility work in the road contract and state if they require prequalified or preapproved contractors or not. If no utility owner prequalifies or preapproves contractors, the following statement shall be placed here: "**No contractors**

are required to be prequalified or preapproved by the utility owner(s) to perform utility relocation work under this contract.")

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 must be completed by either the prime contractor or a subcontractor that is 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 may 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. The KYTC Section Engineer will relay any approvals or correspondence to the utility contractor as appropriate. 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.

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:

*(List here utility owner name(s) and specific materials that will be provided to the contractor. If there are some utility owners that will be supplying materials and others that will not, it may be prudent to also list each utility owner that will not be supplying materials for clarity of the contract. If no utility owner intends to supply materials, the following statement shall be placed here: "**No materials are being supplied by the utility owner(s). All materials are to be supplied by the contractor per bid item descriptions, utility specifications and utility 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 Gas Bid Item Descriptions

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.

G 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 gas main under streets, creeks, 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. Carrier pipe installed within a bore pipe shall be paid separately under pipe items. Payment under this item shall be for all sizes and not be size specific. 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. This bid item shall also include the cost of pre and/or post directional bore gas installation video inspection of adjacent sanitary and storm sewer mains, manholes, and laterals when the utility specifications associated with the contract require such video inspection. 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.

G ELECTRONIC ID MARKER This bid item is to pay for labor, equipment, computer programing, and installation of an electronic ID marker at the locations shown on the plans or as directed by the engineer. The marker may be in the form of a ball, disk, cylinder, post, or other shape as required by specification and may be buried, at grade, or above grade as specified. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. Paid EACH (EA) when complete.

NOTE: This bid item is not for payment of standard non-electronic markers or monuments. A separate "Line Marker" bid item is established for this purpose.

G 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, vents, 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.

G 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, vents, 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.

G FARM TAP AND REGULATOR This item is for the installation of gas service tap and regulator assembly on a gas transmission main. This item shall include excavation, labor, equipment, and all tapping, piping, fittings, and regulator materials to install the farm tap and regulator assembly in accordance with the plans, specifications, and standard drawings complete and ready for use. Only one pay item has been established for Farm Tap and Regulator installations. Payment shall be made under this item regardless of farm tap service and regulator size. No separate pay items will be established for size 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.

G LINE MARKER This item is for payment for furnishing and installing a gas 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.

NOTE: This bid item is not for payment of "Electronic ID Markers". Electronic ID Markers are paid under a separate bid item.

G MAIN ABANDON This bid item is in full payment for all efforts in abandonment of all gas mains and facilities shown to be abandoned on the plans, for removal of any sections of abandoned main that is in conflict with road construction, and for nitrogen purge and plug of any sections of main that are to remain. All work shall be done in accordance with the plans and specifications, and in accordance with

all pipeline safety regulations. This bid item is for all work to abandon and purge gas main in the total project regardless of size or length. No adjustment in the unit bid price will be allowed if the scope of work described in this item should increase in this contract for any reason. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item is to be paid LUMP SUM (LS) when complete.

G 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 gas main at point locations such as to clear a conflict at a proposed drainage structure, pipe or any other similar short relocation situation. All new materials are to be used. 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. 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. Main Point 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.

G METER AND REGULATOR This bid item description shall be used for all meter and regulator bid items of every size except those defined as "Special". These pay items are for all labor, equipment, and materials needed for the installation of a service meter and regulator assembly at the locations shown on the plans or as directed by the engineer in accordance with specifications and standard drawings complete and ready for use. Materials to be provided under this bid item shall include, but are not limited to, meter, regulator, piping, fittings, building anchoring brackets, and hardware needed to create and install the assembly. 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.

G PIPE This description shall apply to all polyethylene/plastic and steel pipe bid items of every size and type to be used as gas 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), corrosion protective coatings of steel pipe and fittings, labor, equipment, excavation, bedding, restoration, pressure testing, backfill, 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. For steel pipe, this bid item shall include all cathodic protection anodes, lead wire, test boxes or stations, and any accessories. No additional payment will be made for rock excavation. This bid item shall include material and placement of flowable fill under existing and proposed pavement, and wherever else specified on the plans or in the specifications. This bid item shall also include the cost of pre and/or post directional bore gas installation video inspection of adjacent sanitary and storm sewer mains, manholes, and laterals when the utility specifications associated with the contract require such video inspection. Measurement of quantities under this item shall be through valves (including horizontal measurements through above grade valves), 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.

G REGULATOR STATION Includes all labor, equipment, materials and restoration, to install a new gas regulator station as indicated on plans and on standard drawings compete and ready for use. Only one pay item has been established for regulator station installations. Payment shall be made under this item regardless of regulator station size. No separate pay items will be established for size 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.

NOTE: This item is to be used to pay for regulator stations to reduce the pressure of gas from a higher pressure main to feed a lower pressure main. This item is not to be used to pay for regulators used on individual customer service lines.

G 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, 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, 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. This bid item shall also include the cost of pre and/or post directional bore gas installation video inspection of adjacent sanitary and storm sewer mains, manholes, and laterals when the utility specifications associated with the contract require such video inspection. 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.

G 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, coupling for connecting the new piping to the surviving existing piping, 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 installations were 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. This bid item shall also include the cost of pre and/or post directional bore gas installation video inspection of adjacent sanitary and storm sewer mains, manholes, and laterals when the utility specifications associated with the contract require such video inspection. 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.

G SERVICE RELOCATE This item is for the relocation of an existing gas 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.

G TIE-IN This bid description shall be used for all polyethylene/plastic or steel gas main tie-in bid items of every size except those that include a temporary bypass or are defined as "Special". This item includes all labor, equipment, excavation, fittings, sleeves, reducers, couplings, restoration, testing and backfill required to make the gas 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. No additional payment will be made for rock excavation. This bid item shall also include material and placement of flowable fill backfill under existing and proposed pavement, and wherever else specified on the plans or in the specifications. 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.

G TIE-IN W/BYPASS This bid description shall be used for all polyethylene/plastic or steel gas main tie-in bid items that include temporary bypass of every size except those defined as "Special". This item includes all labor, equipment (including tapping, stopple and/or squeeze equipment), excavation, permanent and temporary fittings (including, but not limited to, tees, split tees, bends, reducers, plugs, caps, and couplings), temporary bypass piping, restoration, testing and backfill required to make the gas main tie-in with temporary bypass as shown on the plans, and in accordance with the specifications complete and ready for use. Mainline pipe for tie-ins shall be paid under separate bid items. No additional payment will be made for rock excavation. This bid item shall also include material and placement of flowable fill backfill under existing and proposed pavement, and wherever else specified on the plans or in the specifications. 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: The tie-in size reflected in the bid item reflects the nominal internal diameter size of the main gas line being tied-in, not the bypass pipe size.

G VALVE This description shall apply to all buried valves of every size and type required in the plans and specifications except those bid items defined as "Special". Payment under this description is to be

for gas valves being installed with new main. This item includes the valve as specified in the plans and specifications, protective coating and corrosion protection, labor, equipment, excavation, valve box and valve stem extensions, backfill, 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. 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.

G VALVE ABOVE GRADE This description shall apply to all above grade valve assemblies of every size and type required in the plans and specifications except those bid items defined as "Special". Payment under this description is to be for above grade gas valves being installed with new main. This item includes the above grade valve, pipe, and fittings as specified in the plans, specifications and standard drawings. This bid items shall also include protective coating and corrosion protection, labor, equipment, excavation, backfill, restoration, testing, etc., required to install the specified above grade valve at the location shown on the plans 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.

G 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, 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.

G WELD X-RAY INSPECTION This description shall apply to all radiographic x-ray inspections of steel pipe joints of every size within the pipe size ranges given in the bid item text. This bid includes all labor, equipment, materials, to assess the acceptability of the weld to comply with specifications and to industry and regulatory standards. 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) for each pipe joint inspected.

Specifications for Gas Main Replacement within

STATE OF KENTUCKY ROAD PROJECTS

October, 2022

Note: KYTC has prepared "STANDARD GAS BID ITEM DESCRIPTIONS" for all items of gas work contained in the road contract. These "STANDARD GAS BID ITEM DESCRIPTIONS" are contained elsewhere in the project proposal. These "STANDARD GAS BID ITEM DESCRIPTIONS" shall supersede any and all conflicting information in the following gas specifications. Where conflicts do not exist, the following shall apply.

1.0 GENERAL

1.1 Scope of Work

Gas main relocation work required for the proposed Mt. Zion Rd project consists of the following work:

- Installing approximately 13,236' of 12" plastic gas main. There is also 953' of 6" PL main, 1154' of 4" PL main and 592' of 2" PL main.
- Renewing M-C services as needed. We've estimated that there will be (30) long side services and (16) short side services to be replaced.
- Installing valves per drawings.

A Gas Contractor, approved by Duke Energy, shall perform the gas facility relocation work. **The General Contractor awarded the KYTC road project, shall hire an approved Gas Contractor listed at the end of these specifications.**

A Duke Energy Inspector will oversee all piping work performed by the Gas Contractor. Transportation Cabinet inspectors will primarily oversee vertical and horizontal placement of the main, all backfill, traffic control work, and record pay quantities for gas work in the road contract in consultation with the gas inspector.

1.2 Acceptable Gas Contractors

Installation of gas facilities on this project is limited to the following Gas Contractors due to their pre-qualification for such work with Duke Energy:

1. AMS Construction
2. RLA Investments
3. Miller Pipeline

At the end of these specifications is a phone list for the Duke Energy approved Gas Contractors. Contrary to previous road contracts, gas contractors (which are now considered **specialty contractors** by the Kentucky Transportation Cabinet) are no longer are required to be prequalified by the Cabinet to perform utility work included in the road contract. All gas contractors prequalified by Duke Energy are now allowed to perform gas work in road contracts. **U. S. Department of Transportation regulations prohibit any non-qualified contractor from performing any gas main work. This includes, but is not limited to excavation, main lowering, pipe installation, service installation, and back filling.**

1.3 Standards

In addition to these specifications, all facilities must be installed in accordance with Duke Energy's Procedures and Standards CFR part 192, and all applicable specifications. These General and Technical Provisions shall be made a part of this project contract by reference. Copies are available from Duke Energy. Where the following specifications and those referenced are in conflict, the following specifications shall govern and take precedence.

1.4 Definitions

Where the word "**Engineer**" appears in these specifications or on the gas plans, it shall be understood the "Engineer" is the Kentucky Transportation Cabinet (KYTC) Section Engineer or his/her designated representative and the Duke Energy Engineer or Project Manager or his/her designated representative jointly. Both Engineers must mutually agree upon all decisions made with regard to the gas line construction. The Transportation Cabinet, Section Engineer shall make all final decisions in all disputes. The Section Engineer is ultimately responsible for the engineering supervision of the road contract.

Where the word "**Gas Inspector**" or "Inspector" appears in these specifications or on the gas plans, it shall be understood the "Inspector" is the Duke Energy Gas Inspector or his designated representative.

Where the words "**Resident Engineer**" appears in these specifications or on the gas plans, it shall be understood the "**Resident Engineer**" is the KYTC Section Engineer or his designated representative.

Where the word "**Road Contractor**" appears in these specifications or on the gas plans, it shall be understood the "**Road Contractor**" is the General Contractor that was awarded the road improvement project by KYTC and that hired the Gas Contractor for the gas replacement work.

Where the word "**Gas Contractor**" appears in these specifications or on the gas plans, it shall be understood the "**Gas Contractor**" is the Duke Energy and KYTC approved contractor hired by the Road Contractor to perform the gas replacement work within the KYTC Road Project.

1.5 Video Taping

Duke Energy recommends that the Gas Contractor videotape every project prior to starting. The video is extremely important in settling disputes with governing agencies.

1.6 Permits & Fees

All permits for the replacement work will be obtained by Duke Energy and will be provided to the Gas Contractor by the Gas Inspector prior to the start of work. Duke Energy will pay all permit fees except cut/fill fees. Cut/fill fees required for dumpsites will not be paid by Duke Energy except for material dumped for main tie-ins where the Gas Contractor is paid directly by Duke Energy on a time and material (T&M) basis. The Gas Contractor will be responsible for all tree damage unless the damage was a result of a direct order by the Engineer. Clean up and

restoration on all projects must be in compliance with KYTC and local governmental agencies and must be approved by the Duke Energy Inspector. It is the sole responsibility of the Gas Contractor to check with governing agencies for work hour restrictions. No compensation will be given for restricted work hours or crews working at night.

1.7 Operator Qualification

The Duke Energy Learning Services personnel will be responsible for the qualification of the Gas Contractor employees according to Duke Energy Procedures. It is the Contractor's responsibility to ensure those performing covered tasks hold the appropriate Operator Qualifications.

1.8 Security

Picture ID's are required for all Gas Contractor employees. Gas Contractor personnel are required to show their ID's whenever asked by customers or Duke Energy Personnel.

MATERIAL

2.1 Duke Energy Supplied Materials

Duke Energy will provide all:

- Steel and polyethylene pipe,
- Steel and polyethylene pipe fittings, flanges, adapters, couplings, etc.
- Valves and valve assemblies,
- Regulators,
- Regulator vaults or enclosures,
- Cathodic protection material,
- Other associated gas pipe materials required for the replacement work.

2.1.1 Material Delivery and Tracking

Duke Energy supplied material will be delivered to the job site or Gas Contractor yard. It will be the responsibility of the Gas Contractor to meet the delivery truck, to track material received, and to provide weekly reports showing material received, material used, and material remaining. The material assigned to a specific project is to be used on that project only. All surplus materials, at the end of the project, are to be returned to the storeroom or a credit requisition completed allocating the material to another job. The material must be returned or requisitioned to another job in the same condition that it was received. A certain percentage of waste will be applied to the pipe. All other unaccounted, damaged or material left unprotected will be the responsibility of the Gas Contractor.

Service Material will be delivered to each Gas Contractor yard. Each Gas Contractor will be required to provide an adequate shelter area with shelves to organize all the service material.

The Gas Contractor will provide a person to receive material, organize and reorder material as needed.

2.2 Contractor Supplied Materials

The Gas Contractor is required to provide all materials and equipment other than as indicated on the construction drawings that are necessary to construct the project. All welding materials such as welding rods, grinding wheels, clamps, etc. is to be provided by the Gas Contractor.

Pipe Bedding
Pipe bedding shall meet the requirements for Pipe Bedding as contained in Kentucky Department of Highways, Standard Specifications for Road and Bridge Construction.

Flowable Fill / Low Strength Mortar Mix
Flowable fill & Low Strength Mortar shall meet the requirements of the Kentucky Department of Highways, Standard Specifications for Road and Bridge Construction. Low Strength Mortar is required as backfill under all existing and proposed KYTC roads.

Surface Restoration Materials (Temporary and Permanent)
All restoration materials shall meet the requirements of the appropriate sections of Kentucky Department of Highways, Standard Specifications for Road and Bridge Construction.

3.0 JOINING PIPE

3.1 Welding Steel Pipe

All welds will be made in accordance with Duke Energy's Gas Division welding procedures and specifications.

3.2 Joining Plastic Pipe

All plastic joining will be made in accordance with Duke Energy's Gas Division plastic joining procedures and specifications.

4.0 GAS MAINS

4.1 Inspection

The road contractor must contact Duke Energy (Missy Vaughan, 513-312-9744) one month prior to the beginning of any gas main work so that Duke Energy can plan for the construction project. Duke Energy will provide a Gas Inspector on all main replacement projects. The Inspector will have multiple projects to cover and will not be on site at all times. No changes to the project drawings shall be made without the joint consent of the Duke Energy Engineer or Project Manager and Gas Inspector AND the KYTC Section Engineer or his inspector. The Gas Inspector will record the as-built location of the gas main, track the pay and

non-pay item quantities, and provide general guidance to the Gas Contractor and assistance to the Section Engineer. **The Gas Inspector works for Duke Energy and not the Road Contractor.**

4.2 Depth and Location of Main

Gas mains on this project shall have 60" of cover from proposed grade under roadways and a minimum depth of 42" in all other areas

All mains are to be installed at the depth or elevation, and location specified on the project drawings. No changes to the project drawings shall be made without the joint consent of the Duke Energy Engineer or Project Manager and the Gas Inspector AND the KYTC Section Engineer or his inspector. The Duke Energy Engineer has designed the proposed gas main location to avoid conflicts with proposed and existing utilities and grades. Changes to the planned alignment without the consent of the Duke Energy Engineer AND KYTC Section Engineer may result in conflicts with other proposed facilities. **It is the responsibility of the Road Contractor to stake the proposed alignment of the gas mains for the Gas Contractor.**

4.3 Installation Methods

Direct bury is the preferred installation method for the gas main replacement work within the Road Project. Directional drilling of main is an alternative installation method that will be considered by the Duke Energy Engineer AND the KYTC Resident Engineer on a case-by-case basis. The following paragraphs discuss these installation methods.

4.3.1 Direct Bury

The trench shall be excavated to accommodate the minimum specified cover over the main from proposed final grade, the pipe outside diameter, and a minimum of 3 inches of bedding material below the pipe. Where the main is being constructed within proposed ditch lines, across final pavements, and along final roadways, the trench shall be excavated to accommodate a minimum of 48 inches of cover over the main from final grade. The minimum cover shall be increased to 60 inches when crossing streams. The minimum trench width shall be 24 inches. The Gas Contractor shall string the pipe along the trench and join the pipe. Services shall be installed with a minimum horizontal separation from the existing service of 12 inches.

Once the pipe has been joined, the contractor shall lift and carefully lower the pipe into the center of the trench. The Gas Contractor is cautioned to handle the pipe carefully so as to minimize damage to the pipe. Additional bedding material shall be placed around the pipe and compacted in equal lifts so as to avoid lateral displacement. Bedding material shall be placed in lifts not to exceed 6 inches compacted depth. Bedding material shall be placed to a level approximately 12 inches above the pipe barrel. Bedding material shall not exceed the approximate 12 inches level over the pipe barrel. The bedding material under, around, and over the pipe shall be compacted using a vibratory compactor.

Once the pipe has been placed, trench excavated material or flowable fill shall be used to backfill the remainder of the trench. Trench excavated material shall be placed in the trench and shall be

compacted to 95% maximum standard Proctor density with hand operated equipment. The Gas Contractor may use flowable fill for trench backfill at his cost. **When installing gas mains under existing or proposed KYTC roadways, the contractor must backfill with flowable fill to the subgrade elevation.** The cost of this flowable fill shall be incidental to the gas bid items. Granular material shall not be used as trench backfill.

4.3.2 Directional Drilling

Directional drilling is an accepted method for pipe installation and must comply with all the guidelines set forth in this specification. **The Duke Energy Engineer must approve all directional drilling.** The Gas Contractor must record the location and depth of the directional-drilled gas main at an interval of fifty (50) feet or less. The Gas Contractor shall excavate a test hole at least every 200-feet of bore to verify the location and depth of the drilled gas main.

For all directional-drilled gas main, the location and depth of all sewer laterals shall be determined and documented prior to drilling to insure there is no conflict between the proposed gas main and the existing sewer. A Sewer Lateral Location Plan must be submitted to Duke Energy and approved prior to the Gas Contractor performing any directional drill work; no additional money will be paid for this plan. **The gas contractor must perform a pre and post camera of all sewer lines and laterals.** Acceptable methods for locating the laterals are a camera or by physically uncovering the lateral. The Gas Contractor must install a sewer tag on every sewer clean out. Duke Energy will supply these tags.

4.4 Backfill

Backfill shall be compacted to 95% optimum density throughout the project regardless of location unless otherwise shown in the plans or directed by the Engineer. Granular backfill will not be allowed.

4.4.1 Flowable Fill (Low Strength Mortar Material)

When installing gas mains under existing or proposed roadway pavement, or when shown on the plans, the contractor must backfill with flowable fill to the subgrade elevation.

4.5 Lowering Main in Place

The Gas Contractor shall excavate along existing gas mains and lower the top of the mains in place to the elevations specified on the Gas Plans. The length of trench either side of the point to be lowered, required to ensure stresses are minimized in the pipe after it is lowered, is specified on the Gas Plans. Lowering mains in place shall be accomplished by:

- Excavate trench along both sides the existing main so it transitions down from the bottom of the main at one end of the trench to below the required top of pipe elevation at the point or length to be lowered, and then transitions back up to the bottom of the main at the opposite end of the trench. Excavate the soil from over and under the main as the trench is excavated. Additional trench depth should be excavated to accommodate sand bedding.

- Support the exposed steel mains at a minimum of 50-foot intervals and MDPE mains at a minimum of 100-foot intervals (unless specified otherwise on the plans) using side booms, track-hoes, blocking/skids, or sling supported from a beam or section of pipe placed across the trench width.
- Clean the pipe and visually check line for any damage. The protective coating on steel mains should be jeeped for holidays. Make repairs as needed per Duke Energy standards.
- Bed the bottom of the trench with 3" of sand.
- Lift the pipe using slings and side booms or track-hoes. Remove the pipe supports and lower the main into the trench. Adjust supports before lifting the main so they are not at or near girth welds.
- Check the top of main elevation at the point or over the points to be lowered to see if the top has been lowered to or below the elevation specified.

The lowering of main in place shall only be done by Duke Energy approved Gas Contractors or Duke Energy Crews.

4.6 Damage to Gas Facilities

The Gas Contractor must notify the Duke Energy Inspector whenever gas leaks or any questionable situation is encountered. The Gas Contractor shall not repair any active services or mains that may be damaged during construction.

4.7.2 Casing under Railroad Tracks

Agreements between Duke Energy and the Railroad must be signed before any utility work is performed on Railroad property. Railroad crossings require steel mains encased in steel casing if the top of the casing pipe is installed between 5.5 feet and 10 feet below the base of the rails. Un-cased steel mains can be installed if the top of the main is installed below 10 feet from the base of the rails. The Gas Contractor shall follow the terms and conditions outlined in the Crossing Agreement.

Railroad personnel are required to be present at the time of the crossing. The Gas Contractor must notify the Railroad before the crossing. Bored and Jacked installations shall have a borehole diameter essentially the same as the outside diameter of the casing pipe. The top of the casing pipe shall be more than 5.5-feet below the base of the railway rail. The carrier pipe shall be centered in the casing pipe and sealed and vented in accordance with Duke Energy Standards.

4.9 Pressure Testing

The contractor must supply all labor, equipment, and material to perform and complete the testing of all installed gas mains and services per Duke Energy's Pressure Testing procedure.

4.10 Gas Main Tie-Ins

The Gas Contractor may be required to assist Duke Energy at tie-ins. When assisting Duke Energy at tie-ins, the contractor will be working for Duke Energy and not the General Contractor/KYTC. Contractor will be paid at established rates (not prevailing wage) when performing work for Duke Energy. **Duke Energy reserves the right to perform all tie-ins to the existing gas mains.** On steel mains, tie-ins will require the installation and tapping of TD Williamson fittings. Tie-ins on polyethylene mains will require squeezing off the main and installing the appropriate saddles. The Gas Contractor will be required to have the following equipment:

- T D Williamson equipment for 2" through 6" steel mains.
- Squeeze-off equipment for 2-inch through 8-inch polyethylene,
- 4-inch and smaller guillotine saws,
- Electro-fusion equipment,
- Air Test and Hydrostatic Testing Equipment, and
- Other pertinent equipment necessary to tie in 2-inch through 6-inch steel and polyethylene mains.

It will be the responsibility of the Gas Contractor to meet with the Duke Energy inspector, prior to scheduling any tie in work, to discuss the equipment and personnel necessary to perform the work. Duke Energy will provide pressure crews to assist on tie in and purging activities.

Wipe test are required when performing tie-ins over 4" in diameter. The Gas Contractor must notify the Gas Inspector whenever liquid condensate is visible in the existing mains. The Road Contractor is responsible to provide a space for a roll off box if it is determined that there is PCB contaminated pipe on site. The Gas Contractor is responsible to keep the roll off box covered at all times. Duke Energy will provide the roll off box and dispose of any PCB contaminated pipe found on site.

The Gas Contractor may supply additional labor, equipment, and material necessary to abandon mains that are replaced in the road project. All purging, capping, sealing, cutting on main being abandoned or active main in the process of being abandoned will be completed by in house Duke crews.

Tie-ins on many Duke Energy mains are pressure and/or temperature dependent. All tie-ins completed between November 1 and April 30 will be looked at on a case by case basis by Duke Energy's Gas Control and Pressure Departments to evaluate the feasibility of completing the tie-in.

4.11 Restoration

All gas facility replacement work will likely be performed within the limits of the KYTC Road Project during its active construction by the Road Contractor. **Final restoration of all areas is the responsibility of the Road Contractor**; however, the Gas Contractor may have to perform some restoration to maintain traffic and ensure public safety. All areas, which are disturbed during gas main construction, which are outside of road construction limits, shall be replaced in-kind. All restoration shall be performed to the satisfaction of the KYTC Section Engineer. The KYTC Section Engineer shall approve all temporary and permanent restoration materials and their placement. Contractors will be responsible for maintenance of any restoration they install.

5.0 GAS SERVICES

The Gas Contractor may be required to renew customer services from the gas main to the customer's service meter. The service lines are broken into two portions: the main to curb cock portion (M-C) and the curb cock to service meter portion (C-M). The M-C portion of the gas service line is usually contained entirely within road right-of way. The C-M portion of a service line is mostly on private property, but a portion of it may be within road right-of-way. Duke Energy and its contractors are solely responsible for gas work performed outside the road construction limits. Curb to Meter (C-M) work will be performed for Duke Energy direct and will be paid based on established service work pricing.

The Gas Contractor is required to complete all associated Job Control Forms (JCF's) with the service work. JCF's must be completed within one day of the completion of the service work. JCF's which are not filled out correctly will be returned to the contractor for correction.

5.1 Main to Curb (M-C) Services

M-C services are broken up between short-side and long-side M-C. Method of payment is as defined in Standard Gas Bid Item Descriptions contained elsewhere in the bid proposal. Contrary to past road projects, the length of the gas service to be under or over 15 feet is no longer the determining factor in paying short vs. long side services. The determining factor is defined in the Standard Gas Bid Item Descriptions. The main to curb portion of the service line must have a minimum depth of 60" from proposed grade under roadways and a minimum depth of 42" in all other areas. This is particularly critical when crossing existing or proposed roads with the long-side piping.

5.2 Curb to Meter (C-M) Services

C-M services that do not pass the required pressure test, services that are metallic (steel or copper) or plastic services installed prior to July of 1982 will be renewed. The renewal work shall include turning on and off the services, separating existing facilities for testing, excavating, air testing, rebuilding of the meter set, setting a new meter bracket, replacing the meter as required, and re-lighting the customer appliances. Renewed C-M service lines shall be installed at a minimum depth of 18 inches on customer owned property.

Existing polyethylene services shall be reconnected to the new mains if it passes testing and was installed in July of 1982 or later. The Gas Contractor will be required to turn off and to re-light customer appliances in accordance with the planned service replacement work and the Duke Energy approved procedures. The Gas Contractor shall red tag all customer appliances that do not pass inspection and notify the Gas Inspector of the problem. Contact the gas inspector whenever anything unacceptable is found.

Conversion projects where gas services must be converted from standard pressure to intermediate or high pressure will require the installation of regulators and vent piping. The Gas Contractor must make arrangements with the Gas Inspector to Leak Survey every C-M service

the same day it is installed. All service holes outside the pavement area are to be covered with ¾" plywood and flasher barricade.

The Gas Contractor will be required to replace tin meters and mercury regulators associated with the renewal of curb to meter services. This replacement cost must be included in the curb to meter renewal unit price. Only Duke Energy personnel shall handle mercury regulators. If the household service lines or meters are found in an unacceptable location, the meters may be relocated to the outside.

6.0 DESCRIPTION OF PAY ITEMS

This section describes the gas utility pay items for this project. Pay items are broken up in to two categories:

1.) Pay items billed to the Road Contractor; and
2.) Pay items billed to Duke Energy directly.

6.1 Pay Items Billed to the Road Contractor

The Gas Contractor shall invoice the Road Contractor for all contracted pay items under **Section 7.1** according to the actual units installed. **The Road Contractor shall pay the Gas Contractor for any work performed at the Road Contractor's request that is outside the items contracted with the Road Contractor and that was not pre-approved by Duke Energy and the Cabinet; Duke Energy shall not be billed for this work.** The Road Contractor shall pay the Gas Contractor for actual quantities installed and not for those estimated on the bid sheet. The Road Contractor shall be reimbursed by KYTC. KYTC will bill Duke Energy at times and intervals agreed to by Duke and KYTC.

6.1.1 Length of Gas Main Installed

The length of gas main will be **paid on a linear foot or meter basis** based on the type and size of pipe installed. Payment will only be made for main that has been placed into service. Each size pipe shall be measured along the centerline of the pipe through fittings and casements from end to end. Where the pipe changes size, the particular size pipe shall be measured to the center of the transition fitting. No payment will be made for temporary offsets. **No additional payment will be made for rock excavation or extra depth; bidders must draw their own conclusions as to the subsurface conditions to be encountered.**

This item shall include all costs for labor, equipment, and materials (besides pipe and fittings) necessary to install the gas main. Installation of gas main shall include costs for the following:

- Mobilization,
- Saw cutting pavement,
- Traffic Control (flag-persons, arrow-boards, signs, plates, etc). Gas Contractors should be able to take advantage of the Road Contractors Traffic Control.
- Excavating the trench to the proper depth and width or drilling **in rock or soil**,

- Removal and disposal of spoil,
- Bores required to install 6-inch and smaller mains,
- Stringing the pipe along trench,
- Fusing or welding the pipe,
- Test welds or fusions,
- Sand bedding material,
- Flowable Fill or Low Strength Mortar backfill under existing and proposed roads and as required,
- Bedding the pipe,
- Lifting the joined pipe into trench,
- Coating welds and couplings,
- Excavation for utility location, including test holes,
- Installing tracer wire and test boxes,
- Installing anodes and test boxes,
- Backfilling the trench,
- Air testing,
- All temporary restoration
- All final restoration outside the disturbed road limits (including seed) as required in accordance with the plans and specifications.

No additional payments will be made for restoration and backfill if mains are directional drilled instead of direct buried.

6.1.2 Lower Main In Place

Gas mains lowered in place will be **paid on a linear foot or meter basis** of excavated trench per the size of pipe to be lowered. If service lines have to be relocated for the lowering, they will be paid for under the appropriate bid item. **No additional payment will be made for rock excavation, flowable fill, or extra depth.**

6.1.3 Boring – No Casing

This unit will be **paid on a linear foot or meter basis** for bores required to install 8 inch and larger steel main. The cost for bores required to install 6-inch and smaller mains must be included in the main installation unit price. This unit shall be reported for payment by size of the pipe installed in the bore regardless of the size of the bore and shall include all costs associated with completing the bore as well as setting up the bore machine. The cost of installing the gas main in the bore is in addition to the cost of the actual bore and should be reported for payment under length of gas main installed.

6.1.4 Boring With Steel Casing

This unit will be **paid on a linear foot or meter basis** for the size of the casing installed in the bore regardless of the size of the bore and shall include joining, excavation, the installation of all insulators, seals and vents in accordance with Duke Energy Standards and Procedures. The Gas Contractor shall be paid for installing the gas main in the casing on a linear foot or meter basis

per type and size of main in addition to the length of casing installed. No additional payment will be made for boring through rock.

6.1.5 Steel Casing – No Bore (Open Cut)

This unit will be **paid on a linear foot or meter basis** for the size of the casing installed in the trench. This work shall include joining the casing pipe, coating welds, installing anodes, installing test connections and test boxes, and sealing ends around carrier pipe. The Gas Contractor shall be paid for installing the gas main in the casing on a linear foot or meter basis per type and size of main in addition to the length of casing installed.

6.1.6 Valve Assembly

Valve assemblies will be **paid for on a lump sum basis** for the type and size of valve installed. The unit price for each valve installation includes setting the valve box to proper grade and the installation of pressure stems in accordance with the appropriate standard. For steel valves, the cost of welding the companion flanges, bolting the valve to the companion flange or welding the valve directly onto the line is included in the valve installation unit.

All valve installations will be made in accordance with Duke Energy's Gas Division plastic joining procedures and specifications.

6.1.7 Main Tie-Ins

Main tie-ins will be **paid on a lump sum basis** based on the size and type of main. The lump sum costs shall include:

- Preparation of any and all by-pass requirements,
- Installation of fittings, such as TD Williamson,
- Excavation, without regard to the classification of the materials.
- Transportation and cleaning of the T D Williamson equipment,
- Traffic Control (Flag-persons, arrow- boards, signs, and plates). Gas Contractors should be able to take advantage of the Road Contractors Traffic Control.
- Backfill material including Low Strength Mortar as required
- Surface restoration

Duke Energy reserves the right to allocate work to company personnel at any time to provide assistance with the tie-ins to insure completion in a timely manner.

6.1.8 Services - Main to Curb (M-C) Short Side & Long Side

Main to Curb (M-C) service work shall be **paid on a lump sum basis**. This item shall include all labor, equipment, and materials, necessary to install the gas service. This bid item includes installing 4 inch x 1 inch plastic electrofusion tee, all plastic couplings, stop cock, 1 inch plastic cap (at tee and end of service), plastic curb box (bottom and top), curb box lid, and necessary 1 inch plastic pipe with tracer wire. This item also includes air testing service and tapping tee. Services shall be installed with a 12-inch horizontal separation from the existing service.

M-C service work shall include all costs for the Gas Contractor's completion of all associated paperwork (JCF's, etc). Any temporary or permanent hard or soft surface restoration required for main to curb or curb to meter service installations outside the limits of road construction shall be considered incidental to the contract. No separate payment shall be made for restoration outside the limits of road construction. The Gas Inspector must be notified after a failed service line has been repaired so a record of the event can be logged and the inspector can verify that the repair was adequate.

6.2 Pay Items Billed to Duke Energy

The Gas Contractor shall invoice Duke Energy directly for all work, requested by Duke Energy, that is not included in the road contract**.**

The Gas Contractor shall only bill one project per invoice; do not send two or more projects on one invoice. The Gas Contractor shall not add any items to the pay sheets after the Gas Inspector has signed them. Additional pay items shall be placed on a separate pay sheet and signed by the Duke Energy Inspector.

The Road Contractor shall pay the Gas Contractor for any work performed at the Road Contractor's request that is outside the items contracted with the Road Contractor and that was not pre-approved by Duke Energy and the Cabinet; Duke Energy shall not be billed for this work.

7.0 INVOICING

It is the Gas Contractor's responsibility to know how, by whom, and for what he is being paid.

The Gas Contractor shall invoice the Road Contractor for all work performed to complete items listed under **Section 7.1** and for any extra work negotiated with the Road Contractor. The Road Contractor then invoices KYTC for this work. The Gas Contractor shall talk to the Section Engineer if the Road Contractor is behind in paying the invoices.

The Gas Contractor shall invoice Duke Energy for all work performed to complete items not included in the road contract and for any extra items (contract addendums) directly negotiated and intended to be paid by Duke Energy. These invoices shall be sent to the Duke Energy sponsoring engineer or project manager. These addendum items should not be invoiced with items that were bid.

7.1 Weekly Pay Sheets

The Gas Contractor must **meet** with the Duke Energy Inspector and the Section Engineer or inspector on a **weekly basis** to sign off on all pay sheets (preferably Friday evening or Monday morning). The pay sheets must describe all T&M work and break out the costs according to the appropriate Duke Energy work code. The daily sheets should clearly identify the start and stop times for the T&M on each date along with the inspector's signature for approval on that date.

Duke Energy Pre-qualified Gas Contractor Phone Numbers (REVISED 10/7/22)

AMS Construction – 10670 Loveland Madeira Rd., Loveland, OH 45140
Phone- 513-794-0410 Fax: 513-794-0414
Contact: Dale Franklin, Cell Phone - 513-276-0329 dale@amsdigs.com

RLA Investments – 603 Shepherd Lane, Cincinnati, Ohio 45215
Office: 513-554-1469 Fax: 513-554-1221
Contact: Scott Moody, Cell Phone – 513-623-4258, rlainvestment@fuse.net

Miller Pipeline – 4320 Mt Carmel Rd, Cincinnati, OH 45244
Office: 513-271-5616
Contact: Leon Morrison, Cell Phone – 513-582-9024, Lmorrison@ksenergyservices.com

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 compete 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 compete 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 were 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 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 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 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 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.

WATER RELOCATION SPECIFICATIONS

NORTHERN KENTUCKY WATER DISTRICT

THE FOLLOWING SPECIFICATIONS AND STANDARD DRAWINGS ARE TO BE USED FOR RELOCATION OF NORTHERN KENTUCKY WATER DISTRICT FACILITIES ONLY.

Section II
GENERAL INSTRUCTIONS AND SPECIAL NOTES

1. WATER SHUTDOWNS The Contractor after approval by the NKWD's representative shall notify all affected NKWD's customers a minimum of 48 hours prior to interrupting water service. Notification shall be made by the Contractor using the Northern Kentucky Water District "Interruption of Service Notice". All NKWD's customers shall be notified prior to having their water turned-off to have ample time to draw water for use until service is restored. Under no circumstance shall a customer of the NKWD be without water service overnight. Commercial customers may have additional requirement such as temporary water feed, special shut-down times, etc. If water service or existing water system cannot be interrupt during normal daytime hours due to water needs or high demands, the contractor may be required to conduct the work at night or on the weekend. This work is considered an incidental to the project. No active water main shall be shut down without prior approval of Northern Kentucky Water District. Tie-ins on this project may have to be scheduled at night, on weekends or other off peak hours.

2. 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 affected utilities, whether shown on the plans or not, prior to excavation and 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.

3. STATIONS AND DISTANCES All stations and distances indicated in the plans or specifications are approximate, therefore, some minor adjustment may have to be made during construction to fit actual field conditions.

4. FIRE HYDRANT DISCONNECTION No fire hydrant shall be removed from service without prior approval of Northern Kentucky Water District, and the proper fire authority.

5. RESIDENT ENGINEER "Resident Engineer" as referred to in the specifications or in the plans shall mean the KYTC Section Engineer in charge of the project and his inspectors.

6. WATER MAIN INSPECTION Northern Kentucky Water District and their inspectors, and the resident engineer and his inspectors shall be jointly responsible for inspection of water line facilities installation. Where the phrase "as directed" appears in these specifications without defining who is doing the directing, it shall be understood "as directed" means jointly directed by the KYTC Section Engineer and Northern Kentucky Water District

7. PRIOR INSPECTION OF EXISTING METER SETTINGS The Contractor with the Northern Kentucky Water District's inspector shall make an inspection of all meter settings to adjusted or relocated prior to construction. Any meter setting not up to Northern Kentucky Water District standard shall be noted and parts furnished to the Contractor by the Northern Kentucky Water District for installation as needed. Any water meter setting, fire hydrant or any other water facilities that are to be relocated, adjusted, reused or remain and are damaged by the Contractor shall be repaired at the contractors expense. Any old water meter settings removed and not reused shall be turned over to the Northern Kentucky Water District.

8. SPECIAL BACKFILL NOTE No sand or granular material shall be used for backfill above 12” over the top of the pipe or around structures. Only compacted soil or flowable fill shall be used unless approved or otherwise directed by the KYTC Section Engineer.

9. GENERAL SAFETY For the security and safety of people in and adjacent to trenches or construction operations, the "Manual of Accident Prevention in Construction" published by the Associated General Contractors Association of America, the "Manual On Uniform Traffic Control Devices" published by the Federal Highway Administration, and the safety regulations of the appropriate state and local agencies shall be followed when specifically applicable, or by similarity of operation or as necessary for adequate protection.

10. MATERIAL HANDLING Pipe, fittings, valves, hydrants, and accessories shall be loaded, unloaded, and handled by lifting with hoists or skidding so as to avoid shock or damage. Under no circumstances shall such materials be dropped. Pipe handled on skidways shall not be skidded or rolled against other pipe.

11. PROTECTION OF PAVEMENT Where main construction is located in or adjacent to pavements, all construction equipment shall have rubber tires. Crawler equipment will be permitted when there is no danger of damaging pavement.

12. NOISE, DUST AND ODOR CONTROL The Contractors construction activities shall b conducted so as to eliminate all unnecessary noise, dust, and odors. The use of oil or other materials, for dust control, which may cause tracking will not be permitted.

13. EXCAVATION AND CONSTRUCTION MATERIALS All excavated material and all construction materials in prosecution of the work shall be deposited so as not to endanger the work, create unnecessary annoyance to the public, or interfere with natural drainage courses. During the course of the work, all material piles shall be kept trimmed up and maintained in a neat, workmanlike manner. All material piles shall be kept a reasonable distance away from roadways so as not to cause a hazard and block the motorists view.

14. PROTECTION OF TREES, SHRUBS, AND OTHER ITEMS TO REMAIN Special care shall be taken by the Contractor to avoid unnecessary damage to trees or shrubs and their root systems or any other items shown to remain. Should the Contractor do unnecessary damage to any item shown to remain, the item shall be repaired or replaced at the contractors expense. Should unnecessary damage be caused to items to remain and is determined not repairable, the Contractor shall compensate the owner for the loss if any.

15. UNACCEPTABLE EXCAVATED TRENCH MATERIAL Any excavated trench material which is determined unacceptable for backfill shall be removed from the area and wasted at a location acquired by the Contractor and approved by the Resident Engineer. Acceptable backfill material shall be acquired by the Contractor at a location approved by the KYTC Section Engineer. The disposition and handling of unacceptable material and the acquisition and handling of acceptable material shall be at the Contractors expense.

16. BLASTING ROCK No blasting of rock shall be performed without specific permission of the Resident Engineer. Blasts shall be properly covered and all utilities and structures in the area shall be properly protected. Warning shall be given to all persons in the area who could be affected by the blasting. Blasting shall be at the risk of the Contractor who shall be liable for all damages to persons or property caused by the blasting. All blasting shall be performed in accordance with all regulations of the Kentucky Department of Mines and Minerals and all other governing agencies having jurisdiction. The Kentucky Department of

Mines and Minerals, area emergency response agencies, utility companies with utilities in the area shall be notified of the blasting sufficiently in advance.

17. ABANDONED VALVES The valve boxes shall be removed from all abandoned valves prior to final roadway paving. This shall be done to the satisfaction of the Engineer. Paving over a valve box without removing same will not be acceptable. No separate payment will be made for removal of valve boxes but shall be considered incidental to water line construction.

18. SALVAGED AND STOCKPILED ITEMS The Contractor shall salvage all items in a workmanlike manner. Any item damaged by the Contractor thru negligence shall be replaced with new items at the contractors expense. All salvaged items to be stockpiled and picked up by NKWD, shall be stored in a safe place until pickup. The Contractor is to notify NKWD at 859-578-9898 when salvaged items are available for pickup.

14. CONSTRUCTION PROCEDURE The successful contractor is to prepare a construction procedure with respect to the installation of water utilities. The Sequence and Procedure of Water Utilities Construction shall be approved by the Northern Kentucky Water District's Engineering Department and the KYTC Section Engineer prior to the beginning of the water utilities relocations.

Section III
MATERIAL SPECIFICATIONS

1. CONCRETE All concrete shall be Class A in accordance with KYDOH Standard Specs. for Road and Bridge Construction, current edition, and shall be placed in accordance with same unless otherwise noted. The concrete shall be placed to the dimensions as required in the plans or specifications. Reinforcing steel shall be placed in the concrete as required in the plans or specifications.

2. CONCRETE REINFORCING STEEL All reinforcing steel shall be Grade 40. The size, location, placement, and quantity shall be as required in the plans or specifications.

3. WATER MAIN

   A. **DUCTILE IRON PIPE**. Ductile iron pipe shall meet the requirements of ANSI A21.51 (AWWA C151)

      1. Material. The chemical constituents shall meet the physical property recommendations of ASTM A536 to ensure that the iron is suitable for satisfactory drilling and cutting.

      2. Minimum Thickness. Unless otherwise shown on the plans, the minimum thickness of the barrel of the pipe shall be Class 52. All pipe shall be clearly marked as to class by the manufacturer.

      3. Coating and Lining. The pipe shall be coated outside with a bituminous coating in accordance with ANSI A 21.51 (AWWA C151) and lined inside with cement mortar and seal coated in accordance with ANSI A21.4 (AWWA- C104).

      4. Fittings & Glands. Fittings and glands shall be ductile iron as specified in Section 3A, "Ductile Iron Fittings".

      5. Polyethylene Encasement. Ductile Iron Pipe shall be encased with Polyethylene film conforming to ANSI A21.5 (AWWA C105)

   B. **PIPE JOINTS**

      1. Push on and Mechanical. - Push-on and mechanical joints including accessories shall conform to ANSI A21.11 (AWWA-C111). Bolts shall be high strength COR-10 tee head with hex nuts. The maximum deflection at push-on joints and/or mechanical joints shall be 5 degrees or as recommended by the Manufacturer.

      2. Flanged. - Flanged joints shall meet the requirements of ANSI A21.15 (AWWA C115) or ANSI B16.1

         a. Gaskets. All flanged joints shall be furnished with 1/16 inch thick full face red rubber.
         b. Bolts. Bolts shall have American Standard heavy unfinished hexagonal head and nut dimensions all a specified in ANSI B18.2. For bolts of 1-3/4 inches in diameter and larger, bolt studs with a nut on each end are recommended. Material for bolts and nuts shall conform to ASTM A307, Grade B.

3. Restrained. - If restrained joint system is required on the plans, all pipes, bends, tees, etc. shall be restrained push-on joint pipe and fittings utilizing ductile iron components. Restrained joint pipe shall be ductile iron manufactured in accordance with the requirements of ANSI/AWWA C151/A21.51. Push-on joints for pipe shall be in accordance with ANSI/AWWA C111/A21.11 “Rubber-Gasket Joints for Ductile-Iron Pipe and Fittings.” Pipe thickness shall be designed in accordance with ANSI/AWWA C150/A21.50 “Thickness Design of Ductile-Iron Pressure Pipe,” and shall be based on laying conditions and internal pressures as stated in the project plans and specifications. All restrained joint pipe and fittings shall be boltless, flexible and capable of deflection after installation. Restrained joint pipe and fittings shall be U.S. Pipe’s TR FLEX restrained joint system, American’s Flex-Ring or pre-approved equal. Restraint of field cut pipe shall be provided with U.S. Pipe’s TR FLEX GRIPPER® Ring, TR FLEX Pipe field weldments or pre-approved equal. Method of restraining and laying schedule shall be approved by the District prior to the start of the project. Manufacturer installation instructions shall be followed. Restrained joints shall be capable of withstanding a maximum joint pressure of 250 psi. unless otherwise noted. **Mechanical joints with retainer gland and Field Lok® gaskets (or approved equals) are not acceptable unless otherwise specified (note: exception for valves and Special Restrained Joint).**

Exception to Restraint Specifications: Valves shall be restrained using mechanical joint restraint devices consisting of multiple gripping wedges incorporated into a follower gland compatible with all mechanical joints or MJ Field Lok conforming to the requirements of ANSI/AWWA C111/A21.11. Gland body, wedges and wedge actuating components shall be cast from 65-45-12 ductile iron and shall have a working pressure of 250 psi. Megalug Series 1100, MJ Field Lok® or approved equal.

Exception for Special Restrained Joints: When called out in bid items, special restrained joint pipe gaskets shall develop a wedging action between pairs of high-strength stainless steel stainless steel elements spaced around the gasket (Field Lok®, Fast-Grip® or approved equal gaskets). The bend shall be restrained using mechanical joint restraint devices consisting of multiple gripping wedges incorporated into a follower gland compatible with all mechanical joints (Megalug Series 1100®, MJ Field Lok® or approved equal). Restrained push-on joints shall conform to ANSI A21.11 (AWWA C111).

a. Bell and Spigot Bell and spigot joints shall conform to ANSI A21.6.

4. **FITTINGS**

A. DUCTILE IRON FITTINGS. Ductile Iron Compact Fittings and accessories shall conform to AWWA C153 and Full Body Fittings - and accessories to AWWA C110. Bolts and nuts shall be high strength, corrosion resistant alloy, such as "Cor-Ten" or approved equal.

1. Working Pressures. All fittings and accessories shall be Ductile Iron, rated for a minimum of 200 psi working pressure or as specified herein. The fittings and accessories shall be new and unused. (NOTE: Certain areas of the District’s service area require materials used, to be of a higher working pressure than 200 psi.)

2. Coating and Lining. The fittings shall be coated outside with a bituminous coating in accordance with ANSI A21.10 (AWWA C110) and lined inside with cement mortar and seal coated in accordance with ANSI A21.4 (AWWA C104).

3. Fittings and Glands. All pipe fittings shall be mechanical joint fittings. Mechanical joints shall conform to AWWA C111.

4. Polyethylene Encasement. Ductile Iron Fittings shall be encased with polyethylene film conforming to ANSI A21.5 (AWWA C105)

B. JOINTS

1. Mechanical. Mechanical joints including accessories shall conform to ANSI A21.11 (AWWA C111). Glands shall be ductile iron. Bolts shall be high strength COR-10 tee head with hex nuts.

2. Flanged. Flanged joints shall meet the requirements of ANSI A21.15 (AWWA C115) OR ANSI B16.1 and be used with the express approval of the Engineer.

a. Gaskets. All flanged joints shall be furnished with 1/16 inch thick full face red rubber.

b. Bolts. Bolts shall be stainless steel and have American Standard heavy unfinished hexagonal head and nut dimensions all a specified in ANSI B18.2. For bolts of 1-3/4 inches in diameter and larger, bolt studs with a nut on each end are recommended. Material for bolts and nuts shall conform to ASTM A307, Grade B.

3. Restrained. If restrained joints is shown on the plans, all pipe, bends, valves, etc. shall be restrained.

a. Bell and Spigot. Bell and spigot joints shall conform to ANSI A21.6.

5. POLYETHYLENE WRAP

All ductile iron pipe, fittings, valves, and fire hydrant leads shall be polyethylene wrapped, installed according to the current edition of AWWA C105. Ductile iron fittings, valves, and fire hydrant leads used in the installation of P.V.C. pipe shall be included.

A. Material. Polyethylene wrap shall be a minimum of 8-mil thickness low-density film or 4-mil thickness high-density cross-laminated polyethylene tube per AWWA C105. Polyethylene tube shall be blue in color.

B. Installation. The contractor shall cut the roll in tubes 2 feet longer than a standard length of pipe. Each tube shall be slipped over the length of pipe, centering to allow a 1' overlap on each adjacent pipe section. After the lap is made, slack in the tubing shall be taken up for a snug fit and the overlay shall be secured with polyethylene tape.

Pipe shall not be wrapped and stored on site for any period of time, but wrapped and immediately placed in the trench, fittings shall be wrapped prior to installing blocking or pads. (see Standard Drawing #104) Polyvinyl chloride pipe requires no wrap. Odd shaped appurtenances such as valves, tees, fittings, and other ferrous metal pipeline

appurtenances shall be wrapped by using a flat sheet of polyethylene. Wrapping shall be done by placing the sheet under the appliances and bringing the edges together, folding twice, and taping down.

For polyethylene wrap of the 24" water main, refer to the "CATHODIC PROTECTION" section of the specifications for special instructions.

6. **FIRE HYDRANTS**

A. DESCRIPTION. The Contractor shall provide all labor, materials, tools, and equipment required to furnish and install in good workmanlike manner all fire hydrants complete and ready for service where shown on the plans or where directed by the Engineer and as specified herein.

B. FIRE HYDRANTS. Fire hydrants shall conform to AWWA C502. Hydrants shall conform to the standards of the Northern Kentucky Water District as SHOWN on the plans. All fire hydrants shall have auxiliary valves for isolating water flow to the hydrant. All fire hydrants and auxiliary valves shall be positively locked to the water main by restrained joints, hydrant adapters, or other approved method.

Hydrants shall be designed to 200 psi working pressure and shall be shop tested to 300 psi hydrostatic pressure with the main valve both open and closed. The barrel shall have a breakable safety section and/or base bolts just above the ground line. Hydrants shall have a main valve opening of 5 1/4 inches, a 6 inch mechanical joint inlet to be suitable for setting in a trench 1,000 mm (3' 6") deep minimum, and shall be the traffic style hydrant so that the main valve remains closed when the barrel is broken off. Hydrants shall have a dry top and shall be self draining, when the main valve is closed. Self draining hydrants shall drain to dry wells provided exclusively for that purpose. Hydrant drains shall not be connected to storm or sanitary sewers. Hydrants located generally in the Covington System and other areas determined by the Engineer (flood zones) shall have all drain holes plugged prior to installation. Hydrants shall be rotatable in a minimum of eight (8) position in 360 degrees. All hydrants shall have two (2)- two and one half (2 1/2) inch hose nozzles and one (1) steamer or pumper connection threaded to conform to Northern Kentucky Water District Standards: steamer nozzle shall be National Standard Thread and 2 1/2" outlets shall be Northern Kentucky Water District Standard Thread (Old Cincinnati Thread). The operating nut and the nuts of the nozzle caps shall be square in shape, measuring one (1) inch from side to side. Hydrant body shall be painted yellow for areas designed for 150 psi working pressure and red for areas in excess of 150 psi. Hydrants used in areas in excess of 150 psi working pressure shall be designed to operate at the higher pressures and shall have independent operating valves on each 2 1/2" outlet.

All hydrants shall be right hand open, clockwise, except in certain areas of Campbell Co. as specified in Standard Drawings and shall have a direction arrow of operation cast into the dome of the hydrant. Installation per Standard Drawing #109.

C. INSTALLATION. The installation of fire hydrants shall be in conformance with "Mains Installation" section, paragraph "Setting Hydrants".

D. Polyethylene Encasement Fire hydrant tee, anchoring pipe and part of the fire hydrant shoe shall be encased with Polyethylene film conforming to ANSI A21.5 (AWWA C105). .(See Standard Drawing #109)

7. VALVES

A. DESCRIPTION. The Contractor shall provide all labor, materials, tools, and equipment required to furnish and install in good workmanlike manner all valves and accessories complete and ready for service where shown on the plans or where directed by the Engineer and as specified herein.

B. GATE VALVES. Gate valves shall conform to AWWA C509 and shall be cast iron or ductile body, resilient wedge, non-rising stem with rubber "O" ring packing seals. All external dome and packing bolts shall be stainless steel. The valves shall open by turning counter-clockwise. All valves shall have openings through the body of the same circular area as that of the pipe to which they are attached. Valves shall have mechanical joint ends unless otherwise shown on the plans or directed by the District. All valves shall be designed for a working pressure of 250 pounds per square inch (PSI) unless otherwise noted on the plans or in the "Supplemental Specifications". An extension stem shall be furnished if required, to bring the operating nut within 3-1/2 feet of finished grade. Extension stems shall be securely fastened to the valve stem. The Contractor shall make all valves tight under their working pressures after they have been placed and before the main is placed in operation.

B2. DUCTILE IRON RESILIENT WEDGE GATE VALVE WITH BEVELED GEARING. Ductile iron body, non-rising stem, open left, 2” square operating nut, epoxy coated, mechanical joint, inlet and outlet connections, O-ring type packing, resilient wedge, 250 PSI working pressure, and conforming in all other ways to AWWA Standard C515 American Flow Control 2500 Resilient Wedge Gate Valve or approved equal. Valve body to be assembled with stainless steel bolts grade 304 or better. Accessory package (glands, gaskets and bolts) shall not be included. Includes the specified valve, labor, equipment, excavation, polyethylene wrap, bedding, backfill, disinfection, pressure testing, restoration, etc. (contractor must supply mechanical joint restraints on restrained joint applications), required to install the specified 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 External Dome and Packing Bolts Shall be Stainless Steel.

C. TAPPING SLEEVES AND VALVES. Tapping sleeves and valves shall be designed for a working pressure of 250 psi. The tapping sleeve together with the tapping valve shall be tested at 250 psi for visible leakage and pressure drop before the main is tapped. Tapping sleeve and valve used in high pressure areas shall be tested at 350 psi.

1. Tapping Sleeves Tapping sleeves shall be two piece with mechanical joint type ends, and be so designed as to assure uniform gasket pressure and permit centering of the sleeve on the pipe.

2. Tapping Valves Tapping valves shall have a flange on one end for bolting to the tapping sleeve and a mechanical joint type end connection on the outlet with slotted standard flange or other adapters for connection to the tapping machine. All external dome , flange and packing bolts shall be stainless steel. The valves shall open by turning counterclockwise. Tapping valves shall conform to AWWA C509.

D. VALVE BOXES All valves shall be provided with valve boxes. Valve boxes shall be of standard, adjustable, heavy duty cast iron extension type, two piece, 5 1/4 inch shaft,

screw type, and of such length as necessary to extend from valve to finished grade, Tyler #562-S, Tyler #564-S or approved equal. Valve box cover shall be stamped "Water". Tops shall be set at final established grade.

E. BUTTERFLY VALVES. Unless otherwise specified valves 16 inches and larger shall be butterfly valves rated at 250 psi working pressure and conform to the applicable portions of AWWA Standard C504, latest edition.

1. Body - The valves shall be AWWA Class 250B designed for tight shut-off against a differential pressure of 250 psi. Valve bodies shall be constructed of ductile iron. Two trunnions for shaft bearing shall be integral with the valve body. The valves and appurtenances shall be suitable for buried service.

2. Ends - Valves shall have mechanical joint ends and shall be furnished with high strength COR-10 tee head with hex nuts, ductile iron glands, and rubber gaskets for each mechanical joint end.

3. Discs - Valve discs of cast steel, fabricated steel, or cast bronze are not acceptable.

4. Seats - Seats bonded on the discs are not acceptable.

5. Shaft Seals - If stuffing boxes are utilized for shaft seals they shall be constructed of cast iron, ASTM A126. Gland assemblies shall be of cast bronze, ASTM B132. The packing gland shall be housed in a solid walled cast iron, ASTM A48, Class 40 one piece structure or equal.

6. Operators - The valve operating mechanism shall be for counterclockwise opening. There shall be no external moving parts on valve or operator except the operator input shaft. Input shaft is to be operated by a 2 inch square operating nut. Maximum required input force on the operator shaft to open and close the valve shall be 40 pounds. The total number of turns applied to the operating nut required to completely open the valve from a completely closed position shall not be less than twice the normal valve diameter. An extension stem shall be furnished to bring the operating nut within 3 1/2 feet of the finished grade. Extension stems shall be securely fastened to the valve stem.

E. VALVE BOXES All valves shall be provided with valve boxes. Valve boxes shall be of standard, adjustable, heavy duty cast iron extension type, two piece, 5 1/4 inch shaft, screw type, and of such length as necessary to extend from valve to finished grade, Tyler #562-S, Tyler #564-S or approved equal. Valve box cover shall be stamped "Water". Tops shall be set at final established grade.

F. AIR RELEASE AND VACUUM VALVES. Air release valves shall be constructed at high points in the water line as indicated on the plans. These valves shall permit the air in the pipeline to escape as the pipe line fills and allows the air to re-enter as the line empties. These valves shall be APCO Air Release Valves Model #200-A, 250 psi working pressure, 1”, cast iron body and cover. 16" and larger water mains shall be a 2" air release valve and curb stop. Refer to Standard Drawing #106 for reference.

8. **STEEL CASING PIPE**

Casing pipe shall be steel pipe with a minimum yield strength of 35,000 psi with a minimum wall thickness as listed below:

Nominal Diameter Casing Pipe	Normal Wall Thickness	Nominal Diameter Casing Pipe	Normal Wall Thickness
Under 350 mm (14")	0.251"	650 mm (26")	0.438"
350 & 400 mm(14"&16")	0.282"	700 & 750 mm(28"&30")	0.469"
450 mm (18")	0.313"	800 mm (32")	0.501"
500 mm (20")	0.344"	850 & 900 mm(34"&36")	0.532"
550 mm (22")	0.375"	950 – 1050mm(38,40&42")	0.563"
600 mm (24")	0.407"	1200 mm (48")	0.626"

The inside diameter of the casing pipe shall be at least 100 mm (4”) greater than the outside diameter of the carrier pipe joints. Steel casing sections shall be connected by welding, conforming to AWWA C206.

Adequate pipe spacers shall be installed to ensure that the carrier pipe is adequately supported in the center of the casing pipe throughout it’s length, particularly at the ends. There shall not be any metallic contact between the casing and carrier pipe. Casing shall be backfilled with pea gravel or sand after the carrier pipe is installed to prevent pipe movement. Casings shall have both ends sealed up in such a way as to prevent the entrance of foreign material. See Standard Drawing #104 for installation details.

9. **MATERIAL APPROVAL** Material certification and test samples shall be provided by the Contractor, at the contractors expense, as required by Northern Kentucky Water District and the Kentucky Department of Highways. No material shall be used until approved. All rejected material be removed from the project and approved material acquired by the Contractor at the Contractor's expense.

10. **PAVING MATERIALS FOR REPLACEMENT IN KIND** All materials for replacement in kind of streets, sidewalks, curbs, walls etc. shall meet the requirements of the applicable sections of KYDOH Standard Specifications For Road And Bridge Construction.

11. **FLOWABLE FILL** This material shall meet the requirements of SPECIAL NOTE 7X of the Kentucky Department of Highways’ Standard Specifications for Road and Bridge Construction.

Section IV
CONSTRUCTION

A. GENERAL Installation of water mains and appurtenances shall conform to the latest edition of AWWA Standard C600 for D.I.P.

Water main pipe and fittings shall be laid on a good level foundation with no gaps or humps under the pipe or fittings. Excavation shall be done by hand at joints to prevent the pipe and fittings from being supported by the mechanical joint or slip joint bell. Pipe shall be laid with the bell ends facing in the direction of laying.

The interior of the pipe shall be thoroughly cleaned of foreign matter before being lowered into the trench and shall be kept clean during laying operations. ALL OPEN ENDS ARE TO BE CLOSED WITH CAPS OR PLUGS AT ALL TIMES WHEN PIPE LAYING OPERATIONS ARE NOT IN OPERATION AND AT THE END OF THE DAY. All caps or plugs shall be properly installed and blocked in advance of filling, flushing, and testing mains. All securing and blocking shall be inspected by the Engineer prior to backfilling of ditch.

B. HANDLING. Pipe, fittings, valves, hydrants and accessories shall be loaded and unloaded by lifting with hoists or skidding so as to avoid damage. Under no circumstances shall such materials be dropped. Pipe handled on skidways shall not be skidded or rolled against other pipe. Pipe hooks that extend inside the ends of the pipe shall not be used for handling the pipe since they could damage the lining. Under no circumstances shall such materials be dropped. The interior of all pipe, fittings and other accessories shall be kept free from dirt and foreign material at all times. When handling P.V.C. pipe care should be taken to avoid abrasion damage, gouging of the pipe, rocks, and any stressing of the bell joints or damage of the bevel ends.

C. TREE REMOVAL. Stumps of trees designated for removal 12" in diameter and smaller shall be physically removed. Any stump larger than 12" shall be ground down to 6" below final grade level.

D. DEWATERING. Should water be encountered, the Contractor shall furnish and operate suitable pumping equipment of such capacity adequate to dewater the trench. The trench shall be sufficiently dewatered so that the laying and joining of the pipe is made in the dry. The Contractor shall convey all trench water to a natural drainage channel or storm sewer without causing any property damage.

E. CONSTRUCTION EQUIPMENT. Where mains are located in or adjacent to pavements, all backfilling and material handling equipment shall have rubber tires. Crawler equipment shall be permitted when there is no danger of damaging pavement.

F. TRENCH SUPPORT. Supporting open cuts for mains shall be the responsibility of the Contractor where trenching may cause unnecessary damage to street pavement, trees, structures, poles, utilities, or other private or public property. During the progress of the work, whenever and wherever it is necessary, the Contractor shall, at his expense, support the sides of the excavation by adequate and suitable sheeting, shoring, bracing, or other approved means. Such trench support material and equipment shall remain in place until backfilling operations have progressed to the point where the supports may be withdrawn without endangering property.

G. NOISE DUST AND ODOR CONTROL. The Contractor's construction activities shall be conducted so as to eliminate all unnecessary noise, dust and odors.

H. DISINFECTION AND LEAKAGE TESTING. See Section "Disinfection and Leakage Testing."

I. TRENCH EXCAVATION AND BOTTOM PREPARATION.

1. General. The Contractor shall perform all excavation of every description and of whatever substances encountered to the depths indicated on the drawings or as otherwise specified. During excavation material suitable for backfilling shall be piled in an orderly manner a sufficient distance form the banks of the trench to avoid overloading and to prevent slides or cave-ins. All excavated materials not required or suitable for backfill shall be removed and wasted at a site acquired by the Contractor and approved by the Engineer. Topsoil shall be stripped from the excavation area before excavation begins.

Such grading shall be done as may be required to prevent surface water from flowing into trenches or other excavations, and any water accumulating therein shall be removed by pumping or other approved methods. The trench shall be sufficiently dewatered so that the laying and joining of pipe is made in the dry. The Contractor shall take whatever action necessary to insure that water pumped from the trench will not damage private property. If necessary the Contractor shall haul trench water to another suitable location for disposal.

Such sheeting and shoring shall be furnished and installed by the Contractor, at his own expense, as may be necessary for the protection of the work, protection of other utilities, protection of structures, the safety of the personnel, and the safety of the public. All shoring shall be removed when the work is completed unless directed otherwise by the Engineer. The Contractor shall also furnish whatever barricades or fencing necessary to provide for the safety of pedestrians in excavation areas and for traffic control as discussed in other sections. All open trenches shall be adequately covered, barricaded and/or backfilled during non-working hours in order to adequately protect vehicular and pedestrian traffic.

The Contractor shall excavate whatever material encountered. Trenches shall be excavated to the widths shown in the table headed "Trench Width" or as otherwise indicated in the plans, and the banks shall be as nearly vertical as practicable. The bottom of the trenches shall be accurately graded to provide uniform bearing and support for each section of the pipe or conduit on undisturbed soil at every point along its entire length, except for bell holes and for the proper sealing of the pipe joints. Bell holes and depressions in order that the pipe rest upon the prepared bottom for as nearly its full length as practicable, shall be only of such length, depth, and width as required for properly making the particular type of joint. Additional depth shall be excavated in rock as described elsewhere herein.

Except in cases where the elevations of the water lines are indicated on the plans, trenches for water line shall be of a depth that will provide a minimum cover over the top of the pipe of 36 inches from the indicated finished grade, and avoid interference of the water lines with other existing or proposed utilities. Where the note occurs, "Slope to Drain", the Contractor shall manage to keep a positive slope in that direction in order that air may travel to the air vent. Where paved surfaces are to be disturbed by an open cut,

the Contractor shall provide suitable machinery to cut the edges of the pavement in a smooth straight line.

2. Rock The word "rock" wherever used as the name of an excavated material, shall mean boulders and solid masonry larger than 1/2 cubic yard in volume, or solid ledge rock and masonry which, in the opinion of the Engineer, requires for its removal, drilling and blasting, wedging, sledging, barring, or breaking up with a power operated hand tool. Any material which can be excavated using a hand pick and shovel, power operated excavator, power operated backhoe or power operated shovel shall not be defined as rock.

3. Blasting Rock. No blasting of rock shall be done within 40 feet of pipes or structures without specific permission from the Engineer. Blasts shall be properly covered and the pipe or structure properly protected. Warnings shall be given to all persons in the immediate vicinity. Blasting shall be at the risk of the Contractor who shall be liable for all damages to persons or property. Necessary permits shall be secured and paid for by the Contractor.

4. Trench Width. Widths of trenches shall be held to a minimum to accommodate the pipe and appurtenances. The trench width shall be measured at the top of the pipe barrel and shall conform to the following limits:

Earth

a. Minimum - outside diameter of the pipe barrel plus 8 inches, 4 inches each side of pipe.
Maximum - nominal pipe diameter plus 24 inches.

Rock

Minimum – 24" or less, nominal pipe size: outside diameter of pipe barrel plus 12”, @ 6” each side.
Minimum - Larger than 24", nominal pipe size: outside diameter of pipe barrel plus 18”, @ 9” each side.
Maximum - nominal pipe diameter plus 24”.

b. Butterfly Valves. Trench width shall be over excavated 24" on the side that the operating mechanism is located on the butterfly valve when the surrounding area cannot be hand dug.

c. Structures. The minimum excavation limits for structures shall be as indicated. In rock, the excavation limits shall not exceed 12 inches from the outside wall and 6 inches below the footer.

5. Excessive Trench Width. If, for any reason the trench width exceeds the maximum trench width defined in paragraph "Trench Width", the Contractor, subject to approval of the Engineer, shall provide compacted stone bedding, additional strength pipe or concrete encasement, at the contractor expense.

6. Bottom Preparation The Contractor shall use excavation equipment that produces an even foundation. For the entire length of the trench, a compacted layer of sand or bankrun bedding material shall be installed below the pipe. Bell holes and depressions for joints, valves, and fittings shall be dug after the trench bedding has been graded in order that the pipe rest upon the prepared bedding for as nearly its full length as

practicable. Bell holes and depressions shall be only of such length, depth, and width as required for properly making the particular type of joint.

a. Earth. The trench shall be excavated to the depth required, so as to provide a uniform and continuous bearing and support for the pipe barrel. A minimum of 3" sand shall be installed on the solid and undisturbed ground. The finished trench bottom shall be accurately prepared by means of hand tools.

b. Rock. Where excavation is made in rock or boulder, the trench shall be excavated 6 inches below the pipe barrel for pipe 24 inches in diameter or less, and inches for pipe larger than 24 inches in diameter. All loose material shall be removed from the trench bottom. After preparation of the trench bottom, a pipe bed shall be prepared using sand and thoroughly compacted. The bedding material shall be spread the full width of the trench bottom.

7. Water Main Depth. Mains 12" and less in size shall be not less than 36" in depth and no more than 48" in depth, unless otherwise specified. Mains larger than 12" shall be installed as shown on the plans.

8. Excessive Trench Depth. If, for any reason, the trench depth exceeds the trench depth shown on the Plans, the Contractor is responsible for any and all additional cost incurred for the excessive depth.

9. Foundation. The mains are to be built on a good foundation. If, in the Engineer's opinion, the material forming the trench bottom is not suitable for a good foundation, a further depth shall be excavated and the same filled with suitable material. Unauthorized excavation below the trench bottom shall be filled with compacted crushed stone at the Contractor expense.

J. PIPE, VALVE AND HYDRANT INSTALLATION The provisions of AWWA C600 shall apply in addition to the following:

1. Pipe shall not be laid in water or when trench or weather conditions are unsuitable for the work except when permitted by the Engineer. Unless otherwise indicated in the plans or in Section I, Bid Item Explanations, the material shall be new and unused. The interior of the pipe shall be thoroughly cleaned of foreign matter before being lowered into the trench and shall be kept clean during laying operations by plugging or other approved methods. Pipe shall be laid with bell ends facing in the direction of laying, unless otherwise directed by the Engineer. After placing a length of pipe in the trench, the spigot end shall be centered in the bell of the pipe and forced home. All pipe shall be laid with ends abutting and true to line and grade. Deflection of pipe joints in excess of the manufacturer's recommendations will not be permitted. A watertight pipe plug or bulkhead shall be provided and used to prevent the entrance of foreign material whenever pipe laying operations are not in progress. Any pipe that has the grade or joint disturbed after laying shall be taken up and relayed. Any section of pipe found to be defective before of after laying shall be removed and replaced at the Contractor's expense.

2. Pipe Cutting. The cutting of pipe for installing valves, fittings, or hydrants shall be done in a neat and workmanlike manner without damage to the pipe or lining. The end shall be smooth and at right angles to the axis of the pipe. Flame cutting of metal pipe by means of an oxyacetylene torch shall not be permitted. All pipe cutting shall be at the Contractor's expense.

3. Push-On Joints. The surfaces with which the rubber gaskets comes in contact shall be thoroughly cleaned just prior to assembly. The gasket shall then be inserted into the groove in the bell. Before starting joint assembly, a liberal coating of special lubricant shall be applied to the spigot end. (Special lubricant shall be suitable for use in potable water) With the spigot end centered in the bell, the spigot end is pushed home.

4. Mechanical Joints. Mechanical joints require that the spigot be centrally located in the bell. The surfaces with which the rubber gasket comes in contact shall be thoroughly cleaned just prior to assembly. The clean surfaces shall be brushed with a special lubricant just prior to slipping the gasket over the spigot end and into the bell. (Special lubricant shall be suitable for use in potable water) The lubricant shall also be brushed over the gasket prior to installation to remove the loose dirt and lubricate the gasket as it is forced into its retaining space. P.V.C. pipe spigot ends shall be field cut smooth and at right angles to the axis of the pipe for installation in mechanical joint fittings.
   1. Bolt Torque The normal range of bolt torque to be applied to standard cast iron bolts in a joint are:

Size	Range of Torque in foot-pounds
5/8"	40 - 60
3/4"	60 - 90
1"	70 - 100
1-1/4"	90 - 120

5. Restrained Joints

   a. Ball and Socket. Ball and Socket joints shall be assembled and installed according to the manufacturers recommendations. The joint shall be thoroughly cleaned and lubricated. Check the retainer ring fastener. After installation, all slack shall be taken out of the pipe joint.

   b. Push-On. Assemble and install the push-on joint according to the manufacturer's recommendations. Restrained joint-type pipe and fittings shall only be used as approval by the Engineer. Retaining glands, field lock gaskets, or retaining flanges shall not be considered as providing a restrained joint. The joint shall be thoroughly cleaned and lubricated. Check the retainer ring fastener. After installation, all slack shall be taken out of the pipe joint.

6. Setting Valves. Valves shall be set on a firm solid concrete block foundation so that no load will be transferred to the connecting pipe. Valves in water mains shall, where possible, be located on the street property lines extended, unless otherwise shown on the plans. A valve box shall be provided for every valve. The valve box shall not transmit shock or stress to the valve and shall be centered and plumb over the operating nut of the valve. The box cover shall be set flush with the surface of the finished pavement unless otherwise shown. All valves boxes with the exception of isolating valves for fire hydrants that are located in non-paved areas shall have a minimum of 2'x2'x4" concrete pad as shown in Standard Drawing No. 105.

7. Setting Hydrants. Hydrants shall be located as shown on the plans or as directed by the Engineer. The location shall provide complete accessibility and minimize the possibility of damage from vehicles or injury to pedestrians. All hydrants shall stand plumb with the pumper nozzle facing the curb. Hydrant shall be set to the established grade, with the

traffic flange within 100 mm (4") above final grade in accordance to Standard Drawing No. 109. Each hydrant shall be controlled by an independent gate valve with valve box. All valves used for hydrant control shall be anchored to the branch tee.

8. Thrust Blocking. All bends over five (5) degrees, plugs, caps, and tees shall be securely blocked against movement with concrete thrust blocks placed against undisturbed earth in accordance with Standard Drawing No. 104. Thrust blocks shall be approved by the Engineer prior to backfilling. Water mains shall have concrete thrust block at all pipe intersections and changes of direction to resist forces acting on the pipeline. All concrete thrust blocks shall be poured in such a manner that the bolts can be replaced without disturbing the blocking.

   All caps or plugs used in mains to undergo hydrostatic test shall be properly installed and blocked in advance of testing mains. All caps or plug installations shall be approved by the Engineer's representative before the main is subjected to the pressure test.

   a. Concrete Blocking. Concrete blocking shall be K.D.O.T. Class A concrete as specified in Section "Concrete". Blocking shall be placed between undisturbed ground and the fitting to be anchored. The area of bearing on the fitting and on the ground in each instance shall be that shown herein. The blocking shall, unless otherwise shown, be so placed that the pipe and fitting joints will be accessible for repair.

   b. Tie Rods. If shown or specified, movement shall be prevented by attaching suitable metal rods, clamps or restrained fittings. Steel tie rods or clamps, where permitted, shall be of adequate strength to prevent movement. Steel tie rods or clamps shall be painted with three coats of an approved bituminous paint or coal tar enamel. A minimum of 3/4" welded eye bolts @ a 90 degree bend and 3/4" threaded rods may only be used with the approval of the Engineer for temporary restraint only. Duc-Lucs are prohibited for use.

   c. Restrained Fittings. Restrained fittings, where permitted, shall be subject to the approval of the Engineer.

K. TRENCH BACKFILL

All trench backfill shall be free from cinders, refuse, organic material, boulders, rocks or other material which in the opinion of the Engineer is unsuitable. No backfill shall be made with frozen material.

1. BACKFILL

   a. Trench Bottom Preparation. The pipe shall be bedded on sand to achieve full pipe barrel support. In any event not less than 3" of sand bedding shall be used.

   b. Backfill to 12" Over Pipe Barrel. All trench excavations shall be backfilled immediately after pipe is laid with the exception of thrust blocks. Compacted sand shall be used to backfill the trench from the bottom of the pipe barrel to the 12" over the pipe barrel. No flushing of backfill shall be permitted to achieve compaction. Clay bulkheads shall be installed as specified under Bulkheads Section.

   c. Remaining Trench Backfill. From 12" above the pipe barrel to the surface, excavated trench material or flowable fill may be used as backfill material. No material shall be

used for backfill that contains frozen earth, vegetation or organic material, debris, rocks **8"** or larger measured in any direction, or earth with an exceptionally high void content.

d. Compaction. All backfill shall be placed in uniform loose layers, not to exceed 12" layers, and each layer shall be compacted to a density not less than 95 percent of the standard Proctor maximum dry density (ASTM D698). The backfill shall be compacted in such a manner and with appropriate equipment so that there is no pipe damage, pipe misalignment or damage to joints. No flushing of backfill shall be permitted to achieve compaction.

e. Bulkheads. When a granular bedding is provided in rock or when granular backfill is used, the Contractor shall place bulkheads of clay soil across the trench at 100' intervals to resist the movement of groundwater through the granular material. Such bulkheads shall be carefully compacted and shall extend approximately 3 feet in a direction parallel to the pipe and shall extend from the bottom of the trench to a point 4" below final grade level.

f. Flowable Fill as Backfill As required by the Engineer, flowable fill shall be per Special Note 7X of the Ky. Department of Highways Standard Specifications for Road and Bridge Construction.

g. Surface Conditions. The trench surface shall be periodically attended to during the course of the contract. The trench surface shall be maintained in a safe condition and shall not interfere with natural drainage.

L. INSTALLATION OF PIPE BY BORING OR JACKING. At certain locations where designated on the plans, the Contractor will be required to install pipe under paved areas or other obstacles by boring a hole large enough to pull the pipe through without obstructing the designated area, or by jacking, whichever is the most feasible.

M. WATER METERS Water Meters shall be installed at locations shown on the plans. The meter shall be constructed as shown on Standard Drawings contained herein or in the plans.

N. CONNECTIONS (TIE-INS) TO EXISTING WATER LINES All connections to existing water lines shall be made at location shown on the plans. Care shall be taken in each case that none of the sterilizing water may enter the system during the sterilizing operation. Each connection shall be preceded with a one inch corporation stop and drain to allow bleeding of the water line of air and sterilizing water. This corporation stop shall be furnished and installed at the Contractor's expense. All sections of pipe and appurtenances to be used for tie-ins and not sterilized, shall be thoroughly cleaned by scrubbing with a chlorine solution prior to installation. All tie-ins of mains shall be done with transitional or straight solid sleeves. Mains shall be flushed of sterilizing water before tie-ins to existing mains are made.

O. INSTALLATION OF SERVICE LINES Service line shall be installed as shown on the plans or as directed. The Contractor shall excavate whatever material encountered. The service lines shall be installed using boring and jacking or open cut (as specified on the plans) at the depth required to clear existing and proposed sewers, but in no case shall the line be installed with less than 36" cover from final grade. The trench width shall be as excavated to a maximum of 2'. The line shall be laid on firm soil. In rock, sufficient extra depth shall be excavated and refilled with acceptable compacted soil or bedding sand to provide a cushion for the elimination of the possibility of crushing or perforating the pipe. Connections shall be made using normal practices for water line installation and in accordance with the standards

in the plans or contained herein. Backfill shall meet the same requirements as that described in PIPE TRENCH BACKFILL.

P. TEMPORARY SERVICE CONNECTIONS Contractor shall furnish, install, make connections, and maintain all temporary lines and other appurtenances necessary to run temporary service connections as needed to permit construction. All temporary service pipes crossing streets, commercial driveways, and/or wheelchair ramps must be buried to prevent a traffic/pedestrian hazard.

The pipe, hoses and other materials furnished by the Contractor for use as temporary service pipe, shall be clean, water-tight and fully adequate to withstand existing pressures and all other conditions of use.. Care shall be exercised throughout the installation of all temporary pipe and service fittings to avoid any possible contamination of any mains or house services or contamination of the temporary pipe proper. Contractor must disinfect all temporary line. All temporary lines must be flushed before being hooked to service line.

The Contractor shall be responsible for the regularly testing and recording the chlorine level of the temporary lines. If low levels are encountered, the Contractor shall be responsible for flushing the line to get levels into standard. The Contractor shall perform all connecting and disconnecting of temporary bypass to consumers' services and all back clearing of service lines.

The Contractor shall maintain the temporary water service line in safe and operative condition at all times. Any temporary bypass lines or services crossing a sidewalk or driveway shall be temporarily covered with a rubber ramp provided by the Contractor or bituminous cold patch, compacted by a roller or a mechanical compaction device, provided by the Contractor. Ramping method must be approved by the District prior to use. The Contractor shall be responsible for the maintenance of the temporary ramping method and any damage as a result there-of.

Q. **APPLICABLE SPECIFICATIONS & STANDARDS**

The following specifications and standards form a part of these Specification:

A. **American Water Works Association** (AWWA) Standards
B. **Northern Kentucky Water District** Standards Drawing & Specifications
C. "Manual of Accident Prevention in Construction" published by the **Associated General contractors of America**
D. **Kentucky Occupational Safety and Health Administration's** "Kentucky Occupational Safety and Health Standards for General Industry" current edition.
E. **American National Standards Institute** (ANSI)
F. **American Society for Testing & Materials** (ASTM)
G. **Kentucky Division of Water Quality**
H. **"Recommended Standards for Water Works"** current edition

Section V
DISINFECTION AND LEAKAGE TEST

A. SCOPE. This section covers the disinfection of the new water mains, fittings, temporary services and associated appurtenances. The Contractor shall provide all labor, materials, tools, equipment, and incidentals required to test the mains for watertightness and disinfect the mains as directed by the District and as specified herein. Gauges for the test shall be furnished by the Contractor.

B. TEST SECTION. After the main has been installed and backfilled all newly installed pipe or any valved section thereof shall be considered a test section.

C. WITNESS. All tests performed for each test section shall be witnessed and approved by the District before acceptance. In the event the Contractor performs any test without witness by the District, the Contractor will be required to test the section again in conformance with this specification at no cost to the District.

D. GENERAL. All disinfection work shall conform to the requirements of the latest revision of ANSI/AWWA C651 and the requirements of the Kentucky Division of Water. If any State requirements conflict with the provisions of this section, the State requirements shall govern.

Water required for flushing and disinfection work will be provided as stipulated in the temporary facilities.

When it is necessary to interrupt service to water customers, each customer affected shall be notified in advance of the proposed service interruption and its probable duration in accordance with the project requirements.

E. DISINFECTION PROCEDURE. During construction or after the installation of the pipe and fittings is complete, an approved disinfection method, according to governing standards, shall be used. The disinfection solution shall be allowed to stand in the main and associated appurtenances for a period of at least twenty-four (24) hours.

During disinfection, all valves, hydrants, and service line connections shall be operated to ensure that all appurtenances are disinfected. Valves shall be manipulated in such a manner that the strong disinfection solution in the main from flowing back into the supply line. Check valves shall be used if required.

All non-disinfected fittings used for tie-ins or repairs shall be cleaned and swabbed with a liquid sodium hypochlorite disinfecting solution prior to installation.

F. FINAL FLUSHING. Upon completion of chlorination but before sampling and bacteriological testing, Contractor shall remove all heavily chlorinated water from the main and temporary services by flushing with potable water at the maximum velocity which can be developed under the direction and control of the District.

The Contractor shall properly neutralize and dispose of the chlorinated water and flushing water in accordance with all applicable regulations. Contractor shall obtain all special waste disposal permits necessary.

G. DISPOSAL OF HEAVILY CHLORINATED WATER. Contractor shall apply a de-chlorinating agent to the water to be wasted to neutralize thoroughly the chlorine residual remaining in the water. (See the following table for neutralizing chemicals.) Federal, state, and local regulatory agencies should be contacted to determine special provisions for disposal of heavily chlorinated water.

Chlorine residual of water being disposed of shall be de-chlorinated by treating with one of the chemicals listed in the following table:

Pounds of Chemicals Required to De-chlorinate Various Residual Chlorine Concentrations in 100,000 Gallons of Water*

Residual Chlorine Concentration *mg/L*	Sulfur Dioxide (SO2)	Sodium Bisulfate (NaHSO3)	Sodium Sulfite (Na2SO3)	Sodium Thiosulfate (Na2S2O3@5H2O)
1	0.8	1.2	1.4	1.2
2	1.7	2.5	2.9	2.4
10	8.3	12.5	14.6	12.0
50	41.7	62.6	73.0	60.0

* Except for residual chlorine concentration, all amounts are in pounds.

The Contractor shall provide all necessary materials, equipment and labor for applying the de-chlorinating chemical in a manner such that proper mixing and contact time of the chemical and the heavily chlorinated water is obtained for complete removal of chlorine being flushed. The Contractor shall periodically test the flush water to verify that the chlorine residual is zero.

H. CHLORINE RESIDUAL TESTS. Upon completion of final flushing, the District will perform chlorine residual tests to ensure the chlorine residual in the main and temporary services is not higher than that generally prevailing in the remainder of the water distribution system and is acceptable to the District.

I. BACTERIOLOGICAL TESTS. Sampling and testing of water in the main and temporary services will be performed by the District after final flushing. A standard plate count will be made by the District for each sample.

J. REDISINFECTION. Should the bacteriological tests indicate the presence of coliform organisms at any sampling point, the main and temporary services shall be re-flushed, re-sampled, and re-tested. If check samples show the presence of coliform organisms, the main and temporary services shall be re-chlorinated at no additional cost to the District until results acceptable to the District are obtained.

Re-disinfection shall be completed by the continuous feed or by the slug method. Unless otherwise permitted, the chlorination agent shall be injected into the main and temporary services at the supply end through a corporation cock installed in the top of the pipe. All materials, equipment and labor necessary for the re-disinfection shall be

supplied by Contractor at no additional cost to the District.

K. HYDROSTATIC TESTING. Hydrostatic Testing will be in accordance with AWWA C600. The water main being tested shall have all air expelled by additional flushing or installation of taps on high points in the line. The pressure of the water main shall be gradually increased to obtain a minimum pressure of 100 psi over the design pressure 250 psi. at the lowest elevation point of the water main or as directed by the Engineer. The test will be for a two (2) hour duration and will not vary by more than 5 psi. All tests performed for each test section shall be witnessed and approved by a representative of the Engineer, in the event any test is performed without a representative of the Engineer, the Contractor shall be required to test the section again. Leakage is defined as the amount of water used to maintain the test pressure.

Section VI
VEHICULAR AND PEDESTRIAN TRAFFIC CONTROL

1. REFERENCE MATERIALS Traffic shall be maintained in accordance with the “Manual on Uniform Traffic Control” published by the Federal Highway Administration, current edition of Kentucky Department of Highways Standard Specifications for Road & Bridge Construction and current KYDOH Standard Drawings.

2. PEDESTRIAN TRAFFIC Should the Contractor be required to remove sidewalk or any other pavement used by pedestrians, the Contractor shall construct an approved, safe, alternate route with acceptable paving materials. Approval for alternate routes and temporary paving materials shall be acquired form the Engineer. The Contractor shall also construct temporary barricades and fences as required. No extra payment will be made for construction of temporary pedestrian walkways, fences or barricades required for water line construction, but shall be considered incidental to water line construction.

3. VEHICULAR TRAFFIC Vehicular traffic shall be maintained as required by the referenced materials listed above. The cost of all temporary paving materials for pavement restoration due to water line construction shall be considered incidental to the contract. The cost for all traffic control materials including signs, barricades, etc. shall be considered incidental to the contract. The Contractor shall be required to keep the construction area safe at all times and check that traffic control devices are in place. Should temporary paving materials used for water line construction fail to perform satisfactorily, the Contractor shall repair same at his own expense.

Section VII
TEMPORARY AND PERMANENT RESTORATION

1. TEMPORARY RESTORATION Any street, driveway, parking lot, sidewalk, stairs, walls, etc. disturbed by water line construction which is shown on roadway construction plans to be disturbed by roadway construction may be replaced with temporary materials. These temporary materials and their placement shall be approved by the Engineer prior to placement. The cost for temporary paving materials and their placement shall be considered incidental to the cost of water line construction.

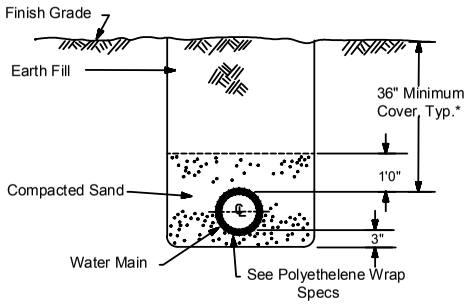
2. PERMANENT RESTORATION Any street, driveway, parking lot, sidewalk, walls, shrubs, etc. disturbed by water line construction, which is shown on roadway construction plans to remain and not be disturbed by roadway construction, shall be replaced in kind. The concrete, asphalt, and stone removed shall be replaced with the same type material, the same thickness as that removed. All pavement shall be removed and replaced to 1' beyond the limits of excavation as detailed on drawing contained herein. These permanent materials and their placement shall be approved by the Engineer prior to placement. The Contractor shall reconstruct same to the original lines and grades and in such a manner as to leave all such items in fully as good or better condition than that which existed prior to construction. All restoration work shall conform to the requirements of KDOH Standard Specifications for Road and Bridge Construction and to the drawing for pavement restoration contained herein. The cost for this permanent restoration shall be considered incidental to the cost of the water line construction.

3. SEEDING AND SODDING This work shall be performed under bid items pertaining to same for roadway construction and in accordance with KDOH Standard Specifications for Road and Bridge Construction.

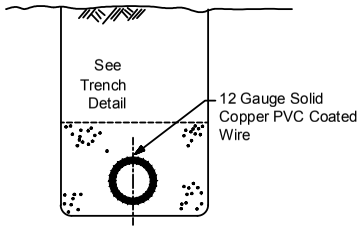
Northern Kentucky Water District

2021

Standard Specifications & Drawings for the Installation of Water Mains

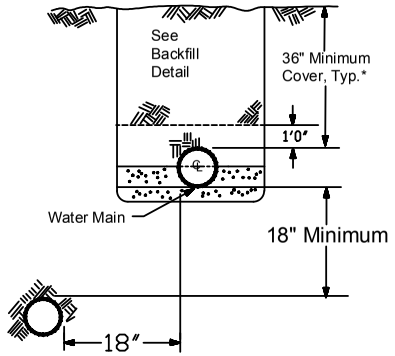


EARTH CUTS
TRENCH DETAIL



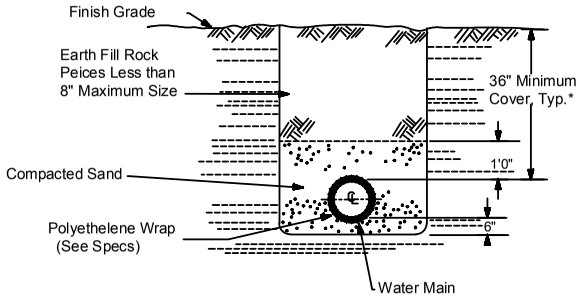
PVC PIPE

ALTERNATE TO BE USED ONLY ON APPROVAL
BY THE DISTRICT



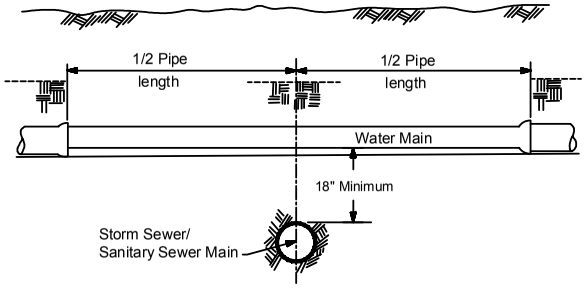
Water Main must be located a minimum of 10 feet lateral distance from anyexisting or future sewer lines or manholes, or as shown in the above alternate.

WATER MAIN PARALLELING
SEWER MAIN



ROCK CUTS
& UNSTABLE SUBGRADE

TRENCH DETAIL



WATER MAIN CROSSING SEWER

SUBDIVISION CONSTRUCTION

* Unless Otherwise Noted

REVISION	BY	DATE
1.5" Max. Rock size	MPS	1/15/93

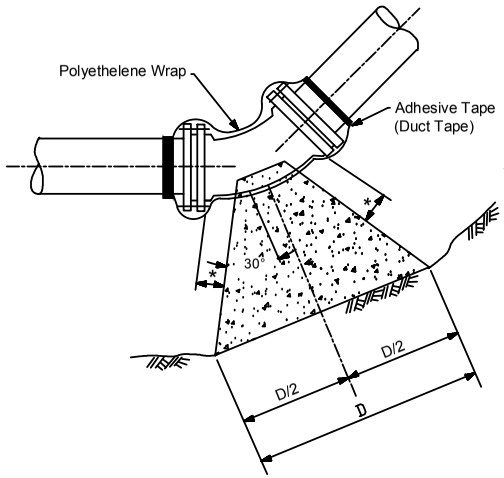
N. KY. WATER DISTRICT
TYPICAL PIPELINE TRENCH
DETAIL

DRAWN BY: SAR

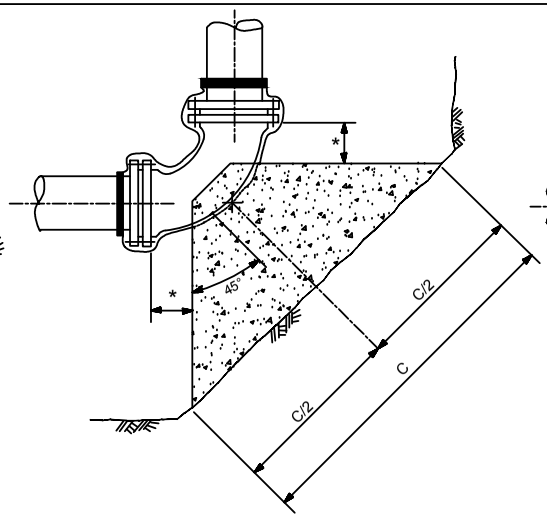
APPROVED:

DATE: 2/1/2021

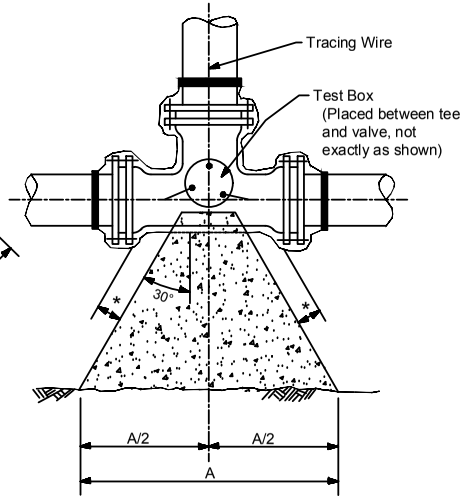
STANDARD DRAWING NO: 103



45° BEND



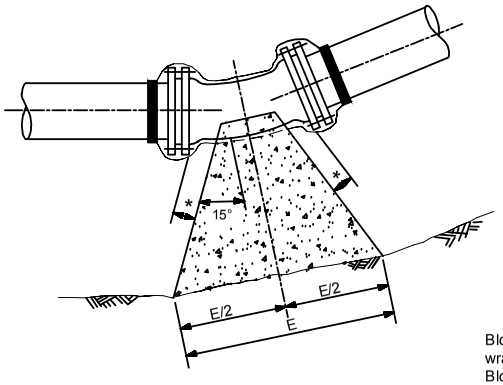
90° BEND



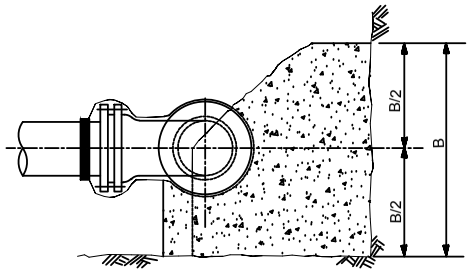
TEE (DEAD END OR FIRE HYDRANT SIMILAP

150 PSI/250 PSI

PIPE SIZE	A	B	C	D	E
6"	2'-6"	2'-0"	3'-0"	2'-0"	2-0"
8"	3'-0"	2'-6"	4'-6"	2'-6"	2'-6"
12"	5'-6"	3'-0"	7'-6"	4'-0"	3'-0"
16"	7'-6"	3'-6"	11'-0"	6'-0"	4'-0"
24"	14'-6"	4'-0"	20'-6"	11'-6"	6'-0"
30"	22'-6"	4'-0"	31'-6"	17'-0"	9'-0"



11 1/4° & 22 1/2° BEND



ELEVATION

Blocking shall be poured after blue polyethelene wrap is in place.
Blocking shall be inspected by the District prior to backfilling.

* Distance to be 1/2" longer than entire length of the bolt used.

NOTES

1 DIP Fittings shall be per specifications.
2 Concrete to be 3500 psi.
3 All fittings to be Mechanical Joint.
4 Thrust blocks to be placed against undisturbed earth - use additional concrete as required for over excavation.
5 Blocking to be placed in a manner so that bolts can be removed without distrubing the block.
6 Thrust block bearing surface must be suitable for a design bearing pressure of 2,500 psi.

REVISION	BY	DATE

N. KY. WATER DISTRICT

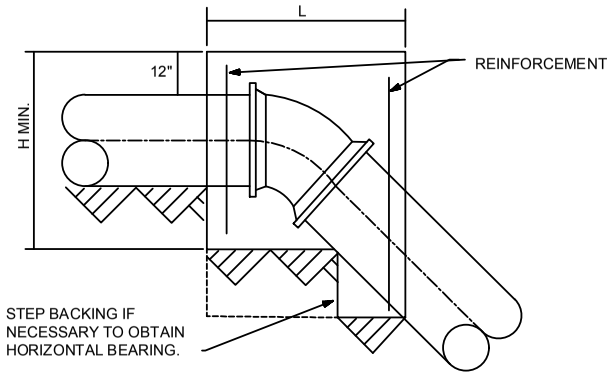
CONCRETE THRUST BLOCK DETAIL

DRAWN BY: SAR

APPROVED:

DATE: 2/1/2021

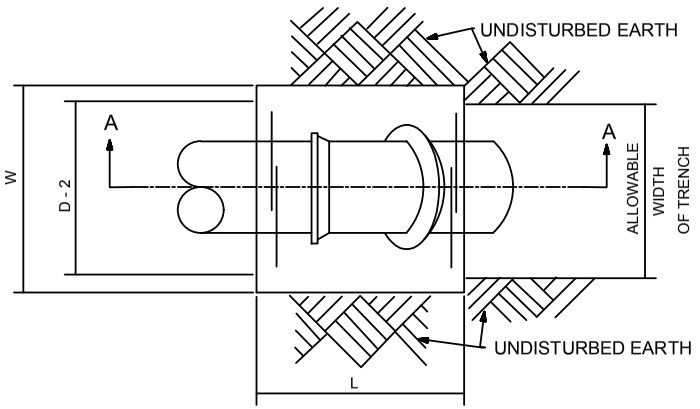
STANDARD DRAWING NO: 104-M



SECTION A-A

SIZE of PIPE	DEGREE OF BEND											
	11 1/4				22 1/2				45			
	L"	W"	H"	VOL.	L"	W"	H"	VOL.	L"	W"	H"	VOL.
4"	12	24	16	2.7	15	30	18	4.7	22	36	24	11.0
6"	12	43	18	5.4	16	48	34	15.1	30	55	24	22.9
8"	12	54	24	9.0	18	57	36	21.4	36	57	33	39.2
12"	20	63	36	26.3	37	62	37	49.2	48	62	51	88.0
16"	31	65	38	44.4	60	65	39	88.2	65	65	65	159.2
20"	45	70	40	73.0	56	70	60	136.4	72	76	78	247.5
24"	47	72	54	106.0	67	74	69	198.4	88	84	84	360.1

NOTE: VOLUMES GIVEN IN CUBIC FEET



PLAN

CONCRETE BACKING FOR VERTICAL BENDS

1. BACKING DESIGNED FOR 3000 POUNDS PER SQUARE FOOT SOIL BEARING AND 150 POUNDS PER SQUARE INCH INTERNAL PRESSURE.

2. PROVIDE MINIMUM CONCRETE REINFORCEMENT OF 2 PAIR OF TWO 5" "U" BARS @ 12" C.

3. CENTER BACKING ON BEND.

BLOCKING FOR SIZES NOT SHOWN SHALL USE THE NEXT LARGER SIZE.

REVISION	BY	DATE

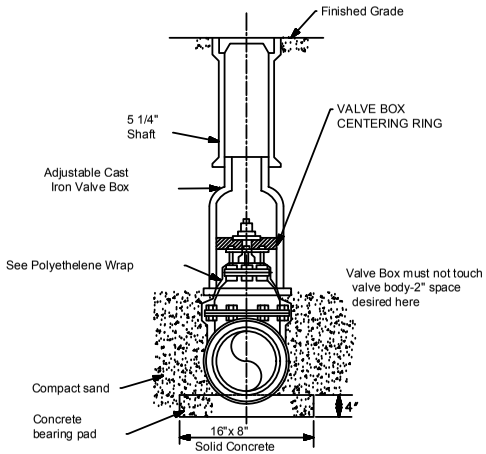
N. KY. WATER DISTRICT
CONCRETE THRUST BLOCKING
FOR VERTICAL BENDS

DRAWN BY: SAR

APPROVED:

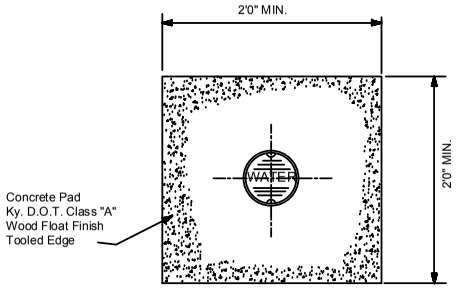
DATE: 2/1/2021

STANDARD DRAWING NO:
104-A

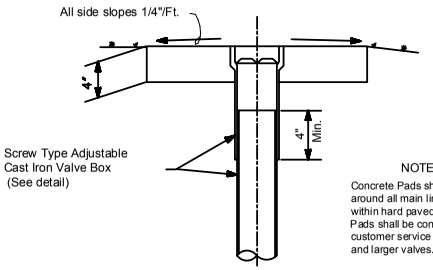


Detail Valve Box Installation

Note:Valve box shall not transmit shock or stress to the valve



PLAN



ELEVATION

NOTES

Concrete Pads shall be constructed around all main line valve boxes except within hard paved areas. Concrete Pads shall be constructed around customer service line valve boxes 3" and larger valves.

REVISION	BY	DATE
* 2'0" Concrete pad use	MPS	6/28/93
Detail Valve Box Installation	MPS	9/22/93

N. KY. WATER DISTRICT

VALVE BOX AND
VALVE PAD DETAIL

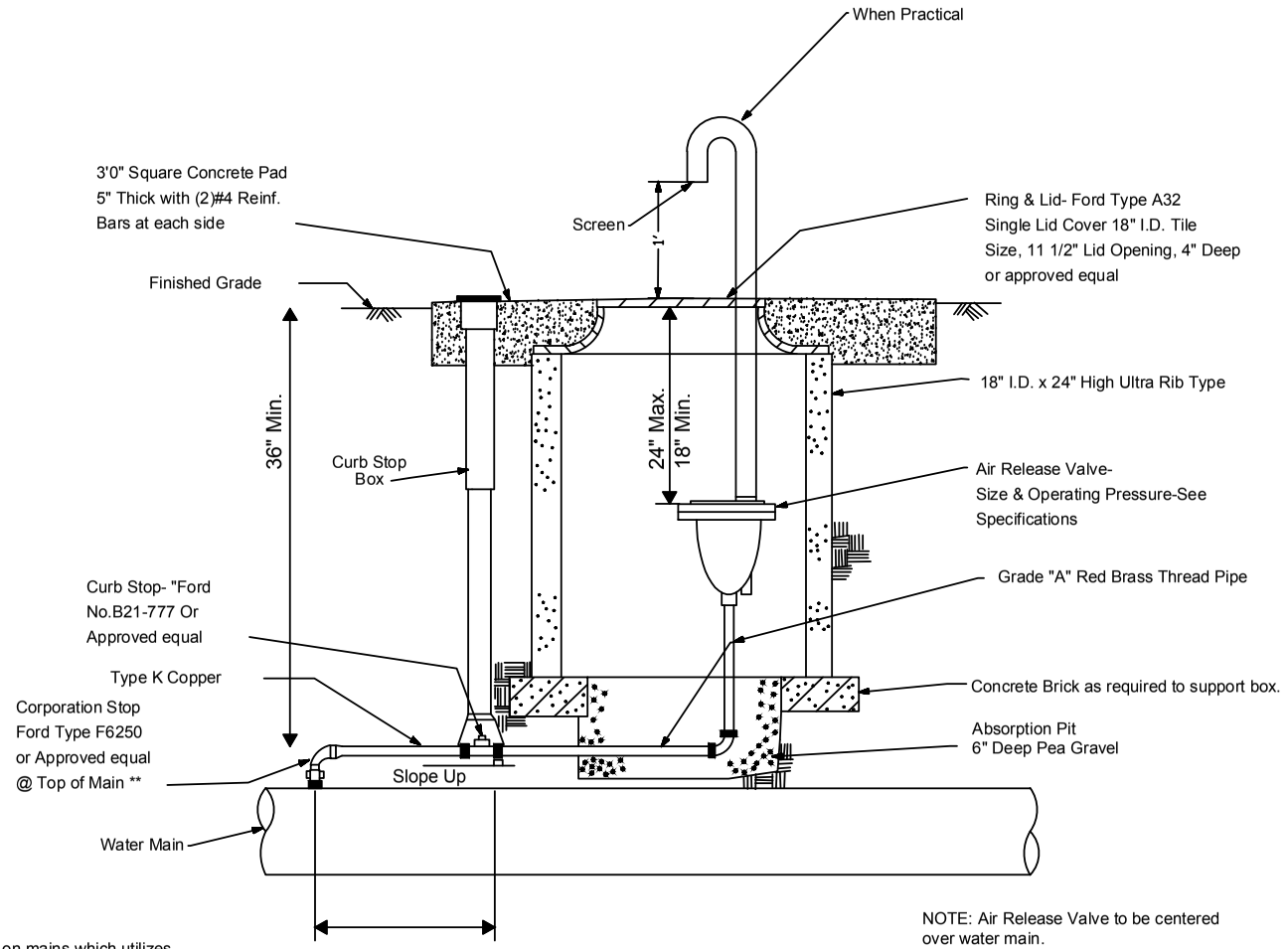
DRAWN BY: SAR

APPROVED:

DATE: 2/1/2021

STANDARD DRAWING NO:

105



** Taps on mains which utilizes a cathodic protection system shall require an isolation corporation stop

NOTE: Air Release Valve to be centered over water main.
Air Release Valves larger than 1" use:
vault size 24"x24"
lid Ford Type MC 24 &
Extension Ring Ext-2 or approved equal.

REVISION	BY	DATE

N. KY. WATER DISTRICT

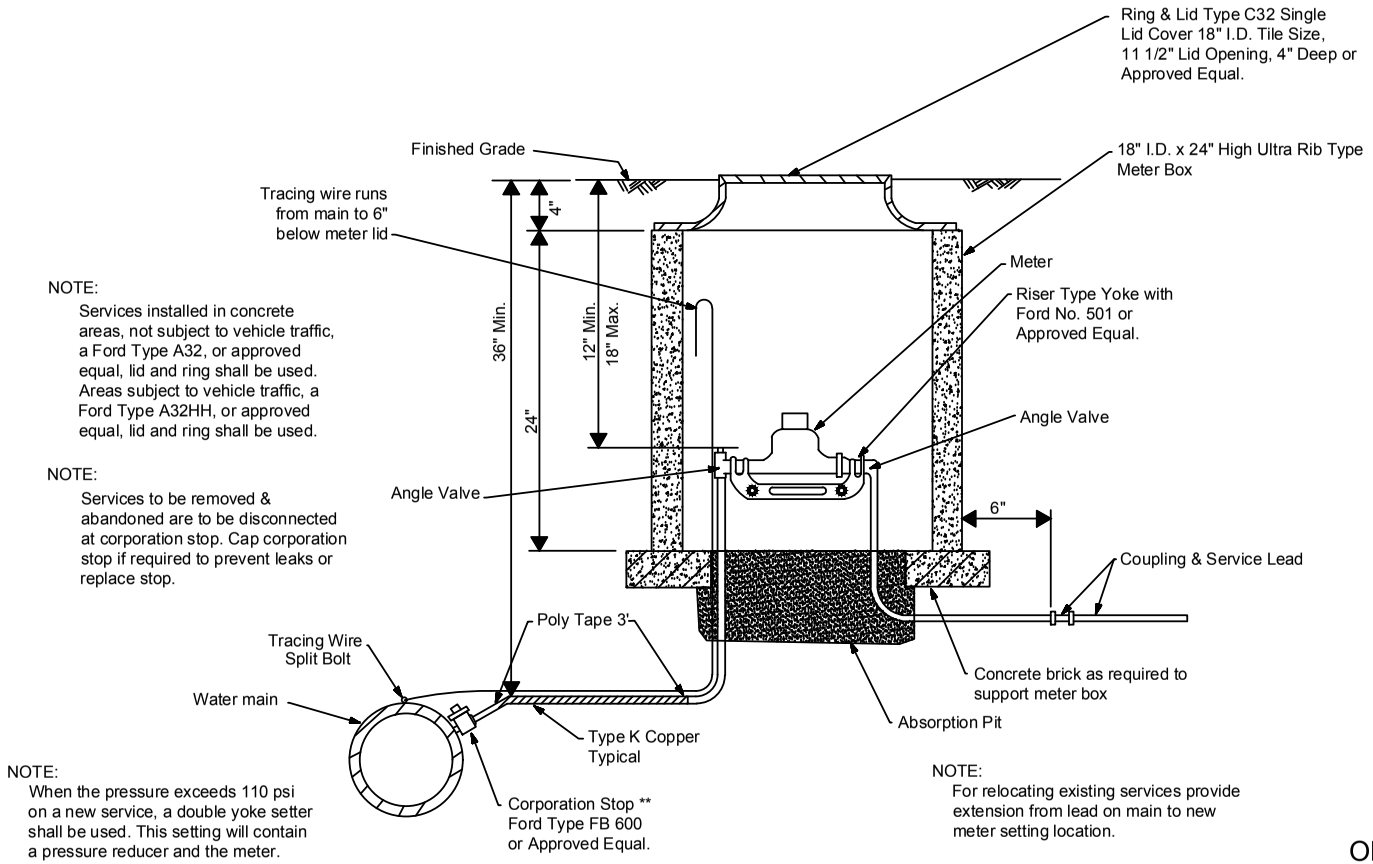
N.KY WATER DISTRICT
AIR RELEASE VALE

DRAWN BY: SAR

APPROVED:

DATE: 2/1/2021

STANDARD DRAWING NO:
106



NOTE:
Services installed in concrete areas, not subject to vehicle traffic, a Ford Type A32, or approved equal, lid and ring shall be used. Areas subject to vehicle traffic, a Ford Type A32HH, or approved equal, lid and ring shall be used.

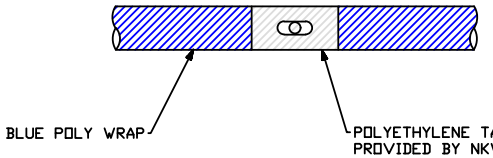
NOTE:
Services to be removed & abandoned are to be disconnected at corporation stop. Cap corporation stop if required to prevent leaks or replace stop.

NOTE:
When the pressure exceeds 110 psi on a new service, a double yoke setter shall be used. This setting will contain a pressure reducer and the meter.

NOTE:
For relocating existing services provide extension from lead on main to new meter setting location.

** Taps on mains which utilizes a cathodic protection system shall require an isolation corporation stop

ONLY FOR D.I. PIPE



REVISION	BY	DATE

N. KY. WATER DISTRICT
5/8" & 1" METER SETTING
COPPER

DRAWN BY: SAR

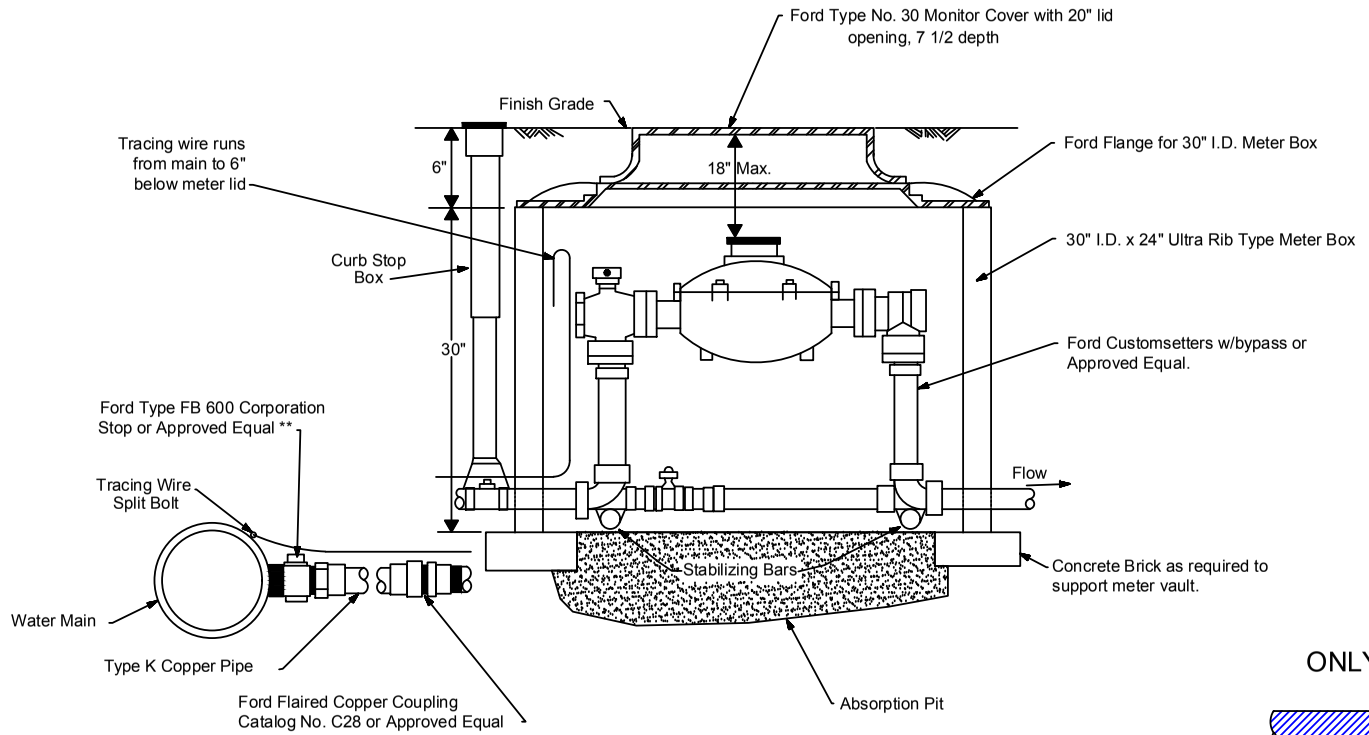
APPROVED:

DATE: 2/1/2021

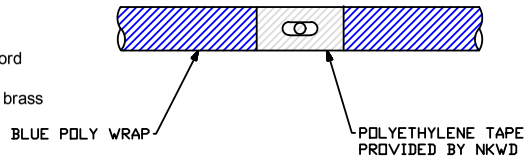
STANDARD DRAWING NO: 107

Note: Services to be removed & abandoned are to be disconnected at corporation stop. Cap corporation stop if required to prevent leaks or replace stop. For relocating existing services provide extension from lead on main to new meter setting location.

Note: If service is installed in sidewalk or pavement area,a heavy duty lid shall be installed.



ONLY FOR D.I. PIPE



** Taps on mains which utilizes a cathodic protection system shall require an isolation corporation stop

Notes: Pressure regulators are required for new services where the pressure exceeds 110 psi.

Notes: PVC Mains - use single band brass saddle Ford Type 101BS or equal.
D.I.P. Mains 8" or smaller use a double strap brass tapping saddle Ford Type 202B or equal.

REVISION	BY	DATE

N. KY. WATER DISTRICT

1-1/2" & 2" METER SETTING

DRAWN BY: SAR

APPROVED: JKK

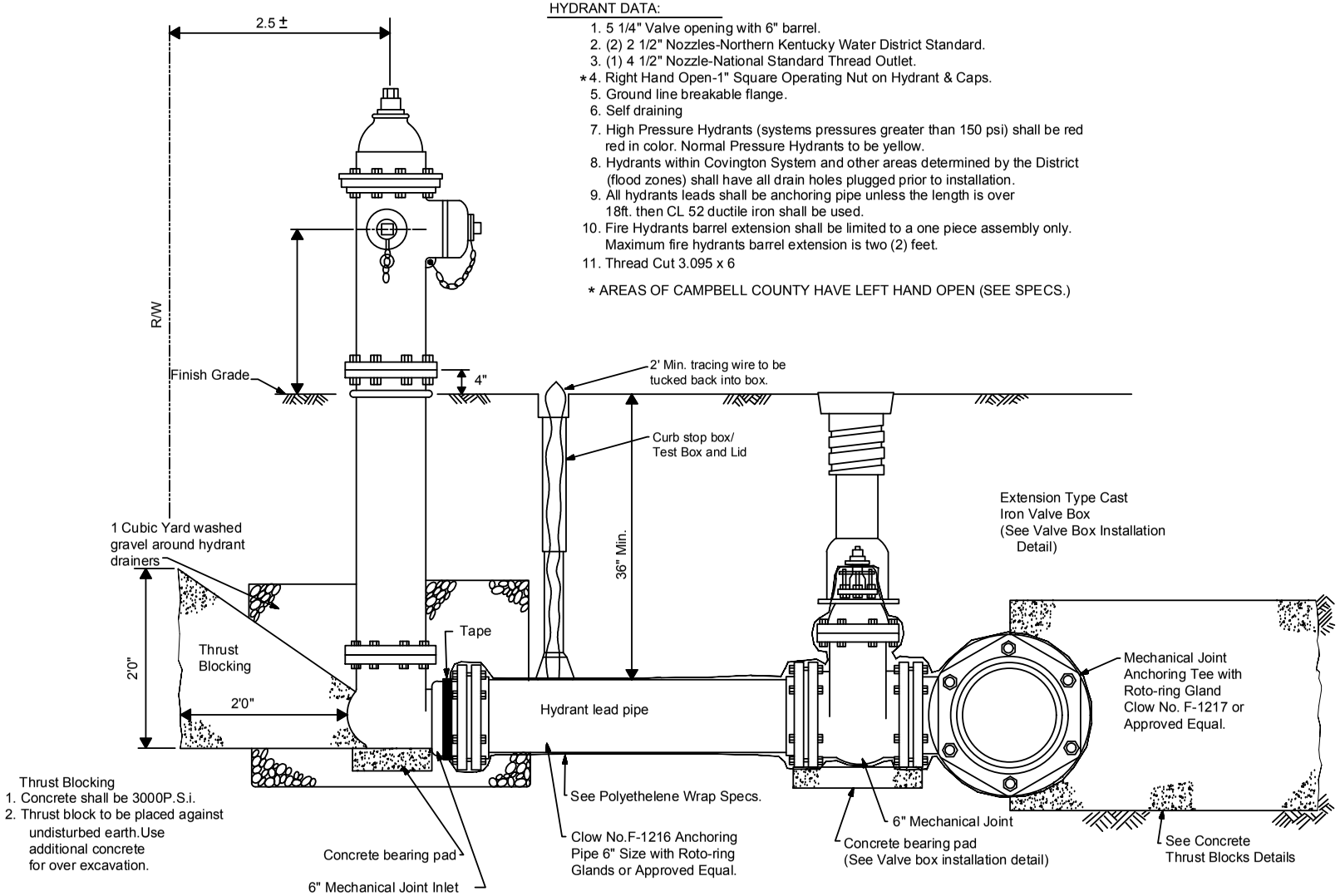
DATE: 2/1/2021

STANDARD DRAWING NO: 108

HYDRANT DATA:

1. 5 1/4" Valve opening with 6" barrel.
2. (2) 2 1/2" Nozzles-Northern Kentucky Water District Standard.
3. (1) 4 1/2" Nozzle-National Standard Thread Outlet.
4. * Right Hand Open-1" Square Operating Nut on Hydrant & Caps.
5. Ground line breakable flange.
6. Self draining
7. High Pressure Hydrants (systems pressures greater than 150 psi) shall be red red in color. Normal Pressure Hydrants to be yellow.
8. Hydrants within Covington System and other areas determined by the District (flood zones) shall have all drain holes plugged prior to installation.
9. All hydrants leads shall be anchoring pipe unless the length is over 18ft. then CL 52 ductile iron shall be used.
10. Fire Hydrants barrel extension shall be limited to a one piece assembly only. Maximum fire hydrants barrel extension is two (2) feet.
11. Thread Cut 3.095 x 6

* AREAS OF CAMPBELL COUNTY HAVE LEFT HAND OPEN (SEE SPECS.)



Thrust Blocking
1. Concrete shall be 3000P.S.i.
2. Thrust block to be placed against undisturbed earth.Use additional concrete for over excavation.

REVISION	BY	DATE
Blocking,conc.pads,polywrap	MPS	9/22/93
Extension to barrel	MPS	12/22/93
Blocking inside R/W	MPS	10/25/95

N. KY. WATER DISTRICT

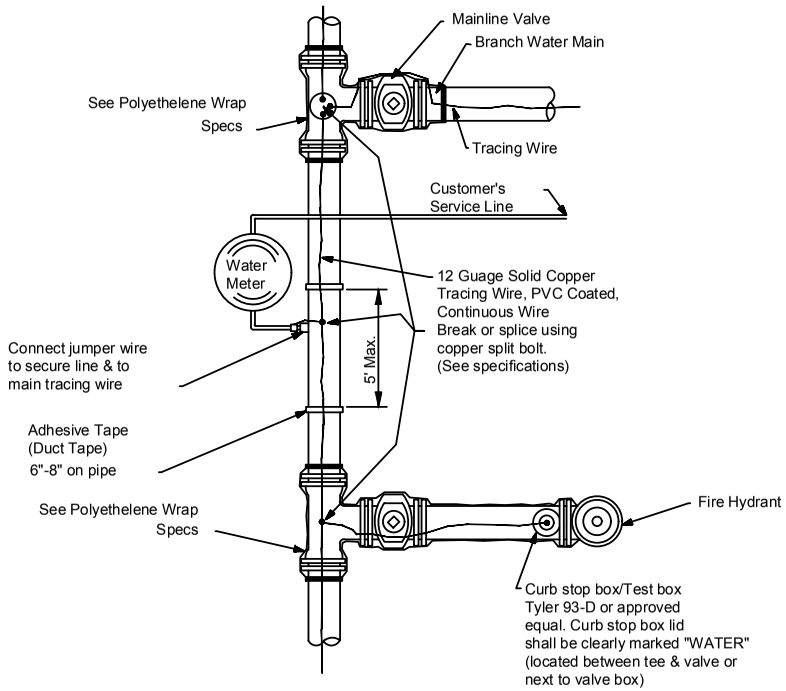
HYDRANT ASSEMBLY

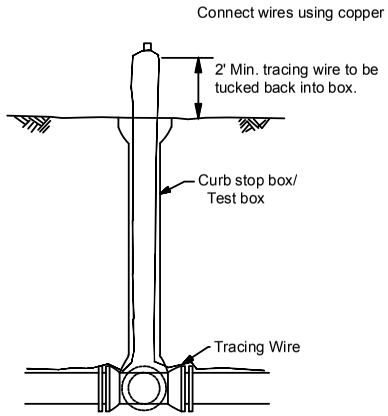
DRAWN BY: SAR

APPROVED:

DATE: 2/1/2021

STANDARD DRAWING NO: 109





DUCTILE IRON AND PVC PIPE WITH DUCTILE IRON FITTINGS

Note: Curb stop box/test box shall not be installed in paved areas.

REVISION	BY	DATE

N. KY. WATER DISTRICT

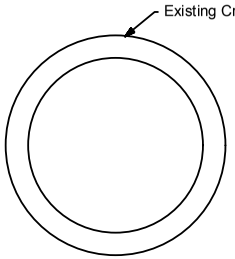
TRACING WIRE INSTALLATION DETAIL

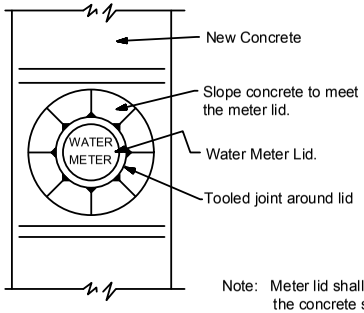
DRAWN BY: SAR

APPROVED:

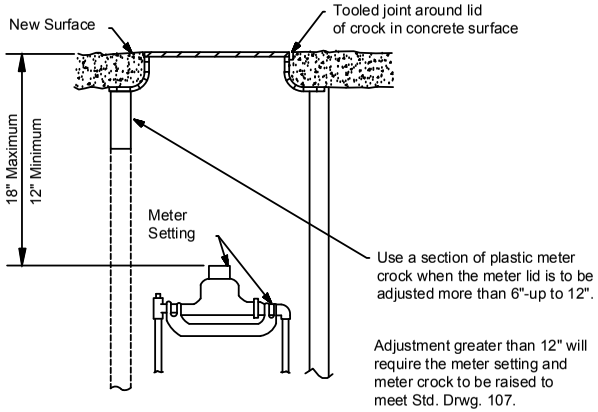
DATE: 2/1/2021

STANDARD DRAWING NO: 111





Note: Meter lid shall be flush with the top of the concrete surface. The concrete surface shall be tapered to provide a smooth transition to the meter lid. A tooled joint shall be formed around the meter lid.



NOTE: SERVICES INSTALLED IN CONCRETE AREAS, NOT SUBJECT TO VEHICLE TRAFFIC, A FORD TYPE A32, OR APPROVED EQUAL, LID AND RING SHALL BE USED. AREAS SUBJECT TO VEHICLE TRAFFIC, A FORD TYPE A32HH, OR APPROVED EQUAL, LID AND RING SHALL BE USED.

PLASTIC (PVC) METER CROCKS shall be raised by use of an adapter with a section of plastic crock cut to achieve final grade.

At no time shall wood be used to adjust the ring and lid to grade.

Meter ring and lids shall be reset solidly and shall have no broken edge to allow dirt to enter the crock.

If the meter box is damaged beyond repair it shall be replaced. See Standard Drawing 107.

RAISING CURB STOPS OR VALVE BOXES:

Curb stop boxes and valve boxes shall be raised by turning the upper section to meet grade. If the upper section cannot be raised in this manner it shall be carefully broken off and replaced.

New upper sections shall be supplied by NKWD

REVISION	BY	DATE

N. KY. WATER DISTRICT

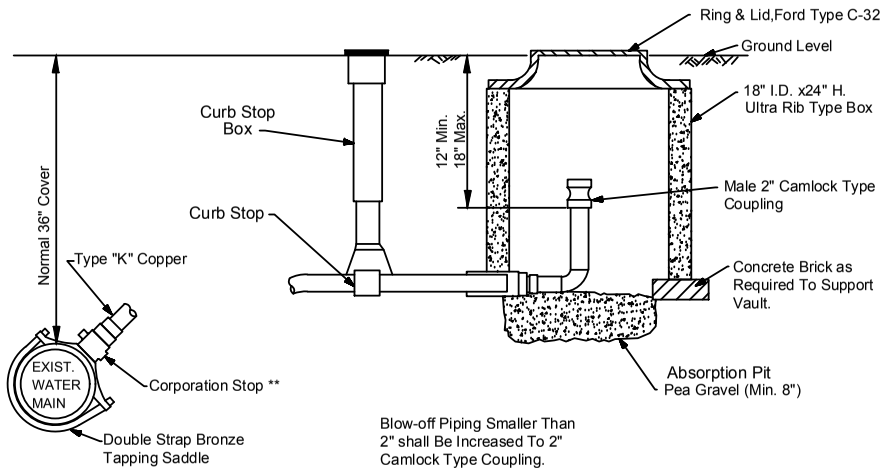
ADJUDTING RING & LID TO GRADE

DRAWN BY: SAR

APPROVED: AKK

DATE: 2/1/2021

STANDARD DRAWING NO: 112



** Taps on mains which utilizes a cathodic protection system shall require an isolation corporation stop

TYPICAL FLUSHING DEVICE INSTALLATION and Manual Air Release Valve N.T.S.

REVISION	BY	DATE

N. KY. WATER DISTRICT

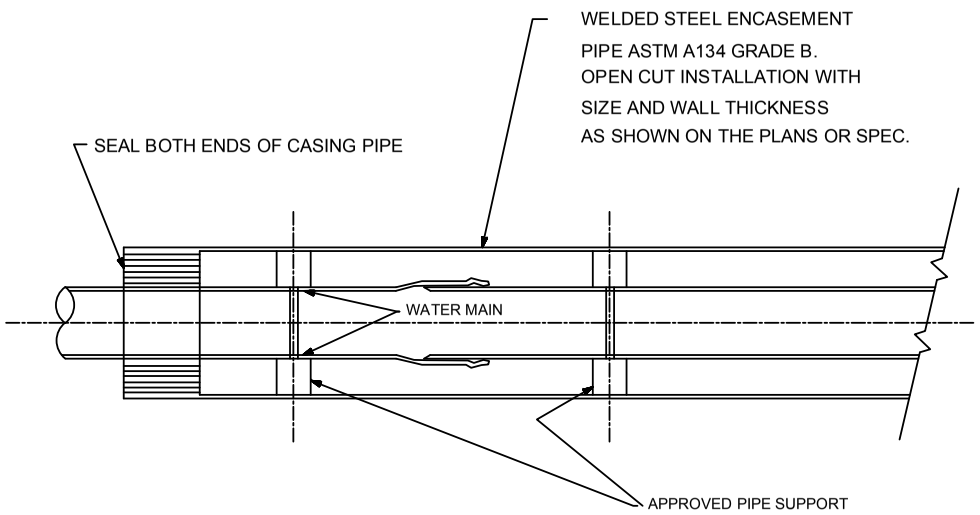
TYPICAL FLUSHING DEVICE INSTALLATION and MANUAL RELEASE VALVE

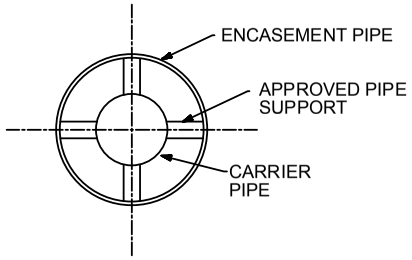
DRAWN BY: SAR

APPROVED:

DATE: 2/1/2021

STANDARD DRAWING NO: 113





1. All carrier pipe placed in steel casing pipe shall be minimum class 50 ductile iron pipe and conform to the latest edition of AWWA C151.
2. Carrier pipe gaskets shall develop a wedging action between pairs of high-strength stainless steel elements spaced around the gasket (FIELD LOK , FASTGRIP, or approved equal gaskets).

NOTE: CASING PIPE JOINTS SHALL BE SEAM WELDED SO THAT CASING IS WATER TIGHT FROM END TO END.

ENCASEMENT PIPE DETAIL

NO SCALE

REVISION	BY	DATE
1. Remove Granular Fill	JS	2/1/00

N. KY. WATER DISTRICT

ENCASEMENT PIPE DETAIL

DRAWN BY: SAR

APPROVED:

DATE: 2/1/2021

STANDARD DRAWING NO: 114

Northern Kentucky Water District

2021

Standard Specifications & Drawings for the Installation of Meters Pits

PIT CONSTRUCTION SPECIFICATIONS

PART I - GENERAL

1.01 INTRODUCTION Unless modified, deleted, replaced, or otherwise changed, the latest published addition of the following documents shall be the accepted standard for materials and/or procedures for the construction of meter pits:

1. Northern Kentucky Water District's Standard Drawings
2. Natural Resources & Environmental Protection Cabinet, Division of Water
3. Kentucky Public Service Commission Regulations
4. American Water Works Association Standards (AWWA)

If a conflict exists between referenced sources, the more restrictive requirements shall prevail. The District shall provide interpretation as requested.

1.02 REQUIREMENTS FOR METER PIT INSTALLATION The following are guidelines for meter pit installations:

A. Meter pit will not be required to be installed if the following conditions can be met:
Firelines-1. An approved back flow prevention device shall be installed as the first device inside the building on the fire line before any taps or branches -and-
2. The fire department connection shall be located downstream of the approved back flow prevention device -and-
3. The domestic water service is 2" or smaller which will be installed per Standard Drawings #107, 107-A, or 108.
Domestic Services-- 2" or smaller domestic water services shall be installed by the District per Standard Drawings #107, 107-A, or 108.

B. Meter pits shall be required to be installed if one or more of the following conditions exists:
Firelines-- The fire department connection is required by the authority having jurisdiction to be installed near the public right-of-way. An approved double check assembly shall be required to be installed per Standard Drawing #204, 206, or 207R.
Domestic Services-- 3" or larger domestic water services shall be installed per Standard Drawings #205R, 207R, or 208.

1.03 CONTRACTORS RESPONSIBILITY All work performed on any meter pit and/or appurtenances that are owned or anticipated to be owned by the District shall be completed under the direction of the District adhering to an acceptable plan approved by the District. A minimum of 24 hours notice shall be given to the District by the contractor prior to the start of work. If the interruption of service to any customer of the District is necessary, the Contractor shall make arrangements to provide such shutdown and notify District customers at the direction of the District Inspector. One set of District approved plans shall be on the job site during construction. There shall be no deviation from the approved plans without written approval from the District.

1.04 EXISTING PITS Any changes, modifications, or alterations made to an existing pit structure, piping, etc., it shall be brought up to current standards. Compliance subject to the discretion of the Water District.

1.05 PLANS Plans are approved subject to the conditions of compliance with all applicable laws, rules, regulations and standards. The proposed project may be constructed only in accordance with the approved plans. Plans submitted to the District for approval shall have a Ky. Professional Engineer or Certified Fire Suppression Technician stamp and signature. Two sets of plans should be submitted for preliminary review and four sets for final review.

1.06 DESCRIPTION In general the following specifications are minimum requirements as pit design. Construction may be dictated by location, soil conditions, ground water, topography, etc. Additional provisions may be required upon submission for approval.

1.07 ACCESSIBILITY OF PITS Accessibility for maintenance and testing of all meter pits shall be provided. A means of access for maintenance vehicles shall be constructed of a hard, all weather surface at least 10' wide and designed to support the heaviest vehicle, within 15' of the pit.

1.08 WATER MAINS ON PRIVATE PROPERTY Meter pits and appurtenances installed on private property outside of normal conditions which are going to be maintained by the Water District shall have proper documentation provided for all easement areas. See appropriate sections of District's Standards Specifications & Drawings for the Installation of Water Mains for procedures.

1.09 HIGH PRESSURE AREAS Additional requirements may be necessary for high pressure areas (110 psi static pressure or higher) as determined by the District.

1.10 MAINTENANCE PERIOD The Owner shall be responsible for the maintenance of the installed meter pit and appurtenances to District Standards for a period of not less than one (1) year from the date the meter pit is placed in service by the District. Meter pits will be placed in service when the meter pit is 100% completed to District Standards.

1.11 MINIMUM REQUIREMENTS Floor slab shall be 6" thick concrete sloping at 1/8 inch per foot to drain or sump location. Dimensions of slab shall be 4 inches larger all around than outside pit walls. Pit shall be drained by a 4" drain or larger as required, leading to grade or a storm sewer. When a drain is not practical an electric operated sump pump shall be used.

Walls shall be 8" thick concrete. Top slab shall be 8" thick reinforced concrete with #5 bars @6" O.C. maximum, spanning in short direction and #5 bars @18" O.C. maximum, in long direction. Two (2) #5 bars, two (2) feet long are to be placed at 45 degree to each corner of slab openings. Reinforcing shall be placed 1-1/2" clear from the bottom of the slab or inside wall faces. Additional reinforcement may be required.

Pit openings shall have lids as indicated or as approved in traffic areas of a type operable by a single person. Removable aluminum ladders shall be furnished in all pits.

1.12 METER PIT DIMENSIONS Minimum inside pit dimensions shall be: Height - 5 feet; Width - 5 feet; Length - 6 feet.

REVISION	BY	DATE

N. KY. WATER DISTRICT

MATERIAL SPECIFICATIONS FOR PIT CONSTRUCTION

DRAWN BY: SAR

APPROVED:

DATE: 2/1/2021

STANDARD DRAWING NO: 201

1.13 QUALITY ASSURANCE

A. Standards: The following publications shall be hereby made a part of these specifications.
1. "Specifications for Structural Concrete for Buildings ACI 301-72 (Revised 1975) with Selected ACI and ASTM Referenced, Sp-15(73)" by the American Concrete Institute.
2. "Placing Reinforcing Bars, CRSI-WCRSI Recommended Practices" by the CRSI-WCRSI Committee on Bar Placing.
3. "Standard Specifications for Road and Bridge Construction by the Kentucky Department of Transportation, Bureau of Hwy. 4.Specifications for the Design and Construction Load-Bearing Concrete Masonry by the National Concrete Masonry Association.

1.14 Or Equal All materials referenced are for design purpose only. Any other materials that are "equal" can be used with prior approval from the District.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Concrete: Ready mixed type meeting K.D.O.T "Class A", 3,500 psi at 28 days compressive strength, 4" maximum slump.

B. Reinforcing Steel: Deformed #5 bars conforming to ASTM A615, A616, or A617, grade 60.

C. Curing Compound: Acrylic based "non-residual" type meeting ASTM C309 Type 1 not less than 18 % to cure, harden and seal concrete.

D. Lid: 48" x 54" double door, aluminum lid with locking padlock bar, centered over the meters, Halliday Products Model #A4854 or approved equal. If padlock bar creates hazard, other locking mechanisms maybe considered.

E. Removable Metal Ladder: Removable metal ladder shall be an approved OHSA Type 1 Industrial Heavy, 250 pound aluminum ladder. Ladder must reach from the pit floor and extend into the pit opening. The bottom of the ladder shall be blocked to prevent it from kicking out but still be removable.

F. Waterproofing: The exterior side of the pit walls shall be waterproofed with one coat of one of the following materials applied in accordance with the Manufacturer's recommendations: Thoroseal; U.S.S. Chemical Tarmastic #102; Koppers Bitumastic Super Service Black; Damchex; Amercoat #78; or an approved equal.

Voids between pipes and chamber walls shall be grouted with a hydraulic cement such as Waterplug or an approved equal before waterproofing pit.

G. Waterstop: A waterstop shall be provided in the pit floor to the pit walls.

H. Floor Drain: Raised or beehive dome grate, 4" minimum, similar to Wade #1634; Josam #7324-N; or an approved equal.

I. Pit Drain Line: Cast iron, Schedule 40 PVC, Plastic STM #35 or ductile iron, 4" minimum.

J. Alternate To Pit Drain Line: Electric Submersible Sump Pump, Little Giant, Big John, Stock #3P-639A Model #6-CIA or approved equal. Note: This alternative shall only be used when a drain line is impractical as determined by the District. (See drawing #202 & Part 4 of Pit Specifications)

K. Packaged, Prefab Meter Vaults: Packaged, prefab meter vaults are acceptable with approval from the Water District.

PART 3 - EXECUTION

3.01 WORKMANSHIP Earth cuts may be used for forms of base slab provided vertical sides are kept true and sharp. All embedded items, reinforcing, piping, etc. shall be secured in place prior to placing of the concrete. Concrete shall be protected from loss of moisture for a curing period of at least 7 days. All concrete shall be deposited within 1-1/2 hours following the initial mixing of water and cement. Wall finish may be a rough form finish. Top slab finish shall be wood float with tooled edges.

PART 4 - ELECTRIC SUMP PUMPS

4.01 DESCRIPTION In general the following specifications are a minimum requirements for the design and installation of Electric Submersible Sump Pumps in meter pits where a normal drain line is impractical.

4.02 ELECTRIC WORK All electric work shall be installed according to the National Electric Code and all other applicable codes. All work shall be inspected by an Electrical Inspector and certification provided to the District.

4.03 RESPONSIBILITY The property owner is responsible for providing continuous electric service for the electric sump pump at the owner's expense. The property owner shall be responsible for the maintenance and upkeep of all electrical boxes, conduit, circuit breaker box, circuit breaker, outlet and wiring outside the pit.

4.04 MATERIALS

A. Electric Submersible Sump Pump: Electric sump pump shall be U.L. Listed, Little Giant, Stock #3P639, Model #6-CIA.

B. Electric Junction Box: Water resistant, U.L. Listed, P.V.C electrical box shall be installed on the inside of the pit on the wall closest to the sump pump nearest the ceiling.

C. Electrical Piping: Electric piping shall be U.L. Listed for underground use, rigid or plastic installed at least 18" below grade.

4.05 INSTALLATION

A. Sump Pump Hole: A 4" deep hole shall be provided in the floor of the pit.

B. Discharge Piping: Piping for the water discharge from the electric sump pump shall be plastic or copper. Minimum piping size shall be 1 1/2". A 1/8" hole shall be bored above the check valve of the discharge pipe if freezing temperatures will affect the pipe.

C. Water Discharge: Water discharge shall be directed into a storm sewer or drainage ditch, if this is impractical, water discharge shall be directed on to a 16" x 16" concrete pad.

D. Electric Service Line: The electric line to the pit shall be only used for the pit sump pump, no other electrical taps shall be made on this line.

E. Manufacturer Instructions: Manufacturer's instructions should be followed for installation.

REVISION	BY	DATE

N. KY. WATER DISTRICT

MATERIAL SPECIFICATIONS FOR PIT CONSTRUCTION

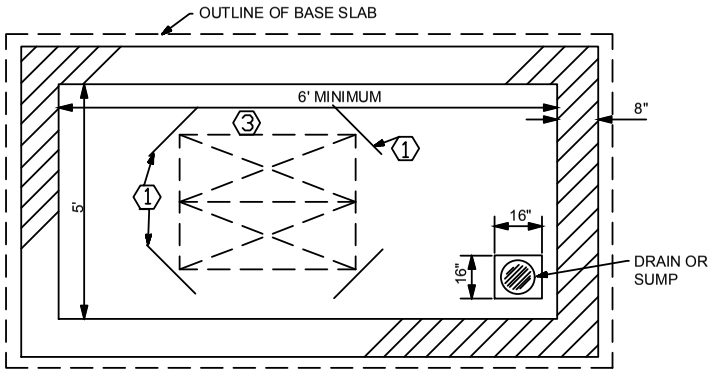
DRAWN BY: SAR

APPROVED:

DATE: 2/1/2021

STANDARD DRAWING NO:

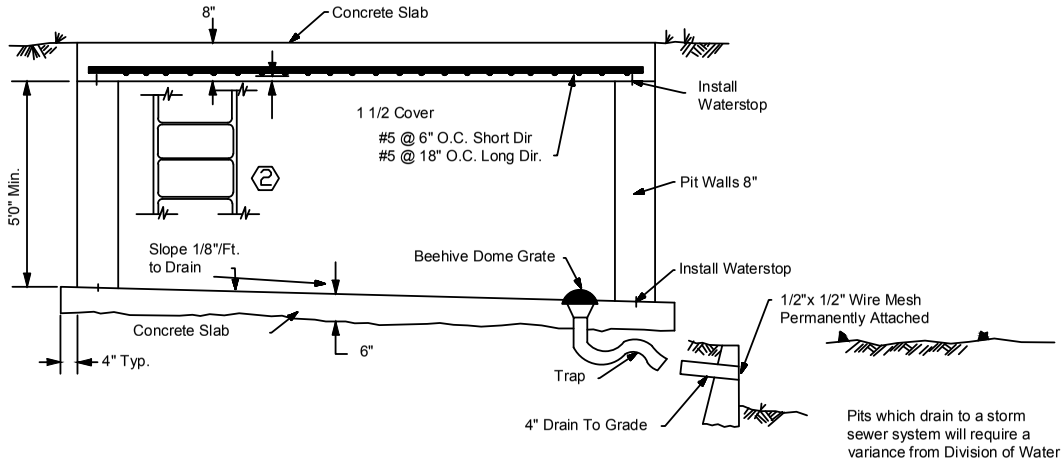
201-A



DRAWING NOTES

1. (2) #5 Reinforcing Bars, 2'6" Long @ 45 Each Corner of Lid or Pit Opening.
2. Removable ALuminum Ladder Within Pit.
3. Lid In Top Slab To Be Centered Over Meter(S). Lids Shown Are For Non-Traffic Area Locations.

   Lids Within Traffic Areas Shall Be Guarded With Approved Post Surrounding The Pit Or Lid, Or The Lid Shall Be Adequate To Support The Imposed Weight And Be Operated By A Single Person As Approved By K.C.W.D. #1.



REVISION	BY	DATE
LID & SUMP PUMP	MPA	10/4/90

N. KY. WATER DISTRICT

TYPICAL PIT DETAIL

DRAWN BY: SAR

APPROVED:

DATE: 2/1/2021

STANDARD DRAWING NO: 202

PART 1 - PRODUCTS

1.01 MATERIALS

A. Underground Piping & Appurtenances: All underground piping and appurtenances shall conforms to appropriate sections of District's "Standard Specifications & Drawings for the Installation of Water Mains". All underground piping 4" and larger shall be polyethylene wrapped Class 50 or higher Ductile Iron Pipe from the public water main to the meter pit.

B. Piping Inside Pits: Pipe installed inside the pit shall be a minimum thickness of Class 53 flanged ductile iron pipe for 3" and larger piping. The pipe shall extend through the pit walls.

C. Fittings: All fittings and accessories shall be Ductile Iron, rated for a minimum of 200 psi working pressure or as specified herein. The fittings and accessories shall be new and unused. (NOTE: Certain areas of the Northern Kentucky Water District require materials used, to be of a higher working pressure than 200 psi.) All pipe fittings inside the meter pit shall be flanged.

D. 2" and Smaller Service Branch Lines: Type K or L copper conforming to ASTM B88. Valves, fittings, and nipples shall be brass.

E. Gate Valves 3" & Larger, Inside Pit: Conforming to AWWA Standard C509. Outside stem and Yoke (OS&Y), ductile iron body, left hand open, resilient wedge, wheel operated, flanged connection, gate valves. Clow Resilient Wedge Gate Valve or approved equal. Valves installed as part of a back flow prevention assembly shall be approved by the F.C.C.C.R., U.S.C.

F. Valves 2" % Smaller: All 2" and smaller valves shall be ball valves.

G. Glands, Gaskets, Bolts & Nuts: Conforming to AWWA C111.

H. Bypass Lines on 3" & Larger Meter Lines: A bypass line of equal or one size less than the domestic line shall be installed on all domestic meter services 3" or larger. Minimum bypass line size is 3".

I. Meters: As purchased from Northern Kentucky Water District.

J. Pressure Reducing Valves: On domestic lines, pressure reducing valve will be required to be installed when the static system pressures is at or above 125 psi. They will be installed before the meter and are installed to protect the meter only. The District will not be liable for any damage due to pressure conditions caused by or arising out of the failure or defective condition of such pressure regulator or for damage that may occur through the installation, maintenance, or use of such equipment. Pressure reducing valves shall be installed at least 5 pipe diameters away from the meter. Cla-Val Model 690-48 shall be installed on 3" and larger lines. This may also include electronic devices, sight gauge, or any other such devices per District requirements.0 thur 300 psi gauges shall be provided on the inlet and outlet sides of the pressure reducing valve.

K. Back flow Prevention Assembly: All assemblies shall be listed and approved by the Foundation for Cross-Connection Control Research, University of Southern California (F.C.C.C.R.,U.S.C.) and the District. The testable assembly consists of the back flow prevention unit and two approved shut-off valves. Valves shall be full port ball valves for 2" and smaller and outside stem and yoke, resilient wedge, left hand open, gate valves for 3" and larger. Assemblies shall be delivered completely assembled by the original manufacturer with all components as approved by F.C.C.C.R.,U.S.C. The assembly shall not be separated or altered in anyway. The type of back flow prevention assembly to be installed shall be determined by the N.K.W.D. (see Back flow Prevention Device Assembly Standard Drawings Figure II-a for general guidelines). All approved back flow devices shall be tested and certified that it works properly after system activation. Special permission must be obtained from the District to install a reduced pressure back flow prevention assembly in a pit.

L. Booster Pumps: Booster pumps 3" and larger installed on water lines shall be equipped with a Pump Suction Control Valve and/or a Low Pressure Cut-off Device which is designed to modulate the pump discharge or shut-off the booster pump when the pressure on the suction-side of the pump drops to 20 psi.

These devices shall be designed to prevent water hammer to the public water system. Pump Suction Control Valve and/or a Low Pressure Cut-off Device shall be inspected and tested for proper operation at the time of installation and at least annually thereafter. The property owner shall maintain a complete record of all test, inspections and repairs to the devices. The devices shall not be bypassed, made inoperative, or removed without authorization from the District.

PART 2 - EXECUTION

2.01 INSTALLATION

A. Pipe Laying: Conforming to AWWA Standard C600. Maintain a minimum pipe cover of 3'-0" with continuous pipe support for entire length. All underground piping and appurtenances shall be installed according to appropriate sections of District's "Standard Specifications & Drawings or the Installation of Water Mains".

B. Pit Components: Adequately supported by solid concrete blocks or supports set on the floor slab. 2" or smaller domestic service lines may be supported by brackets mounted on the pit wall.

C. Anchorage: Inlet valves on 3" or larger piping shall be securely anchored to the pit wall when piping is sleeved through the wall. Additional rodding may be required at the discretion of the District.

D. Disinfection: The interior of all surfaces in contact with the potable water system, tapping sleeve, valves, couplings and pipe shall be swabbed with a 5 % hypochlorite solution prior to installation.

E. Valve Box Protection: The valve box over the tapping sleeve if located outside of a hard paved area shall have a minimum 2'x2'x4" square pad cast around the lid. Refer to standard drawing No. 105.

F. Flushing of Mains: Lines shall be flushed at a rate 2.5 ft/s.

REVISION	BY	DATE

N. KY. WATER DISTRICT

PIPING SPECIFICATIONS FOR PIT CONSTRUCTION

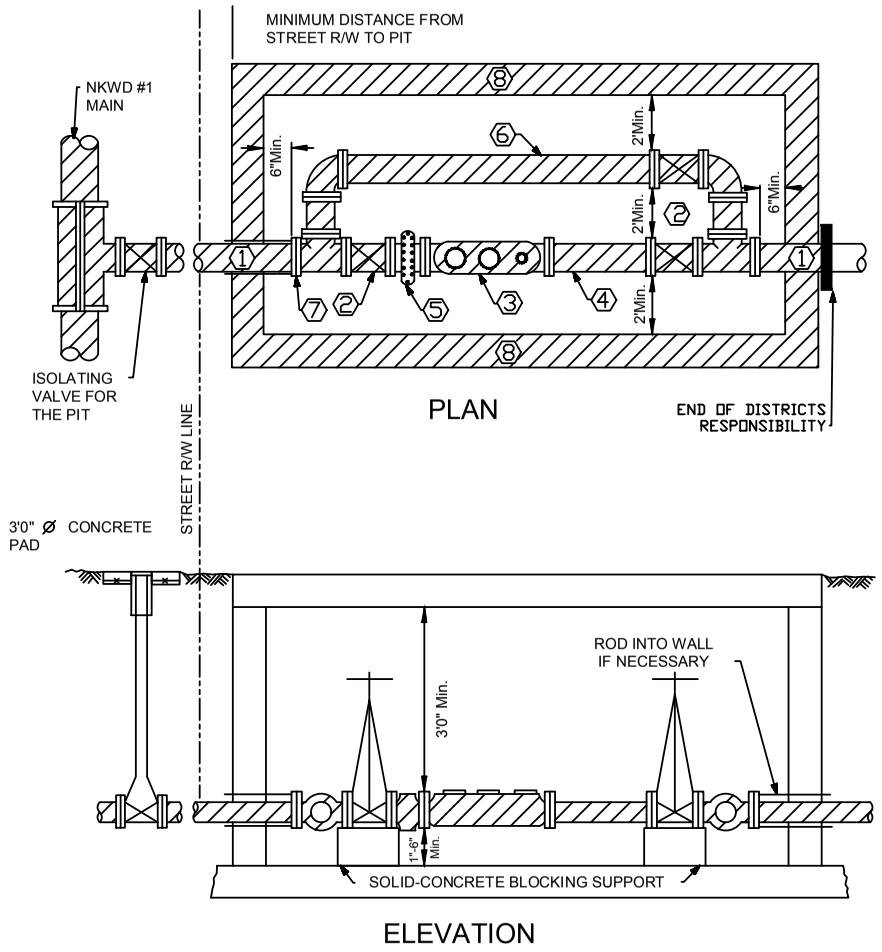
DRAWN BY: SAR

APPROVED:

DATE: 2/1/2021

STANDARD DRAWING NO:

203



DRAWING NOTES

1. PIPING CLASS 52 WITH FLANGED END WITHIN PIT.
2. VALVES WITH OUTSIDE SCREW AND YOKE, FLANGED CONNECTIONS. (RESILENT SEATED VALVES)
3. 2.5"" OR LARGER COMPOUND METER
4. FLANGED COUPLING ADAPTER OVER PLAIN END PIPE FLANGED BY PLAIN END PIPE.
5. STRAINER
6. BYPASS LINE SHALL BE EQUALIVANT IN SIZE AS THE FEED LINE OR THE NEXT SIZE SMALLER (3" MININUM SIZE)
7. If system pressures exceed 110 psi, a regulator SHALL BE INSTALLED AS SHOWN (DWG NO. 201 item No. 1.09)
8. SHADED AREA DISTRICTS RESPONSIBILITY

GENERAL NOTES

1. SEE DRAWING 202 FOR PIT CONSTRUCTION DETAILS.
2. SEE DRAWING 201 FOR PIT MATERIALS SPECIFICATIONS.
3. SEE DRAWING 203 FOR PIPING SPECIFICATIONS.
4. An approved Double Check Valve Assembly shall be required on Fire Lines by the following governing bodies: Kentucky Public Service Commission, Kentucky Division of Water, and Kentucky Division of Plumbing.

REVISION	BY	DATE
COMPOUND METER,ETC.	MPA	10/9/90
NOTE 4-GEN. NOTE	MPA	2/6/92

N. KY. WATER DISTRICT

METER SETTINGS 2.5" AND LARGER

DRAWN BY: SAR

APPROVED:

DATE: 2/1/2021

STANDARD DRAWING NO:

205-R

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 INVSTIGATION This item shall include all equipment, materials, labor and incidentals necessary to enter the sewer in compliance with all safety/confided 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, `1`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.

SANITATION DISTRICT NO. 1

CIP AND DEVELOPMENT STANDARD SPECIFICATIONS MANUAL

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SECTION 02050

DEMOLITIONS

PART 1 – GENERAL

1.1 DESCRIPTION

A. Scope:
   1. CONTRACTOR shall provide all labor, materials, equipment and incidentals as shown, specified and required for demolitions, removal and disposal Work.
   2. Included, but not limited to, are demolition and removals of existing materials, equipment, or work necessary to install the new Work as shown and specified and to connect same with existing work in an approved manner. Demolition includes structural concrete, foundations, walls, doors, windows, structural steel, metals, roofs, masonry, attachments, appurtenances, piping, electrical and mechanical equipment, paving, curbs, walks, fencing, gates, and similar existing facilities.
   3. Demolitions and removals which may be specified under other Sections shall conform to requirements of this Section.
   4. SD1 reserves the right of ownership of any, and all, materials.

B. Related Sections:
   1. Section 02110, Clearing and Grubbing
   2. Section 02220, Excavation and Backfill

1.2 SUBMITTALS

A. Schedule: Submit for approval proposed methods, equipment, and operating sequences. Include coordination for shut off, capping, temporary services, continuation of utility services, and other applicable items to ensure no interruption of SD1's operations.

1.3 JOB CONDITIONS

A. Protection:
   1. Perform all demolition and removal Work to prevent damage or injury to structures, occupants thereof for shut-off, capping, temporary services, continuation of utility services, and other applicable items to ensure no interruption of SD1's operations.
   2. Closing or obstructing of roadways, sidewalks, and passageways adjacent to the Work by the placement or storage of materials will not be permitted, and all operations shall be conducted with a minimum interference to traffic on these ways.
   3. Erect and maintain barriers, lights, sidewalk sheds, and other necessary protective devices.
   4. Repair damage to facilities to remain, or to any property belonging to the SD1 or occupants of the facilities.

B. Scheduling:
   1. Carry out operations so as to avoid interference with SD1's operations and work in the existing facilities.

C. Notifications:
   1. At least 48 hours prior to commencement of a demolition or removal, notify ENGINEER in writing of proposed schedule therefor. SD1 will inspect the existing equipment and mark for identification those items which are to remain the property of the SD1. Do not start removals without the permission of the ENGINEER.

D. Explosives:
   1. Do not bring explosives on site nor use explosives for any demolition.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 GENERAL

A. All materials and equipment removed from existing work, shall become the property of CONTRACTOR, except for those which SD1 has identified and marked for its use. All materials and equipment as indicated in Section 01010 or on the Contract Drawings shall be carefully removed by the CONTRACTOR, so as not to be damaged, and shall be cleaned and transported to the Lakeview Pump Station, 1045 Eaton Drive, Fort Wright, Kentucky 41017 or Dry Creek Wastewater Treatment Plant, 2999 Amsterdam Road, Villa Hills, Kentucky 41017 or as directed by the SD1.

B. CONTRACTOR shall dispose of all demolition materials, equipment, debris, and all other items, except for equipment or materials which are to remain the property of SD1, off the site and in conformance with all existing applicable laws and regulations.

C. Surfaces of walls, floors, ceilings, or other areas which are exposed by any of the removals specified herein, and which will remain as architecturally finished surfaces shall be repaired and re finished by the CONTRACTOR with the same or matching materials as the existing adjacent surface or as may be otherwise approved by the ENGINEER.

D. CONTRACTOR shall work closely with SD1 during completion of the Project to avoid disruptions to pump station operations.

E. Pollution Controls: Use water sprinkling, temporary enclosures, and other suitable methods to limit the amount of dust and dirt rising and scattering in the air to the lowest practical level. Comply with governing regulations pertaining to environmental protection.

1. Do not use water when it may create hazardous or objectionable conditions such as ice, flooding, and pollution.
2. Clean adjacent structures, facilities, and improvements of dust, dirt, and debris caused by demolition operations. Return adjacent areas to conditions existing prior to the start of the Work.

F. Building Demolition:
1. Unless otherwise approved by ENGINEER, proceed with demolition from the top of the structure to the ground. Complete demolition work above each floor or tier before disturbing supporting members of lower levels.
2. Demolish concrete and masonry in small sections.
3. Remove structural framing members and lower to ground by means of hoists, derricks, or other suitable methods.
4. Break up and remove foundations and slabs on grade, unless otherwise shown to remain.
5. Locate equipment used for demolition work, and remove demolished materials, so as to not impose excessive loads on supporting walls, floors or framing.

3.2 STRUCTURAL REMOVALS

A. Remove structures to the lines and grades shown unless otherwise directed by the ENGINEER. Where no limits are shown, the limits shall be 4 inches outside the item to be installed. The removal of masonry beyond these limits shall be at the CONTRACTOR'S expense and these excess removals shall be reconstructed to the satisfaction of the ENGINEER with no additional compensation to the CONTRACTOR.

B. All concrete, brick, tile, concrete block, roofing materials, reinforcement, structural or miscellaneous metals, plaster, wire mesh and other items contained in or upon the structure shall be removed and taken from the site, unless otherwise approved by the ENGINEER. Demolished items shall not be used in backfill adjacent to structures or in pipeline trenches.

C. After removal of parts or all of masonry walls, slabs and like work which tie into new Work or existing work, the point of junction shall be neatly repaired so as to leave only finished edges and surface exposed.

D. The jambs, sills and heads of any new windows, passageways, doors, or other openings cut into new Work or existing work, shall be dressed with new masonry, concrete or metal to provide a smooth, finished appearance.

E. Where new anchoring materials including bolts, nuts, hangers, welds and reinforcing steel, are required to attach new Work to the existing work they shall be included under this Section, except where specified elsewhere.

3.3 MECHANICAL REMOVALS

A. Mechanical removals shall consist of dismantling and removing of existing piping, pumps, motors, equipment and other appurtenances as specified, shown, or required for the completion of the Work. It shall include cutting, capping, and plugging as required, except that the cutting of existing piping for the purpose of making connections thereto will be included under Division 15.

B. Existing process, water, chemical, gas, fuel oil and other piping not required for the new Work shall be removed where shown or where it will interfere with new Work. Piping not indicated to be removed or which does not interfere with new Work shall be removed to the nearest solid support, capped and left in place. Chemical and fuel lines and tanks shall be purged and made safe prior to removal or capping. Where piping that is to be removed passes through existing walls, it shall be cut off and properly capped on each side of the wall.

C. When underground piping is to be altered or removed, the remaining piping shall be properly capped. Abandoned underground piping may be left in place unless it interferes with new Work or is shown or specified to be removed.

D. Waste and vent piping shall be removed to points shown. Pipe shall be plugged with cleanouts and plugs. Where vent stacks pass through an existing roof that is to remain, they shall be removed and the hole in the roof properly patched and made watertight.

E. Any changes to potable water piping and other plumbing and heating system work shall be made in conformance with all applicable codes and under the same requirements as other underground piping. All portions of the potable water system that have been altered or opened shall be pressure tested and disinfected in accordance with Section 15051 and local codes. Other plumbing piping and heating piping shall be pressure tested only.

3.4 ELECTRICAL REMOVALS

A. CONTRACTOR shall be responsible for disconnecting wiring at equipment to be removed. CONTRACTOR shall be responsible for removing the disconnected conduit, disconnect switches, wiring, lighting fixtures, receptacles, and all other appurtenant electrical removals unless otherwise noted on the Drawings.

B. Electrical removals shall consist of the removal of existing transformers, distribution switchboards, control panels, motors, conduits and wires, poles and overhead wiring, panelboards, lighting fixtures, and miscellaneous electrical equipment all as shown, specified, or required to perform the Work.

C. All existing electrical equipment and fixtures to be removed shall be removed with such care as may be required to prevent unnecessary damage, to keep existing systems in operation and to keep the integrity of the grounding systems.

D. Distribution switchboards shall be removed or modified as shown. Switchboards to be removed shall be disconnected and dismantled, and all components shall be disposed of off the site. Circuit breakers and other control equipment on modified switchboards that will no longer be used shall be removed unless otherwise shown or specified. All new openings cut into the modified switchboard panels shall be cut square and dressed smooth to the dimensions required for the installation of the new equipment.

E. Motors shall be disconnected and removed where shown or specified. Motors not designated by the SD1 to be salvaged shall be removed from the site. Motors or other electrical gear designated for reuse shall be stored in enclosed, heated storage.

F. Conduits and wires shall be abandoned or removed where shown. All wires in abandoned conduits shall be removed, salvaged, and stored. Abandoned conduits concealed in floor or ceiling slabs, or in walls, shall be cut flush with the slab or wall at the point of entrance. The conduits shall be suitably plugged, and the area repaired in a flush, smooth, approved manner. Exposed conduits and their supports shall be disassembled and removed from the site. Repair all areas of work to prevent rust spots on exposed surfaces.

G. Where shown or otherwise required, wiring in the underground duct system shall be removed. All such wiring shall be salvaged and stored as specified. CONTRACTOR shall verify the function of all wiring before disconnecting and removing it. Ducts which are not to be reused shall be plugged where they enter buildings and made watertight.

H. Where shown, direct burial cable shall be abandoned. Such cable shall be disconnected at both ends of the run. Where it enters a building or structure, the cable shall be cut back to the point of entrance. All openings in buildings for entrance of abandoned direct burial cable shall be patched and made watertight.

I. Poles and overhead wiring shall be abandoned as shown and specified. Existing substation and poles owned by the power company will be removed by the power company. Poles not owned by the power company shall be completely removed from the site by the CONTRACTOR. The overhead wires shall be salvaged and stored as specified in 3.1A. CONTRACTOR shall perform this work after the new service has been completed and energized, and in accordance with the approved schedule. CONTRACTOR also shall make all the necessary arrangements with the power company for the removal of their transformers and metering equipment after the new electrical system has been installed and energized.

J. Panelboards where shown shall be removed and disposed of off the site. Where shown or specified, they shall be replaced with new panelboards at the same or adjacent locations. All cutting and patching necessary for the removal and replacement of panelboards shall be performed.

K. Lighting fixtures shall be removed or relocated as shown. Fixtures not relocated shall be removed from the site. Relocated fixtures shall be carefully removed from their present location and rehung where shown.

L. Wall switches, receptacles, starters and other miscellaneous electrical equipment, shall be removed and disposed of off the site as required. Care shall be taken in removing all equipment so as to minimize damage to architectural and structural members. Any damage incurred shall be repaired.

3.5 ALTERATIONS AND CLOSURES

A. Alterations shall conform to all applicable Specifications, the Drawings, and the directions and approvals of the ENGINEER.

B. Where alterations require cutting or drilling into existing floors, walls, and roofs, the holes shall be repaired in an approved manner. CONTRACTOR shall repair such openings with the same or matching materials as the existing floor, wall, or roof or as otherwise approved by the ENGINEER. All repairs shall be smoothly finished unless otherwise approved by the ENGINEER.

C. Openings in existing concrete slabs, ceilings, masonry walls, floors and partitions shall be closed and sealed as shown or otherwise directed by the ENGINEER. New Work shall be keyed into the existing Work in an acceptable manner. New reinforcing steel shall be welded to the existing reinforcing. Welding shall conform to AWS D12.1, Reinforcing Steel Welding Code. In general, use the same or matching materials as the existing adjacent surface. The finished closure shall be a smooth, tight, sealed, permanent closure acceptable to the ENGINEER.

3.6 CLEAN-UP

A. CONTRACTOR shall remove from the site all debris resulting from the demolition operations as it accumulates. Upon completion of the Work, all materials, equipment, waste, and debris of every sort shall be removed, and premises shall be left, clean, neat and orderly.

++ END OF SECTION ++

SECTION 02110

CLEARING AND GRUBBING

PART 1 – GENERAL

1.1 DESCRIPTION

A. Scope: The CONTRACTOR shall totally clear the area within the limits of the sewer easement, including but not limited to brush, hedges and trees (unless designated as not to be disturbed on the plans or by direction of SD1), stumps, logs, pavement, and loose or projecting material as necessary to allow the construction work to be completed. The cleared debris and pavement shall be removed and disposed of off-site unless otherwise approved by SD1 in writing.

B. Related Sections:
1. Section 02220, Excavation and Backfill

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 CLEARING AND GRUBBING

A. All fences shall be temporarily removed where crossing the sewer easement, and shall be completely restored to their pre-construction condition to the satisfaction of SD1 after construction work in the area of the fences have been completed. Materials used shall be equal to or better than the original materials in the fences.

3.2 SURVEY MONUMENTATION

A. Any and all survey monumentation encountered and removed during the course of construction must be put back in its original location at the completion of construction by a Registered Surveyor licensed to do business in the State of Kentucky.

3.3 BLASTING

A. No blasting is permitted.

3.4 TEMPORARY CLOSURES

A. Temporary closures shall be erected, maintained and removed at the completion of construction where livestock are in evidence or where directed by SD1.

B. Trees designated as not to be disturbed, shall be protected from harm by machinery, materials or the construction work.

++ END OF SECTION ++

SECTION 02220

EXCAVATION AND BACKFILL

PART 1 – GENERAL

1.1 DESCRIPTION

A. Scope:
1. CONTRACTOR shall provide all labor, materials, equipment and incidentals required to perform all excavating, backfilling, filling and grading, and disposing of earth materials as shown, specified, and required for construction of structures, manholes, vaults, conduits, pipelines, roads, and other facilities required to complete the Work in every respect.
2. All necessary preparation of subgrade for slabs and pavements is included.
3. All temporary means needed to prevent discharge of sediment to water courses from dewatering systems or erosion are included.
4. No classification of excavated materials will be made. Excavation includes all materials regardless of type, character, composition, moisture, or condition thereof.

B. Related Sections:
1. Section 02050, Demolitions
2. Section 02512, Bituminous Paving
3. Section 02900, Landscaping
4. Section 15051, Buried Piping Installation

1.2 QUALITY ASSURANCE

A. Tests:
1. Engage the services of a qualified testing laboratory to make tests and determine acceptability of the fill or material as listed below. Laboratory shall be acceptable to ENGINEER.
2. Field quality control testing will be performed by SD1's testing service. CONTRACTOR shall give full cooperation to SD1's testing personnel so that the required tests can be taken in an efficient and timely manner.
3. Required Tests:
   a. Select Fill Samples: Gradation, ASTM D 422.
   b. General Fill Samples: Gradation, ASTM D 422; Atterberg Limits, ASTM D4318
   c. Compacted General Fill: Compaction, ASTM D 1556 and ASTM D 698, ASTM D 2922.
   d. Compacted Select Fill, Drainage Fill, Subbase Material and Pipe Bedding: Compaction, ASTM D 1556 and ASTM D 698, ASTM D 2922, ASTM D4253, ASTM D4254.

B. Permits and Regulations:
   1. SD1 will obtain all necessary permits for work in roads, rights-of-way, railroads, etc.
   2. CONTRACTOR shall obtain permits as required by local, state and federal agencies for discharging water from excavations.
   3. CONTRACTOR shall perform excavation work in compliance with applicable requirements of governing authorities having jurisdiction.

C. Reference Standards: Comply with applicable provisions and recommendations of the following except as otherwise shown or specified.
   1. ASTM A 36, Specification for Structural Steel.
   2. ASTM A 328, Specification for Steel Sheet Piling.
   3. ASTM D 422, Method for Particle Size Analysis of Soils.
   4. ASTM D 698, Standard Test Methods for Laboratory Compaction Characteristics of Soils Using Standard Effort (12,400 ft – lbf/cu ft) (600 KN-m/cum).
   5. ASTM D 1556, Test Method for Density and Unit Weight of Soil in Place by the Sand Cone Method.
   6. ASTM D 2321, Practice for Underground Installation of Thermoplastic Pipe for Sewer and other Gravity – Flow Applications
   7. ASTM D 2922, In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).
   8. ASTM D4253, Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table.
   9. ASTM D4254, Standard Test Method for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density.
   10. AISC Specifications for the Design, Fabrication, and Erection of Structural Steel for Buildings.
   11. Kentucky Department of Highways (KDOH), Standard Specifications for Road and Bridge Construction, 2000 Edition.
   12. OSHA Standard, Title 29, Code of Federal Regulations, Part 1926, Section .650 (Subpart P - Excavations).

1.3 SUBMITTALS

A. Excavation Plan: Prior to start of excavation operations, submit written plan to demonstrate compliance with OSHA Standard 29 CFR Part 1926.650. As a minimum, excavation plan shall include:
   1. Name of competent person.
   2. Excavation method(s) or protective system(s) to be used.
   3. Copies of "manufacturer's data" or other tabulated data if protective system(s) are designed on the basis of such data.

B. Shop Drawings: Submit for approval the following:
   1. Sheeting and bracing, or other protective system(s).
   2. Dewatering system.
   3. Cofferdams.
   4. Anticipated Protection Methods.

5. Underpinning.

Shop Drawings shall be prepared by a licensed professional engineer recognized as expert in the specialty involved. Also submit for approval, calculations and all other pertinent information. CONTRACTOR, however, will be responsible for designing, in-stalling, operating and maintaining the system(s) as required to satisfactorily accomplish all necessary sheeting, bracing, protection, underpinning and dewatering.

C. Submit gradation and compaction test reports of all specified soil materials.

1.4 JOB CONDITIONS

A. Subsurface Information: Refer to Supplementary Conditions for Data on subsurface conditions. Data is not intended as a representation or warranty of continuity of conditions between soil borings nor of groundwater levels at dates and times other than date and time when measured. SD1 will not be responsible for interpretations or conclusions drawn therefrom by CONTRACTOR. Data are solely made available for the convenience of CONTRACTOR.
   1. Additional test borings and other exploratory operations may be made by CONTRACTOR at no cost to SD1.

B. Existing Structures: The Drawings show certain surface and underground structures adjacent to the Work. This information has been obtained from existing records. It is not guaranteed to be correct or complete and is shown for the convenience of CONTRACTOR. CONTRACTOR shall explore ahead of the required excavation to determine the exact location of all structures. They shall be supported and protected from damage by CONTRACTOR. If they are broken or damaged, they shall be restored immediately by CONTRACTOR at his expense.

C. Existing Utilities: Locate existing underground utilities in the areas of Work. If utilities are to remain in place, provide adequate means of protection during all operations.
   1. Should uncharted or incorrectly charted piping or other utilities be encountered during excavation, consult piping or utility owner and ENGINEER immediately for directions as to procedure. Cooperate with SD1 and utility owner in keeping services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.
   2. In general, service lines to individual houses and businesses are not shown; however, CONTRACTOR shall assume that a service exists for each utility to each house or business.
   3. Do not interrupt existing utilities serving facilities occupied and used by SD1 or others, except when permitted in writing by ENGINEER and then only after acceptable temporary utility services have been provided.
   4. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies for shutoff of services if lines are active.

D. Protection of Persons and Property: Barricade open excavations occurring as part of the Work and post with warning lights. Operate warning lights during hours from dusk to dawn each day and as otherwise required.
   1. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations.

E. Dust Control: Conduct all operations and maintain areas of activity, including sweeping and sprinkling of roadways, to minimize creation and dispersion of dust. Calcium chloride may be used to control serious or prolonged dust problems, subject to approval of ENGINEER.

PART 2 – PRODUCTS

2.1 SOIL MATERIALS

A. Select Fill:
   1. Place select fill where shown or specified below and around structures, pipelines, roads, tanks, walks, and other work.
   2. Use well graded sand and gravel, free from organic matter. A well-graded select fill shall have a uniformity coefficient greater than six for sand and greater than four for gravel and have a coefficient of gradation between 1 and 3 for sand and gravel. Not more than 70% by weight shall pass through a No. 40 sieve; not more than 10% by weight shall pass through a No. 200 sieve; and 100% shall pass.
   3. Advise ENGINEER in writing of source and, if required, submit a sample of the material for approval.

B. Subbase Material:
   1. Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, or natural or crushed sand, approved by ENGINEER.
   2. Comply with the gradation conforming to Crushed Stone Base in KYTC Standard Specifications for Road and Bridge Construction, Latest Edition.

C. Drainage Fill: Gradation shall conform to the requirements for Free Draining Bedding and Backfill in KYTC Standard Specifications for Road and Bridge Construction, Latest Edition.

D. General Backfill and Fill Materials: Provide approved soil materials for backfill and fill, free of rock thicker than 6 inches or larger than 24 inches maximum in any dimension, debris, waste, frozen materials, vegetable and other organic matter and other deleterious materials. Previously excavated materials meeting these requirements may be used for backfill. All rock shall be excluded from fill within 24 inches of the pipe.

E. Riprap: Provide rock, broken concrete (if no reinforcing steel is present), or stone of sizes such that at least 85% of the total material by weight is larger than a 6-inch but less than an 18-inch square opening. At least 50% of the total material by weight shall be larger than a 12-inch square opening. The material smaller than a 6-inch square opening shall consist predominantly of rock and shall be free of soil.

F. Pipe Bedding Material:
   1. Place around pipe and compact for pipe bedding material.
   2. Fill shall be clean natural or washed sand and gravel, crushed gravel or crushed stone, free from bituminous or cementitious substances and flat or flaky particles in an amount to cause caking, packing, yielding or uneven support for the pipe. Lime sand shall not be acceptable. All material shall be of such sizes that 100% passes the one and one half (1-½) inch screen, 40% or less passes the No. 40 sieve, and 10% or less passes the No. 200 sieve.
   3. Fill shall not consist of any organic soil or stone larger than 1½-inch in any dimension.

G. Control Density Fill:
   1. Use for trench backfill where shown on the Drawings.
   2. Description:
      a. Flowable fill shall consist of a mixture of cement, sand, fly ash, water and other materials approved by SD1.
   3. Materials and Mixing Proportioning:
      a. Cement: 30 lbs.
      b. Fly Ash, Class F: 300 lbs. Do not allow the loss or ignition for Class F fly ash to exceed 12%.
      c. Natural Sand (S.S.D): 3,000 lbs.
      d. Water (Maximum): 550 lbs. Water used for the mixture shall be potable and free of oil, salts, acid and other impurities that would have an adverse effect on the quality of the backfill material.
   4. Properties:
      a. Average Compressive Strength:
         1) 28 days: 50 to 100 psi
      b. For applications that require early opening to traffic or placement of pavement as soon as possible, provide a mixture with the following properties:
         1) Mixture bleeds freely within 10 minutes
         2) Mixture shall support a 150-pound person within three (3) hours.

H. Flash Fill:
   1. Use for trench backfill where shown on the Drawings.
   2. Description:
      a. Be readily flowable to form around pipes, cables and other embedments in trenches.
      b. Achieve a quick initial set to permit paving within 4 hours of placement.
      c. Achieve an initial strength capable of bearing traffic within 4 hours of placement.

d. Achieve an ultimate strength of no more than 100 psi so that material can be re-excavated if necessary.

3. Materials:
   a. Cement: None.
   b. Fly ash shall meet ASTM C-618, Class C or Class F, except that requirement for moisture and pozzolanic activity are waived for Class F fly ash.
   c. Sand shall be natural, recycled, or manufactured. Other filler materials may be used as a substitute with approval.
   d. Water used for the mixture shall be potable and free of oil, salts, acid and other impurities that would have an adverse effect on the quality of the backfill material.
4. Properties:
   a. Resistance to Penetration (avg. at 4 hours): 400 psi.
   b. Coefficient of Permeability: 2.6x10-5 cm/sec.
   c. Unconfined Compressive Strength:
      1) 3 Hours: 20 psi (1.44 tsf).
      2) 28 Days: 70 psi (5.0 tsf).
      3) 91 Days: 100 psi (7.2 tsf).
   d. Atterberg Limits: Non plastic.
   e. pH (at one month): 11.16.
   f. Thermal Resistivity: 45 C-cm/w.
   g. Color: Tan.
5. Mixing Proportioning:
   a. ASTM C-618 Fly Ash: 400 lbs.
   b. Sand: 2930 lbs.
   c. Water: 430 lbs.
   d. Unit Weight (Fresh Weight): 135 lbs/cu. ft.
6. Product Name:
   a. Flashfill by Roth Ready Mix Concrete Co.
   b. Or equal.

PART 3 – EXECUTION

3.1 INSPECTION

A. CONTRACTOR shall examine installation site, verify elevations, and observe conditions under which work is to be performed and notify ENGINEER of unsatisfactory conditions. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to ENGINEER.

B. Provide ENGINEER with sufficient notice and with means to examine the areas and conditions under which excavating, filling, and grading are to be performed. ENGINEER will notify CONTRACTOR if conditions are found that may be detrimental to the proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions have been corrected in an acceptable manner.

3.2 SITE PREPARATION

A. Clear all areas to be occupied by permanent construction or embankments of all trees, brush, roots, stumps, logs, wood and other materials and debris. Clean and strip subgrades for fills and embankments of vegetation, sod, topsoil and organic matter. All waste materials shall be removed from site and properly disposed of by CONTRACTOR. Burning will not be permitted.

3.3 TEST PITS

A. Where shown or ordered by ENGINEER, excavate and backfill, in advance of construction, test pits to determine conditions or location of existing facilities. Perform all work required in connection with excavating, stockpiling, maintaining, sheeting, shoring, backfilling and replacing pavement for the test pits.

B. Payment for test pits ordered by ENGINEER not included on Bid Worksheet will be paid for under a change order per Article 10 of the General Conditions.

C. No separate payment will be made for test pits made by CONTRACTOR for his own use.

3.4 EXCAVATION

A. Perform all excavation required to complete the Work as shown, specified and required. Excavations shall include earth, sand, clay, gravel, hardpan, boulders, bedrock, pavements, rubbish and all other materials within the excavation limits.

B. Refer to Section 02222, Rock Removal.

C. Excavations for structures and pipelines shall be open excavations. Provide excavation protection system(s) required by ordinances, codes, law and regulations to prevent injury to workmen and to prevent damage to new and existing structures or pipelines. Unless shown or specified otherwise, protection system(s) shall be utilized under the following conditions.
   1. Excavation Less Than 5-ft Deep: Excavations in stable rock or in soil conditions where there is no potential for a cave-in may be made with vertical sides. Under all other conditions, excavations shall be sloped and benched, shielded, or shored and braced.
   2. Excavations More Than 5-ft Deep: Excavations in stable rock may be made with vertical sides. Under all other conditions, excavations shall be sloped and benched, shielded or shored and braced.
   3. Excavation protection system(s) shall be installed and maintained in accordance with drawings submitted under 1.3, above.

D. Where the structure or pipeline is to be placed below the ground water table, well points, cofferdams or other acceptable methods shall be used to permit construction of said structure or pipeline under dry conditions. Dry conditions shall prevail until concrete has reached sufficient strength to withstand earth and hydrostatic loads and

until the pipelines are properly jointed, and backfilled. In addition, protect excavation from flooding until all walls and floor framing up to and including grade level floors are in place and backfilling has begun. Water level shall be maintained below top of backfill at all times.

E. Pumping of water from excavations shall be done in such a manner to prevent the carrying away of unsolidified concrete materials, and to prevent damage to the existing subgrade. See also additional requirements in Section 15051 Buried Piping Installation.

F. The elevation of the bottom of footings shown shall be considered as approximate only and ENGINEER may order such changes in dimensions and elevations as may be required to secure a satisfactory footing. All structure excavations shall be hand-trimmed to permit the placing of full widths, and lengths of footings on horizontal beds. Rounded and undercut edges will not be permitted.

G. When excavations are made below the required grades, without the written order of ENGINEER, they shall be backfilled with compacted gravel or concrete, as directed by ENGINEER, at the expense of CONTRACTOR.

H. Excavations shall be extended sufficiently on each side of structures, footings, etc., to permit setting of forms, installation of shoring or bracing or the safe sloping of banks.

I. Subgrades:
   1. General Requirements: The backfill shall be maintained at ±3% from optimum moisture content. The compacted fill shall remain firm and intact under all construction operations. Mud, muck, and other soft or unsuitable materials shall be removed.
   2. Subgrade Requirements for Roadways: Compact to the degree specified in the KYTC Standard Specifications for Road and Bridge Construction, Latest Edition.
   3. Subgrade Requirements for Pipeline Trench Bottoms, Floor Slabs and Concrete Pads: Compact to at least 95% of the maximum Standard Proctor dry unit weight as determined by ASTM D 698.
   4. Subgrade Requirements for Footing Foundations: Compact to at least 98% of the maximum Standard Proctor dry unit weight as determined by ASTM D 698 (unless otherwise noted).
   5. Soft Subgrades: For subgrades which are otherwise solid, but which become soft or unsuitable on top due to construction operations, remove the soft and unsuitable material and replace with suitable backfill and recompact to the specified density.
   6. Finished Elevation of Stabilized Subgrades: Do not place above subgrade elevations shown.

J. Stability of Excavations:
   1. Sides of Excavations: Slope to comply with codes and ordinances of agencies having jurisdiction.

2. Shoring and Bracing: Provide shoring and bracing where sloping is not possible either because of space restrictions or stability of material excavated.
3. Safety: Maintain sides and slopes of excavations in a safe condition until completion of backfilling.
4. Caving: If caving occurs outside the excavation area, backfill the resulting hole in accordance with the requirements of this section after removing loose material.

K. Pipe Trench Preparation: Trench construction shall be per SD1 pipe bedding and trench condition details as follows
   1. No more than 200-ft of trench may be opened in advance of pipe laying.
   2. Trench width shall be minimized to greatest extent practical but shall conform to SD1's standard trench details and the following:
      a. Flexible Pipe: Sufficient to provide room for installing, jointing and inspecting piping, but a minimum of pipe barrel OD plus 2-ft for 36" and less diameter pipe. For pipe that is greater than 36" in diameter, the trench width shall be the OD of the pipe plus four feet.
      b. Rigid Pipe: Sufficient to provide room for installing, jointing and inspecting piping, but a minimum of pipe barrel OD plus 2-ft for 36" and less diameter pipe. For pipe that is greater than 36" in diameter, the trench width shall be: **OD + 2*(OD/6).**
      c. Enlargements at pipe joints may be made if required and approved by ENGINEER.
      d. Sufficient for shoring and bracing, or shielding and dewatering.
      e. Sufficient to allow thorough compaction of bedding material adjacent to bottom half of pipe.
      f. Do not use excavating or compaction equipment, which requires the trench to be excavated to excessive width.
   3. Depth of trench shall be as shown. If required and approved by ENGINEER, depths may be revised.
   4. Bedding material shall be carefully placed over the full trench width before the pipe is laid to a depth of at least 6-inches and compacted in maximum of 6-inch lifts over the full trench width. Where pipe is laid in rock excavation, depth of pipe bedding below the pipe shall be at least 6-inches for pipe 24-in. and smaller and 9-inches for pipe 30-in. and larger. After laying pipe, the balance of the bedding material and backfill shall be placed as described herein.

L. Material Storage: Stockpile satisfactory excavated materials in approved areas, until required for backfill or fill. Place, grade and shape stockpiles for proper drainage.
   1. Locate and retain soil materials away from edge of excavations.
   2. Dispose of excess soil material and waste materials as specified hereinafter.

M. Where ENGINEER considers the existing material beneath the bedding material unsuitable, CONTRACTOR shall remove same and replace it with compacted select fill or compacted pipe bedding material.

3.5 UNAUTHORIZED EXCAVATION

A. All excavation outside the lines and grades shown, and which is not approved by ENGINEER, together with the removal and disposal of the associated material shall be at CONTRACTOR'S expense. Unauthorized excavations shall be filled and compacted with select backfill by CONTRACTOR at his expense.

3.6 AUTHORIZED UNDERCUTS

A. Subgrades for concrete structures and trench bottoms shall be firm, dense, and thoroughly compacted and consolidated; shall be free from mud and muck; and shall be sufficiently stable to remain firm and intact under the feet of the workers.

B. If, in the course of excavation as determined by the ENGINEER, unstable soil is encountered at the point of the bottom of the required excavation, the CONTRACTOR shall be authorized to undercut sufficiently to remove all the unstable soil to the limits specified by the ENGINEER.

C. The CONTRACTOR shall refill the undercuts with select backfill or pipe bedding material and compact same to the requirements set forth in 3.4I, unless other means of refill are specified or ordered by the ENGINEER.

D. The cost of removing and disposing of the unstable material and providing refill material shall be reimbursable to the CONTRACTOR at the contract unit price bid or at a mutually agreeable negotiated unit price between the CONTRACTOR and SD1.

3.7 DRAINAGE AND DEWATERING

A. General:
   1. Prevent surface and subsurface water from flowing into excavations and from flooding adjacent areas.
   2. Remove water from excavation as fast as it collects.
   3. Maintain the ground water level below the bottom of the excavation to provide a stable surface for construction operations, a stable subgrade for the permanent work, and to prevent damage to the Work during all stages of construction.
   4. Provide and maintain pumps, sumps, suction and discharge lines and other dewatering system components necessary to convey water away from excavations.
   5. Obtain ENGINEER'S approval before shutting down dewatering system for any reason.

B. Standby Requirements for Dewatering: Provide standby equipment to ensure continuity of dewatering operations.

C. Disposal of Water Removed by Dewatering System:
   1. All dewatering flows are to be settled in siltation basins or directed through filtering devices before discharge to stabilized sites, such as streams or sewers; not onto exposed soils, stream banks, or any other site where the flow could cause erosion.
   2. Silt from construction operations shall not be permitted to enter the storm sewer system. When construction occurs near storm sewer inlets, erosion control measures such as inlet filters and hay bales shall be used to prevent silt from entering storm sewers.
   3. Dispose of all water removed from the excavation in such a manner as not to endanger public health, property, or any portion of the Work under construction or completed.
   4. Dispose of water in such a manner as to cause no inconvenience to SD1, ENGINEER, or others involved in work about the site.
   5. Convey water from the construction site in a closed conduit. Do not use trench excavations as temporary drainage ditches.
   6. CONTRACTOR shall be responsible for complying with all regulatory agency rules pertaining to dewatering and obtaining permits, if required.
   7. See also additional requirements in Section 15051 Buried Piping Installation.

3.8 SHEETING, SHORING, AND BRACING

A. General:
   1. Used material shall be in good condition, not damaged or excessively pitted. All steel or wood sheeting designated to remain in place shall be new. New or used sheeting may be used for temporary work.
   2. All timber used for breast boards (lagging) shall be new or used, meeting the requirements for Douglas Fir Dense Construction grade with a bending strength not less than 1500 psi or Southern Pine No. 2 Dense.
   3. All steel work for sheeting, shoring, bracing, cofferdams etc., shall be designed in accordance with the provisions of the "Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings", of the AISC except that field welding will be permitted.
   4. Steel sheet piling shall be manufactured from steel conforming to ASTM A 328. Steel for soldier piles, wales and braces shall be new or used and shall conform to ASTM A 36.
   5. Maintain shoring and bracing in excavations regardless of time period excavations will be open. Carry down shoring and bracing as excavation progresses.
   6. Unless otherwise shown, specified, or ordered, all materials used for temporary construction shall be removed when work is completed. Such removal shall be made in a manner not injurious to the structure or its appearance or to adjacent Work.
   7. Provide permanent steel sheet piling or pressure creosoted timber sheet piling wherever subsequent removal of sheet piling might permit lateral movement of soil under adjacent structures. Cutoff tops as required and leave permanently in place.

8. The clearances and types of the temporary structures, insofar as they affect the character of the finished Work, and the design of sheeting to be left in place, will be subject to the approval of ENGINEER; but CONTRACTOR shall be responsible for the adequacy of all sheeting, shoring, bracing, coffer-damming, etc.
9. Safe and satisfactory sheeting, shoring and bracing shall be the entire responsibility of CONTRACTOR.

B. Sheeting Left in Place:
1. Steel sheet piling shown to be left in place shall consist of rolled sections of the continuous interlocking type unless otherwise approved. The type and design of the sheeting and bracing shall conform to the above specifications for all steel work for sheeting and bracing. Steel sheeting designated to be left in place shall be new.
2. Steel sheet piling to be left in place shall be driven straight to the lines and grades as shown or directed. The CONTRACTOR shall determine the grade to which the sheet piling shall be driven. The piles shall penetrate into firm materials with secure interlocking throughout the entire length of the pile. Damaged piling having faulty alignment shall be pulled and replaced by new piling.
3. The type of guide structure used and method of driving for steel sheet piling to be left in place shall be subject to the approval of ENGINEER. Jetting will not be permitted.
4. Cut off piling left in place to the grades shown or ordered by ENGINEER and remove the cut offs from the site.
5. Clean wales, braces and all other items to be embedded in the permanent structure, and ensure that the concrete surrounding the embedded element is sound and free from air pockets or harmful inclusions. Provisions shall include the cutting of holes in the webs and flanges of wale and bracing members, and the welding of steel diaphragm waterstops perpendicular to the centerline of brace ends which are to be embedded.
6. Subsequent to removal of the inside face forms, and when removal of bracing is permitted, cut back steel at least 2 inches inside the wall face and patch opening with cement mortar. Concrete shall be thoroughly worked beneath wales and braces, around stiffeners and in any other place where voids may be formed.
7. Portions of sheeting or soldier piles and breast boards which are in contact with the foundation concrete shall be left in place, together with wales and bracing members which are cast into foundation or superstructure concrete.

C. Removal of Sheeting and Bracing:
1. Remove sheeting and bracing from excavations unless otherwise ordered in writing by ENGINEER. Removal shall be done so as to not cause injury to the Work. Removal shall be equal on both sides of excavation to ensure no unequal loads on pipe or structure.
2. Defer removal of sheeting and bracing, where removal may cause soil to come into contact with concrete, until the following conditions are satisfied:
   a. Concrete has cured a minimum of 7 days.
   b. Wall and floor framing up to and including grade level floors are in place.

3.9 TRENCH SHIELDS

A. Excavation of earth material below the bottom of a shield shall not exceed the limits established by ordinances, codes, laws and regulations.

B. When using a shield for pipe installation:
   1. Any portion of the shield that extends below the mid-diameter of an installed rigid pipe (i.e. RCCP) shall be raised above this point prior to moving the shield ahead for the installation of the next length of pipe.
   2. The bottom of the shield shall not extend below the mid-diameter of installed flexible pipe (i.e. Steel, DI, PVC, etc.) at any time and shall be raised above this point prior to moving the shield ahead for the installation of the next length of pipe.

C. When using a shield for the installation of structures, the bottom of the shield shall not extend below the top of the bedding for the structures.

D. When a shield is removed or moved ahead, extreme care shall be taken to prevent the movement of pipe or structures or the disturbance of the compacted bedding for pipe or structures. Pipe or structures that are disturbed shall be removed and reinstalled as specified.

3.10 GENERAL REQUIREMENTS FOR BEDDING, BACKFILL, FILL AND COMPACTION

A. Furnish, place and compact all fill and backfill required for structures and trenches and to provide the finished grades shown and specified, including but not limited to restoration of access roads, construction benches, etc. Unless otherwise specified, backfill and fill may be obtained from onsite sources. Additional materials, if required, shall be furnished from offsite sources at no additional cost to SD1.

B. Backfill excavations as promptly as Work permits, but not until completion of the following:
   1. Acceptance by ENGINEER of construction below finish grade including damp proofing, waterproofing, perimeter insulation, trench construction, and pipe and bedding installation.
   2. Inspection, testing, approval, and recording of locations of underground utilities.
   3. Removal of concrete formwork.
   4. Removal of shoring and bracing.
   5. Removal of trash and debris.
   6. Permanent or temporary horizontal bracing is in place on horizontally supported walls.
   7. Placement of settlement plates.

C. Keep excavations dry during backfilling operations. Bring backfill around structures and piping up evenly on all sides.

D. Do not allow levels of backfill against concrete walls to differ by more than 2-ft on either side of walls unless walls are adequately braced or all floor framing is in place up to and including grade level slabs.

E. Place select backfill material above pipe encasements and as bedding material for pipelines that pass under structures, concrete pavements, or other pipelines. General backfill material may be used above pipe bedding material in other areas. Method of bedding pipe shall be as specified in Section 02610 Pipe & Fittings and as shown on the Drawings.

F. Place all bedding in pipe trenches in horizontal layers not exceeding 6-inches in depth up to a point 12-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.

G. Prior to the installation of pipes which are to be installed in fill sections, place the fill as described herein, until a minimum height of 2-ft above the pipe is reached, unless otherwise required in other Sections. The fill for the trench width shall then be excavated and the pipe installed, bedded, and backfilled. The remainder of the fill shall then be placed.

H. Control the water content of backfill and fill material during placement within the range necessary to obtain the compaction specified. In general, the moisture content of the fill shall be within 3% of the optimum moisture content for compaction as determined by laboratory tests. Perform all necessary work to adjust the water content of the material to within the range necessary to permit the compaction specified. Do not place backfill or fill material when free water is standing on the surface of the area where the backfill or fill is to be placed. No compaction of backfill or fill will be permitted with free water on any portion of the material to be compacted.

I. Do not place or compact backfill or fill in a frozen condition or on top of frozen material. Remove backfill or fill containing organic materials or other unacceptable material and replace with approved backfill material.

J. Perform compaction of bedding, backfill and fill 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.

K. Compacted bedding, backfill, and fill 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.

L. Test the effectiveness of the equipment selected by CONTRACTOR at the commencement of compaction by construction of a small section of trench, backfill or fill 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 thicknesses or obtain a different type of compactor. No

additional cost to SD1 shall be incurred.

M. Perform backfill around structures using the specified procedures, except that within 10-ft of foundations and underground structures, light compaction equipment shall be used, with the gross weight of the equipment not exceeding 7,000 pounds. Provide equipment that is capable of the required compaction within restricted areas next to structures and around piping.

3.11 PIPE BEDDING

A. Bedding Pipe: Bed pipe as specified below. Piping refers to the main line pipe as well as any service laterals or connections to the mainline pipe.
   1. Trench excavation, backfill, bedding materials and compaction shall conform to the requirements of this Section 02220 Excavation and Backfill.
   2. Excavate trenches below the pipe bottom by the amount specified below.
   3. Remove all loose and unsuitable material from the trench bottom in accordance with 3.6 Authorized Undercuts.
   4. Use pipe bedding material as specified in 2.1F.
   5. Where pipe is installed in a trench excavation, pipe bedding shall be carefully placed and compacted over the full trench width before the pipe is laid. Depth of pipe bedding below the pipe shall be at least 6 inches for pipe 24-in. and smaller and 9 inches for pipe 30-in. and larger. After laying pipe, the balance of the bedding shall be placed as described herein.
   6. Carefully and thoroughly compact all pipe bedding with equipment that achieves the degree of compaction specified in 3.12 Compaction Specifications.
   7. Excavate for bell holes in bedding carefully so as not to disturb the surrounding compacted material and lay pipe so that the bell bears uniformly on the compacted trench bedding material beneath the pipe.
   8. If ENGINEER or SD1 witness bedding not being installed correctly, ENGINEER or SD1 may require approval of the bedding condition prior to laying the pipe. If a conflict exists obtain clarification from ENGINEER before proceeding.
   9. Continue placement of bedding material around pipe. Place all bedding and backfilling in pipe trenches in horizontal layers not exceeding 6 inches in depth and thoroughly compact each layer before the next layer is placed. Bedding material shall be sliced or worked-in along the length of the pipeline during each 6-in. layer lift and then compacted.
   10. No pipe shall be brought into position until the preceding length has been bedded and secured in its final position.
   11. Bedding and initial backfill continues to 12 inches above the top of the pipe.
   12. See Sewer Trench Compaction Detail that follows this section.

B. Normal Backfill:
   1. After the pipe sections have been embedded up to a point 12 inches or more above the top of the pipe, the pipe sections have been encased in concrete, or the structures or appurtenances have been constructed, as specified on the drawings, the remainder of the trench or excavated area shall be backfilled using trench or structure excavated material if it meets the requirements set forth under 2.1D. If

the material does not meet these requirements, the trench or structure excavated material shall be wasted and suitable imported material shall be used for backfill.

2. Backfill shall be placed in horizontal loose lifts not exceeding 8 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 under 3.12 Compaction Specifications, up to existing ground level or finished grade level if same has been established.

C. Rock Backfill:
   1. Where the trench is located in areas from which rock had to be excavated in a quantity other than isolated stones, the excavated rock may be used as part of the backfill above a point 2-fteet or more above the top of the pipe, or above a point 1-foot above pipe encasement, but shall not be used under pavement areas, unless specifically authorized by the ENGINEER.
   2. The rock fragments used in the backfill shall not exceed rock thicker than 6 inches or larger than 24-inches maximum in any dimension, shall not be dropped into the trench directly over the pipe centerline and shall be used with sufficient smaller dimensioned material so that voids between larger fragments shall be filled. Compaction shall meet the requirements specified under 3.12 Compaction Specifications, up to existing ground level or finished grade level if same has been established.
   3. Rock shall not be used in the top 12-inches of the backfill, except across creeks, gullies, ravines or areas designated by the ENGINEER, where the rock may be used to the existing ground level as specified on the drawings.

3.12 COMPACTION SPECIFICATIONS

A. Requirements based on material types are as follows:
   1. Select Fill, Drainage Fill and Pipe Bedding: For fill and bedding beneath structures and foundations, compact granular materials that exhibit a well-defined moisture density curve to at least 98% of the standard proctor maximum dry density (ASTM D698). For all other fill and bedding, compact granular materials that exhibit a well-defined moisture–density curve to at least 95% (ASTM D698). Moisture-condition fill materials to within a range of 2% below to 3% above optimum moisture content (ASTM D698). Compact granular materials that do not exhibit a well-defined moisture-density curve to at least 85% relative density (ASTM D4253 and D4254) beneath structures and foundations, and to at least 75% relative density (ASTM D4253 and D4254) for all other areas.
   2. Subbase Material: Compact granular materials that exhibit a well-defined moisture-density curve to at least 100% (ASTM D698). Moisture-condition subbase material to within 1% of optimum moisture contents (ASTM D698). Compact granular materials that do not exhibit a well-defined moisture density curve to at least 85% relative density (ASTM D4253 and D4254).
   3. General Fill and Backfill: Compact materials that exhibit a well-defined moisture density curve to at least 98% of the standard proctor maximum dry density (ASTM D698) beneath structures, foundations and the top 1-ft. below pavements, and at least 95% (ASTM D698) in all other areas. Moisture-condition fill

materials to within a range of 2% below to 3% above optimum moisture content (ASTM D698). Compact granular or rock materials that do not exhibit a well-defined moisture-density curve to at least 85% relative density (ASTM D4253 and D4254) beneath structures and foundations, and to at least 75% relative density (ASTM D4253 and D4254) for all other areas.

B. If the specified densities are not obtained because of improper control of placement or compaction procedures, or because of inadequate or improperly functioning compaction equipment, or because of soil moisture content, the CONTRACTOR shall perform whatever work is required to provide the required densities. This work shall include complete removal of unacceptable bedding, backfill or fill areas, and replacement and recompaction until acceptable densities are provided.

C. CONTRACTOR shall repair, at his own expense, any Settlement that occurs within the construction area. He shall make all repairs and replacements necessary within 30 days after notice from ENGINEER or SD1.

3.13 EMBANKMENTS

A. To the maximum extent available, use excess earth obtained from structure bench and trench excavations for construction of embankments. Obtain additional material from borrow pits as necessary. After preparation of the embankment area, level and roll the subgrade so that surface materials of the subgrade will be compact and well bonded with the first layer of the embankment. All material deposited in embankments shall be free from rocks or stones, more than 6 inches thick or larger than 24 inches in maximum dimension, brush, stumps, logs, roots, debris, and organic or other objectionable materials. Construct embankments in horizontal layers not exceeding 8 inches in uncompacted thickness. Spread and level material deposited by excavating and hauling equipment prior to compaction. Thoroughly compact each layer by rolling or other method acceptable to the ENGINEER to at least 98% of the maximum density within two (2) to three (3) percent of optimum moisture content as determined by ASTM D 698 beneath structures and foundations, and 95% (ASTM D698) in all other areas. If the material fails to meet the density specified, compaction methods shall be altered. Wherever a trench passes through a fill or embankment, the fill or embankment material shall be placed and compacted to an elevation 24 inches above the top of the pipe before the trench is excavated.

3.14 STRUCTURE FILL

A. Provide structure fill in the following locations:
   1. Support for structure foundations where CONTRACTOR excavates below design subgrade shall be provided at CONTRACTOR'S expense.
   2. Support below and around piping and foundations as directed by ENGINEER.
   3. Subgrade for roads and pavements.
   4. Restoration of construction benches and access roads.
   5. Where shown or directed by ENGINEER.

B. Subgrade surface shall be level, dry, firm and subject to ENGINEER'S approval. Do not place fill if any water is on the surface of area to receive fill. Do not place or compact fill in a frozen condition or on top of frozen material.

C. Place fill in horizontal loose lifts of 8 inches maximum thickness. It shall be mixed and spread in a manner to assure uniform lift thickness after placing.

D. Compact each layer of fill before placement of the next lift.

E. Do not use fill containing topsoil, rubble, debris, wood or other organic matter. Fill containing unacceptable material shall be removed and disposed of.

F. The water content of the fill being compacted shall be within the range of two (2) percent below to three (3) percent above the optimum moisture content of the material. CONTRACTOR shall wet or dry the fill materials during placement to achieve water contents needed for effective compaction.

G. Perform compaction of fill with equipment suitable for the type of fill material being placed. Select equipment, which is capable of providing the densities, required and submit selection of the equipment to ENGINEER for approval.

H. Compact each layer of fill material by at least two complete coverages of all portions of the surface of each lift using approved compaction equipment. One coverage is defined as the condition reached when all portions of the fill lift have been subjected to the direct contact of the compacting surface of the compactor.

I. The minimum density to be obtained in compacting the structural fill shall be 98% of the standard Proctor maximum dry density (ASTM D698) beneath structures and foundations, and 95% (ASTM D698) in all other areas. If the field and laboratory tests indicate unsatisfactory compaction, CONTRACTOR shall provide the additional compaction necessary to obtain the specified degree of compaction. All additional compaction work shall be performed by CONTRACTOR at no additional cost to SD1 until the specified compaction is obtained.

J. Structure fill necessary to replace subgrade materials disturbed and softened as a result of CONTRACTOR'S operations or to backfill unauthorized excavation shall be provided, placed and compacted at CONTRACTOR'S expense.

3.15 GRADING

A. General: Uniformly grade areas within limits of grading under this Section, including adjacent transition areas. Smooth subgrade surfaces within specified tolerances, compact with uniform levels or slopes between points where elevations are shown, or between such points and existing grades.

B. Grading Outside Building Lines: Grade areas adjacent to building lines to drain away from structures and to prevent ponding. Finish surfaces free from irregular surface changes, and as follows:
   1. Turfed Areas or Areas Covered with Gravel, Stone, Wood Chips, or Other Special Cover: Finish areas to receive topsoil or special cover to within not more than 1 inch above or below the required subgrade elevations.
   2. Walks: Shape surface of areas under walks to line, grade and cross section, with finish surface not more than 1-in. above or below the required subgrade elevation.
   3. Pavements: Shape surface of areas under pavement to line, grade and cross section, with finish surface not more than 1/2-in. above or below the required subgrade elevation.

C. Grading Surface of Fill under Building Slabs: Grade smooth and even, free of voids, compacted as specified, and to required elevation. Provide final grades within a tolerance of 1/2-inch when tested with a 10-foot straightedge.

D. Compaction:
   1. After grading, compact subgrade surfaces to the depth and percentage of maximum density for each area classification.

3.16 PAVEMENT SUBBASE COURSE

A. General: Place subbase material, in layers of specified thickness, over ground surface to support pavement base course.
   1. See other Sections of Division 2 for paving specifications.

B. Grade Control: During construction, maintain lines and grades including crown and cross slope of subbase course.

C. Shoulders: Place shoulders along edges of subbase course to prevent lateral movement. Construct shoulders of acceptable soil materials, placed in such quantity to compact to thickness of each subbase course layer. Compact and roll at least a 12-in. width of shoulder simultaneously with compacting and rolling of each layer of subbase course.

D. Placing: Place subbase course material on prepared subgrade in layers of uniform thickness, conforming to indicated cross section and thickness. Maintain optimum moisture content for compacting subbase material during placement operations.
   1. When a compacted subbase course is shown to be 6 inches thick or less, place material in a single layer. When shown to be more than 6 inches thick, place material in equal layers, except no single layer more than 6 inches or less than 3 inches in thickness when compacted.

3.17 DISPOSAL OF EXCAVATED MATERIALS

A. Material removed from the excavations which does not conform to the requirements for fill or is in excess of that required for backfill shall be hauled away from the project site by the CONTRACTOR and disposed of in compliance with ordinances, codes, laws and regulations at no additional cost to SD1.

3.18 RESTORING AND RESURFACING EXISTING ROADWAYS AND FACILITIES

A. Restore pavement per roadway trench detail. Maintain the surface of the paved area over the trench in good and safe condition during progress of the entire Work, and promptly fill all depressions over and adjacent to the trench caused by settlement of backfilling. The permanent replacement pavement shall be equal to that of the existing roadways unless otherwise specified.

B. Pavement, gutters, curbs, sidewalks or roadways disturbed or damaged by the CONTRACTOR'S operations shall be restored by him at his own expense to as good condition as they were previous to the commencement of the Work and in accordance with applicable local and state highway specifications.

3.19 TEMPORARY FENCING

A. Furnish and install a temporary fence surrounding excavations and work area. Fence shall have openings only at vehicular, equipment and worker access points.

B. The fence shall be a snow fence type enclosure, 48 inches high. Fence shall be constructed of vertical hardwood slats measuring 1-1/2 by 1/4-inch interwoven with strands of horizontal wire, or shall be of equivalent plastic construction. Posts shall be of steel, either U, Y, T or channel section, and shall have corrugations, knobs, notches or studs placed and constructed to engage a substantial number of fence line wire in the proper position. Posts shall have tapered anchors weighing 0.67 pounds or more, each firmly attached by means of welding, riveting or clamping. Posts shall have a nominal weight of 1/3 pound per linear foot exclusive of the anchor. Each post shall be furnished with a sufficient number of galvanized wire fasteners or clamps, of not less than 0.120-inch in diameter for attaching fence wire to the post.

3.20 ENVIRONMENTAL PROTECTION AND RESTORATION

A. CONTRACTOR shall be responsible for complying with all regulatory requirements pertaining to environmental protection and restoration. CONTRACTOR shall follow all erosion control design provisions shown in the Erosion Prevention and Sediment Control Plan, drawings, and specifications. CONTRACTOR shall provide, install, and maintain additional erosion and sediment control measures as necessary to retain disturbed sediments on-site.

B. All disturbed areas of the site shall be stabilized. Stabilization shall begin within 7 days on areas of the site where construction activities have permanently or temporarily (for 30 days or more) ceased. When snow cover causes delays, stabilization shall begin as soon as possible. Stabilization practices include seeding, mulching, placing sod, planting trees or shrubs, and using geotextile fabrics and other appropriate measures.

3.21 FIELD QUALITY CONTROL

A. Quality Control Testing During Construction: SD1's testing service must inspect and approve subgrades and fill layers before construction work is performed thereon. Tests of subgrades and fill layers shall be taken as follows:
   1. Footing Subgrade: For each strata of soil on which footings will be placed, conduct at least one test to verify required design bearing capacities. Subsequent verification and approval of each footing subgrade may be based on a visual comparison of each subgrade with related tested strata, when acceptable to ENGINEER.
   2. Paved Areas and Building Slab Subgrade: Make at least one field density test of subgrade for every 2,000 square feet of paved area or building slab, but in no case less than three tests. In each compacted fill layer, make one field density test for every 2,000 square feet of overlaying building slab or paved area, but in no case less than three tests.
   3. Compacted bedding material beneath and around pipe in trenches: Make at least one field density test of compacted bedding at the start of the project to ensure CONTRACTOR's method of compacting the bedding is meeting the compaction requirements. SD1 shall periodically call for tests of bedding compaction as the Work progresses and if the CONTRACTOR's pipe placement operations differ from proper procedures.

B. If testing service reports or inspections show subgrade, fills, or bedding compaction are below specified density, CONTRACTOR shall remove any unacceptable materials as necessary and replace with specified materials and provide additional compaction at the CONTRACTOR's sole expense until subgrades, bedding, and backfill are acceptable as specified herein. The costs for the retesting of these subgrade, fills, or bedding materials that did not originally meet the specified density shall be paid by the CONTRACTOR.

++ END OF SECTION ++

SECTION 02222

ROCK REMOVAL

PART 1 – GENERAL

1.1 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. CONTRACTOR shall utilize blasting if required and specified otherwise rock shall be removed by a suitable mechanical method.

C. In general, rock in pipe trenches shall be excavated so as to be not more than 6 inches below the invert of the pipe after it has been laid.

D. No additional payment will be made for rock excavation.

1.2 REFERENCES

A. NFPA 495 – Explosive Materials Code

B. Commonwealth of Kentucky Department of Mines and Minerals, Laws and Regulations Governing Explosives and Blasting.

1.3 REGULATORY REQUIREMENTS

A. Comply with Federal, State, and Local Regulations and National Codes on the purchase, transportation, storage, and use of explosive material. Federal Regulations and National Codes include but are not limited to the following:
   1. Storage, security, and accountability: Bureau of Alcohol, Tobacco, and Firearms (BATF): 27 CFR Part 181.
   2. Shipment: DOT, 49 CFR Parts 171-179, 390-397.
   3. Safety and Health: OSHA 29 CFR Part 1926, Subpart U.
   4. Transportation and Storage: NFPA 495, Chapters 3 through 6.
   5. 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.

1.4 DEFINITIONS

A. Rock: A naturally occurring hard inorganic material that is in-situ. Rock may be either of sedimentary, igneous, or metamorphic origin, and is solid, bedded, jointed or fractured, and cannot be removed without ram hammering or systematic drilling and

blasting; and boulders, masonry or concrete, except pavement, exceeding 1 cubic yard volume.

B. Blaster in Charge (BIC): One competent, experienced person shall be specifically designated as Blaster-in-Charge (BIC); the BIC shall be in charge of explosives and blasting operations.

C. Explosives and Initiating Devices: Explosives and initiating devices include, but are not limited to, dynamite and other explosives, slurries, water gels, emulsions, blasting agents, initiating explosives, detonators, and detonating cord.

D. Shot: Explosive charge designed to fracture rock when detonated.

1.5 QUALITY ASSURANCE

A. Prepare blasting plan in accordance with applicable regulatory requirements. Obtain written approval before bringing any explosives and initiating devices to the jobsite and beginning blasting. The blasting plan is for quality control and record keeping purposes. The review of the blasting plan does not relieve the Contractor of the responsibility for using existing drilling and blasting technology and for obtaining the required results in a safe manner. The blasting plan shall include, but not be limited to the following minimum requirements:
   1. Part 1: Include a complete summary of proposed transportation, handling, storage, safety precautions, and use of explosives and initiating devices, and include the name of the Blaster in Charge (BIC), who will supervise and be responsible for blasting operations, written evidence of past experience and competency, and a minimum of three references for that person.
   2. Part 2: Shall contain the general concept for the blasting, including the following minimum requirements:
      a. Typical plan and section view of the drill pattern for controlled blast holes, and production blast holes as necessary. Indicate stations or coordinates for the areas to be shot and number of holes. Show the free face, burden, hole diameters, depths, spacings, inclinations, and depth of subdrilling if any.
      b. Individual blast hole loading pattern diagram for each type of shot anticipated showing:
         1) Location of each hole.
         2) Maximum dimensions for width, length, depth of shot.
         3) Amount of each type of explosive in each hole including primer and initiators.
         4) Location, type, and depth of stemming.
      c. Initiation and delay methods, delay times and overall power factor.
      d. Manufacturer’s data sheets for all explosives and initiating devices.
      e. Controls of noise, dust, fly rock, air blast and vibrations.
      f. Data necessary to support the adequacy of the Contractor’s proposed efforts regarding the safety of structures and slopes.
      g. Information on test blasts (planned by the Contractor or) required by the regulatory authorities.

B. Videotape preblast conditions with audible descriptions of observed conditions. Provide and install vibration monitors and sensors at designated locations in accordance with blasting plan.

C. Blasting and liability insurance in accordance with Kentucky Department of Highway (KDOH) and Sanitation District No. 1 (Owner) requirements.

D. Comply with local and state safety codes in effect at the time of the work, observe the recommendations set forth in Employers Mutual, Factory Mutual or Associated General Contractors safety manuals and shall be completely responsible for all blasting operations.

E. Blasting shall only be done by a Kentucky certified blaster and will be referred to herein as the BIC. The BIC shall maintain documentation of current license at the site for review by regulatory authorities and OWNER.

F. Explosives and caps shall be kept in separate locked metal boxes, painted a bright color and stenciled with approved warning signs. When not in use, explosives and caps shall be stored in separate magazines. Whenever a blast is made, signals warning persons of danger shall be given in ample time. Suitable timber or steel blasting mats shall be used over blast area to confine all material lifted by blasting.

G. Excessive blasting or overshooting will not be permitted. Any material outside the authorized excavation limits which is shattered or loosened by blasting shall be removed at the CONTRACTOR'S expense. The OWNER shall have the authority, with notice, to order blasting stopped if the method or amount is causing overshooting or is dangerous to life or destructive to property.

H. Preparation: Provide security, notification of adjacent owners, warning signs, guards, clearances, and other protective measures and procedures necessary to this project.

I. Protection: Protect existing features and facilities from damage, movement or gas-induced pressures. Make proper use of blasting mats and other protective devices, adopting additional precautions necessary to prevent damage to trees, shrubs, and other landscape features, buildings, utilities, monuments, and other structures. Should damage occur, make restoration as required by SD1 at no additional cost to SD1.

1.6 SCHEDULING

Requirements: Schedule blasting between the hours of ( ) and ( ), and only on ( ) days.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Explosives: Type recommended by explosives firm and required by authorities having jurisdiction.

B. Delay devices: Type recommended by explosives firm and conforming to state regulations.

C. Blasting mat materials: Type recommended by explosives firm and conforming to state regulations.

PART 3 – EXECUTION

3.1 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-ft. 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.

3.2 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.

3.3 VARIATION LIMITS

General: 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).

3.4 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).

3.5 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.

3.6 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. Seismograph Requirements:
   1. Designed for monitoring blast-induced vibrations and air blast.
   2. Capable of recording particle velocity in three mutually perpendicular directions in range from 0 to 6 inches per second.
   3. Flat vibration frequency response between 4- and 200-Hz.
   4. Capable of recording air-blast overpressure up to 140 decibels.
   5. 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.

3.7 EXPLOSIVES

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. Notify the OWNER, in advance, of provisions to store and use explosives.

3.8 BLASTING PRECAUTIONS

A. Permission for any deviation from the blasting plan and other specified restrictions shall be secured from the OWNER and applicable authorities, 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.

B. 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.

C. The CONTRACTOR shall be solely responsible for his blasting operations. The CONTRACTOR shall not hold SD1 and/or the ENGINEER liable for any damages resulting from his blasting operations on this project.

3.9 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.

3.10 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 SD1. 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.

3.11 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 24 inches wider than pipe diameter.

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 Excavation and Backfill.

3.12 PAYMENT

Rock excavation shall be bid incidental to the Work and will not be paid for separately.

++ END OF SECTION ++

SECTION 02240

DEWATERING

PART 1 – GENERAL

1.1 SCOPE OF WORK

A. Furnish all labor and equipment required to dewater all excavations.

B. Dewatering of all excavations shall be the responsibility of the Contractor, and no additional compensation will be allowed for same unless specifically included as a bid item.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- Earthwork is included in Section 02300.
- Erosion and Sedimentation Control is included in Section 02370 Erosion and Sedimentation Control.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 GENERAL

A. Dewatering equipment shall be of adequate size and quantity to assure maintaining proper conditions for installing pipe, concrete, backfill or other material or structure in the excavation.

B. Dewatering shall include proper removal of any and all liquid, regardless of its source, from the excavation and the use of all practical means available to prevent surface runoff from entering any excavation.

C. The site shall be kept free of surface water at all times. The Contractor shall install drainage ditches, dikes, cofferdams and shall perform all pumping and other work necessary to divert or remove rainfall and all other accumulations of surface water from the excavations. The diversion and removal of surface water shall be performed in a manner that will prevent flooding and/or damage to other locations within the construction area where it may be detrimental. The Contractor shall provide, install and operate sufficient trenches, sumps, pumps, hose piping, well points, deep wells, etc., necessary to depress and maintain the ground water level at least 2-ft. below the base of the excavation during all stages of construction operations. The ground water table shall be lowered in advance of excavation and maintained a minimum of 2-ft. below the lowest excavation subgrade made until the structure has sufficient strength and weight to withstand horizontal and vertical soil and water pressures from natural ground water.

D. Dewatering operations should not discharge into the sanitary sewer system, or into any ditch, pipe or other conveyance that leads to a regulated water body, except as authorized by a KPDES permit.

E. Construction project area shall be isolated from surface water as needed. The Contractor shall install suitable cofferdam system (water-filled, temporary frame, sheet braced, etc.) where necessary to isolate surface water from project area. All cofferdam structures shall be installed in a manner in accordance with supplier recommendations and to limit disturbance to the existing creek environment. Any damage to the existing creek shall be the responsibility of the Contractor.

++ END OF SECTION ++

SECTION 02260

EXCAVATION SUPPORT AND PROTECTION

PART 1 – GENERAL

1.1 SCOPE OF WORK

A. This Section includes, but is not limited to, the following:
   1. Shoring and bracing necessary to protect existing buildings, streets, walkways, utilities, and other improvements and excavation against loss of ground or caving embankments.
   2. Maintenance of shoring and bracing.
   3. Removal of shoring and bracing, as required.

B. Types of shoring and bracing systems include, but are not limited to, the following:
   1. Steel H-section (soldier) piles.
   2. Timber lagging.
   3. Steel sheet piles.
   4. Portable Steel Trench Box.

C. Building excavation is specified in another Section.

1.2 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.3 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 01 Specification Section 01340. Layout drawings for excavation support system and other data prepared by, or under the supervision of, a qualified professional engineer. System design and calculations must be acceptable to local authorities having jurisdiction. This submittal is for information only. Engineer's review is not for adequacy design, but to verify that it has been designed by a licensed professional. Design of shoring is part of means and methods of construction and remains solely the responsibility of the contractor.

1.4 QUALITY ASSURANCE

A. Engineer Qualifications: A professional engineer legally authorized to practice in jurisdiction where Project is located, and experienced in providing successful engineering services for excavation support systems similar in extent required for this Project.

B. Supervision: Engage and assign supervision of excavation support system to a qualified professional engineer foundation consultant.

C. Regulations: Comply with codes and ordinances of governing authorities having jurisdiction.

1.5 JOB CONDITIONS

A. Before starting work, verify governing dimensions and elevations. Verify condition of adjoining properties. Take photographs to record any existing settlement or cracking of structures, pavements, and other improvements. Prepare a list of such damages, verified by dated photographs, and signed by Contractor and others conducting investigation.

B. Survey adjacent structures and improvements, employing qualified professional engineer, establishing exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing elevations.

C. During excavation, resurvey benchmarks weekly, maintaining accurate log of surveyed elevations for comparison with original elevations. Promptly notify Engineer if changes in elevations occur or if cracks, sags, or other damage is evident.

1.6 EXISTING UTILITIES

A. Protect existing active sewer, water, gas, electricity and other utility services and structures.

B. Notify municipal agencies and service utility companies having jurisdiction. Comply with requirements of governing authorities and agencies for protection, relocation, removal, and discontinuing of services.

PART 2 – PRODUCTS

2.1 MATERIALS

A. General: Provide adequate shoring and bracing materials which will support loads imposed. Materials need not be new, but should be in serviceable condition.

B. Structural Steel: ASTM A 36.

C. Steel Sheet Piles: ASTM A 328.

D. Timber Lagging: Any species, rough-cut, mixed hardwood, nominal 3 inches thick, unless otherwise indicated.

E. Portable Steel Trench Box shall be OSHA approved.

PART 3 – EXECUTION

3.1 SHORING

A. Wherever shoring is required, locate the system to clear permanent construction and to permit forming and finishing of concrete surfaces. Provide shoring system adequately anchored and braced to resist earth and hydrostatic pressures.

B. Shoring systems retaining earth on which the support or stability of existing structures is dependent must be left in place at completion of work.

3.2 BRACING

A. Locate bracing to clear columns, floor framing construction, and other permanent work. If necessary to move a brace, install new bracing prior to removal of original brace.

B. Do not place bracing where it will be cast into or included in permanent concrete work, except as otherwise acceptable to Engineer.

C. Install internal bracing, if required, to prevent spreading or distortion of braced frames.

D. Maintain bracing until structural elements are supported by other bracing or until permanent construction is able to withstand lateral earth and hydrostatic pressures.

E. Remove sheeting, shoring, and bracing in stages to avoid disturbance to underlying soils and damage to structures, pavements, facilities, and utilities.

F. Repair or replace, as acceptable to Engineer, adjacent work damaged or displaced through installation or removal of shoring and bracing work.

++ END OF SECTION ++

SECTION 02370

EROSION AND SEDIMENTATION CONTROL
(Areas Less Than One Acre)

PART 1 – GENERAL

1.1 SCOPE OF WORK

A. Furnish all labor, materials, and equipment required for erecting, maintaining and removing temporary erosion and sedimentation controls as shown on the Drawings and as specified herein and as recommended by state and local regulatory agencies.

B. Temporary erosion controls include, but are not limited to grassing, mulching, seeding, providing erosion control and turf reinforcement mats on all disturbed surfaces including waste area surfaces and stockpile and borrow area surfaces; scheduling work to minimize erosion and providing interceptor ditches at those locations which will ensure that erosion during construction will be either eliminated or maintained within acceptable limits.

C. Temporary sedimentation controls include, but are not limited to, silt dams, traps, barriers, and appurtenances on sloped surfaces which will ensure that sedimentation pollution will be either eliminated or maintained within acceptable limits.

D. Contractor is responsible for providing and maintaining effective temporary erosion and sediment control measures prior to and during construction or until final controls become effective.

E. The Contractor shall be responsible for placement of erosion and sedimentation controls. Prior to construction, the Contractor shall develop an erosion control plan and submit to the Engineer for review. Prior to excavation, fill or grade work, the Contractor shall place controls in locations required by the erosion control plan. If during the course of construction, the Engineer determines additional controls are required, the Contractor shall furnish, install and maintain additional mulching, blankets and/or sediment barriers to control erosion and sedimentation to the satisfaction of the Engineer.

F. The Contractor shall notify the appropriate state agency before beginning construction, and shall implement erosion control measures as may be required by state and federal agencies. If disturbed area is greater than one acre, Contractor shall submit a signed Notice of Intent form to the Division of Water at least 48 hours prior to beginning of construction activity.

G. The Contractor shall inspect and repair all erosion and sedimentation controls every 7 days and after each rainfall of 0.5-in. or greater.

H. Bare soil areas must be seeded, mulched, or covered after 14 days if no work will be done in the area within the next 7 days.

PART 2 – PRODUCTS

2.1 SEED

A. The seed mixture to be sown shall be in the following proportions:

Common Name	Proportion By Weight	% of Purity	% of Germination
Fine Lawn Fescue	40	90	85
Chewings Fescue	25	90	85
Italian Rye Grass	20	90	85
Red Top	10	90	85
White Clover	5	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 mixture.

2.2 FERTILIZER

A. Just prior to the planting of turf, evenly broadcast 15 pounds per thousand square feet of fertilizer, 10-10-10 (nitrogen, phosphorus, potassium). Disc or harrow fertilizer 2 to 4 inches into the soil.

B. Fertilizer shall be delivered to the site in the original unopened container bearing the manufacturer's guarantee analysis. Any fertilizer that becomes caked or damaged making it unsuitable for use, will not be accepted.

2.3 SOD

A. Sod shall be at least 70% Bluegrass, strongly rooted and free of weeds.

B. It shall be mowed to a height not to exceed 3" before lifting, and shall be of uniform thickness with not over 1-1/2" of soil.

2.4 MULCH

A. Mulch for seeded areas shall be Conwed Hydro Mulch, Silva-Fiber, or equal. It shall be suitable for use in a water slurry or for application with hydraulic equipment.

B. Clean straw is acceptable as mulch. It shall be spread at the rate of one (1) bale per 1,000 feet (approximately 2" loose depth).

C. Mulch on slopes greater than 4:1 shall be held in place with erosion control netting.

D. Mulch on areas subject to surface water run-off or in drainage ditches shall be held in place with erosion control netting.

2.5 EROSION CONTROL BLANKETS

A. Erosion Control Blanket shall be made up of biodegradable and/or photodegradable products such as jute, wood fiber, coconut fiber, straw and degradable plastic netting. They shall degrade at a rate of approximately 6 months to 24 months.

B. Erosion Control Blanket shall be installed on slopes greater than 4:1 and in all ditches and drainage channels, and where otherwise indicated on the Contract Drawings or directed by regulatory agencies.

2.6 TURF REINFORCEMENT MAT

A. Where indicated on the Contract Drawings or as described in the Specifications, Turf Reinforcement Mat shall be installed for permanent erosion control.

B. Turf Reinforcement Mat shall consist of top- and bottom-heavy weight netting and biodegradable matrix such as coconut fiber or aspen curled wood excelsior.

C. Where slope and hydraulic conditions are severe, a synthetic matrix may be used, based on manufacturer's recommendations.

2.7 SILT FENCE

A. Temporary Silt Fence shall consist of woven geotextile fabric attached to 2" X 2" X 48" tall hardwood stakes.
   1. Fabric shall be 48" tall, with top being even with top of stakes. Bottom 12" shall be buried in trench as shown on the Detail Drawings.
   2. Stakes shall be at 6' centers unless stated otherwise on Contract Documents.

B. Temporary Reinforced Silt Fence
   1. For areas of steep slopes and high flows, where indicated on the Contract Drawings, or as directed by state or local regulations, Reinforced Silt Fence shall be installed.
   2. Fabric shall be woven monofilament geotextile attached to 11-gauge steel fencing of 2" X 4" grid.
   3. Stakes shall be 5" tall steel and shall be installed on 4' centers.
   4. Fabric and fencing shall be buried in trench as shown on the Detail Drawings.

C. Spacing of Silt Fences on slopes shall be according to the following table, or as directed by state or local regulatory agencies:

	Soil Type		
Slope Angle	Silty	Clays	Sandy
Very Steep (1:1)	50 ft.	75 ft.	100 ft.
Steep (2:1)	75 ft.	100 ft.	125 ft.
Moderate (4:1)	100 ft.	125 ft.	150 ft.
Slight (10:1)	125 ft.	150 ft.	200 ft.

D. If runoff flows along the uphill side of the silt fence, Contractor shall install "J-hooks" every 40 to 80 feet. These are curved sections of silt fence above the continuous fence that serve as small dams to stop and hold the flow to allow sediment to settle.

2.8 FIBER ROLLS

A. On long slopes less than 10:1, and wherever indicated on the Contract Drawings or recommended by the regulatory agency, Fiber Rolls shall be installed.

B. Fiber Rolls shall be made of wood shavings, coconut fiber or other similar material encased in heavy duty netting.

C. Wooden stakes at 4'-0" on center shall be used to anchor the Fiber Rolls along the contours of the slope.

2.9 AGGREGATE SILT CHECKS

A. Where needed to slow flow velocity, to cause ponding or to protect storm water inlet structures, Aggregate Silt Checks shall be installed.

B. Aggregate Silt Checks shall consist of rock of various sizes ranging from 2" to 6" contained in or placed on geotextile filter fabric. Pea-stone or gravel-filled bags are acceptable for temporary silt checks in low-flow conditions.

2.10 RIP RAP

A. Rip Rap shall be installed at the outlets of storm drains and on channel banks as noted on the Contract Drawings and/or recommended by state and local regulatory agencies.

B. Rip Rap shall have no less than 80%, by volume, of individual stones that range in size from 0.0247 to 1.483 cubic feet.

2.11 CONSTRUCTION ENTRANCE PAD

A. Contractor shall construct entrance pads at all locations where vehicles will enter or exit the site.

B. Pad shall be a minimum of 20 feet wide, 50 feet long and 6 inches thick, and consist of No. 2 stone laid on top of filter fabric.

PART 3 – EXECUTION

3.1 GENERAL

A. Erosion and sediment control practices shall be consistent with the requirements of the state and local regulatory agencies and in any case shall be adequate to prevent erosion of disturbed and/or regraded areas.

B. Contractor is responsible for notifying the state regulatory agency concerning inclusion under the NPDES General Permit for Storm Water Discharges from Construction Activities.

C. Gravity sewer lines and force mains that cross steams shall be constructed by methods that maintain normal stream flow and allow for a dry exaction. Water pumped from the excavation shall be contained and allowed to settle prior to reentering the stream. Excavation equipment and vehicles shall operate outside of the flowing portion of the stream. Spoil material from the sewer line excavation shall not be allowed to enter the flowing portion of the stream. The provisions of this condition shall apply to all types of utility line stream crossings.

D. Removal of riparian vegetation in the utility line right-of-way shall be limited to that necessary for equipment access. Effective erosion and sedimentation control measures must be employed at all times during the project to prevent degradation of waters of the Commonwealth. Site regrading and reseeding will be accomplished with 14 days after disturbance.

3.2 SEEDING

A. The areas to be seeded shall be thoroughly tilled to a depth of at least 4" by discing, harrowing, or other approved methods until the condition of the soil is acceptable to the Engineer. After harrowing or discing, the seed bed shall be dragged and/or hand raked to finish grade.

B. The incorporation of the fertilizer and the agricultural lime may be a part of the tillage operation and shall be applied no less than 24 hours nor more than 48 hours before the seed is to be sown.

C. Seed shall be broadcast either by hand or approved sowing equipment at the rate of 90 pounds per acre (two pounds per 1,000 square feet), uniformly distributed over the area. Broadcasting seeding during high winds will not be permitted. The seed shall be drilled or raked into a depth of approximately 2-in. and the seeded areas shall be lightly raked to cover the seed and rolled. Drilling 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 likely to develop into washes, shall be removed.

D. After the seed has been sown, the areas so seeded shall be mulched with clean straw at the rate of one (1) bale per 1,000 feet (approximately 2-in. loose depth). Mulch on slopes and in all ditches and drainage channels shall be held in place with erosion control blankets.

E. Areas seeded shall be watered and protected until a uniform stand develops, and then inspected periodically and maintained appropriately. 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 refertilize, reseed and remulch as needed.

Scattered bare spots up to one (1) square yard in size will be allowed up to a maximum of 10% of any area.

F. Payment for seeding and mulching shall be included in the Contractor's bid.

3.3 SOD

A. To install, bring soil to final grade and clear of trash, wood, rock, and other debris. Apply topsoil, fertilizer at approximately 1,000 lbs. per acre.

B. Use sod within 36 hours of cutting. Lay sod in straight lines. Butt joints tightly, but do not overlap joints or stretch sod. Stagger joints in adjacent rows in a brickwork type pattern. Use torn or uneven pieces on the end of the row.

C. Notch into existing grass. Anchor sod with pins or stakes if placed on slopes greater than 3:1. Roll or tamp sod after installation and water immediately. Soak to a depth of 4 to 6 inches. Replace sod that grows poorly. Do not cut or lay sod in extremely wet or cold weather. Do not mow regularly until sod is well established.

3.4 INSTALLATION OF EROSION AND SEDIMENT CONTROL DEVICES

A. All erosion and sediment control products and materials shall be installed per manufacturer's recommendations and in accordance with the Kentucky Erosion Prevention and Sediment Control Field Guide.

B. Contractor shall pay special attention to the trenching-in of the bottoms of silt fence, the staking of sediment barriers, and the stapling of erosion control blankets.

3.5 MAINTENANCE OF EROSION AND SEDIMENT CONTROL DEVICES

A. Erosion and sedimentation controls shall be inspected weekly and after rain events of 0.5-in. or greater. Replace silt fencing as needed, filter stone which is dislodged, erosion control blanket which is damaged, and make other necessary repairs.

B. Remove sediment from fences and barriers when it accumulates to half the height of the barrier, or more often as needed.

3.6 CLEAN UP

A. Upon completion of the project and/or establishment of satisfactory turf, vegetation or permanent erosion control structures, Contractor shall remove all temporary devices and properly dispose of such.

++ END OF SECTION ++

SECTION 02512

BITUMINOUS PAVING

PART 1 – GENERAL

1.1 DESCRIPTION

A. Scope:
   1. CONTRACTOR shall provide all labor, materials, equipment and incidentals as shown, specified or required to furnish and install hot mix hot laid bituminous paving.
   2. Provide bituminous paving in the areas shown on the Drawings or if existing asphalt pavement is disturbed or damaged by the CONTRACTOR during the construction operations as determined by the OWNER.
   3. No additional payment to the CONTRACTOR will be made by SD1 for this repair to areas outside the disturbed limits unless approved SD1.

B. Related Sections:
   1. Section 02220, Excavation and Backfill
   2. Section 02521, Concrete Flatwork

1.2 QUALITY ASSURANCE

A. Tests:
   1. The services of a qualified testing laboratory may be engaged by OWNER to make tests and determine acceptability of the pavement materials.
   2. Required Tests:
      a. Refer to Kentucky Transportation Cabinet's (KYTC) Standard Specifications for Road and Bridge Construction, Latest Edition.

B. Reference Standards: Comply with the applicable provisions and recommendations of the following, unless otherwise shown or specified.
   1. AASHTO MP1, Specification for Performance Grade Asphalt Binder.
   2. AASHTO MP2, Specification for Superpave Volumetric Mix Design.
   3. Kentucky Transportation Cabinet Standard Specifications for Road and Bridge Construction, Latest Edition.

1.3 SUBMITTALS

A. Shop Drawings: Submit for approval the following:
   1. Detailed plan for pavement restoration, including existing aggregate base and asphalt course thicknesses, and detail for restoring existing pavement to the limits indicated on the drawings.
   2. Job mix formula proposed, giving complete data on depth of courses, materials, including source, location, percentages, temperatures, and all other pertinent data.

B. Material Certificates:
   1. In lieu of laboratory reports required in the State Standards, CONTRACTOR may submit certificates of compliance for the following:
      a. Coarse and fine aggregates from each material source and each required grading.
      b. Asphalt or tar cement for each penetration grade.
      c. Job-mix design mixtures for each material or grade.
      d. Density of un-compacted bituminous concrete.
      e. Density of compacted bituminous concrete.
      f. Density and voids analysis for each series of bituminous concrete mixture test specimens.
      g. Bituminous concrete plant inspection.
   2. Certificates that materials, mixtures and plant comply with Specification requirements.
   3. Certificates signed by CONTRACTOR.

1.4 JOB CONDITION

A. Weather Limitations: Use weather limitations in the KYTC Standards for the following:
   1. Application of bituminous prime coats.
   2. Construction of base and surface courses.

B. Grade Control: Establish and maintain the required lines and grades, including crown and cross slope for each course during construction operations.

PART 2 – PRODUCTS

2.1 PAVEMENT THICKNESS

A. Pavement Thickness: As shown on the Drawings and Detail.

B. Place temporary pavement immediately after backfilling trenches in paved roadways, which are to be retained for permanent use. Maintain the surface of the paved area over the trench in good and safe condition during progress of the entire Work, and promptly fill all depressions over and adjacent to the trench caused by settlement of backfilling.

C. The permanent replacement pavement shall be equal to that of the existing roadways to their full width and depth, unless otherwise specified.

D. Pavement, gutters, curbs, sidewalks or roadways disturbed or damaged by the CONTRACTOR'S operations shall be restored by him at his own expense to as good condition as they were previous to the commencement of the Work and in accordance with applicable local and state highway specifications.

2.2 MATERIALS

A. Aggregate Base and Aggregate Berm: Comply with the requirements for Dense Graded Aggregate Base as specified in Section 302 of the KYTC Standards.

B. Crushed Stone Base: Comply with the requirements for Crushed Stone Base as specified in Section 302 of the KYTC Standards.

C. Asphalt Concrete (Base Course): Class 1, 0.75-inch Type D, PG 70-22, in accordance with Section 403 of the KYTC Standards, AASHTO MP1 and AASHTO MP2.

D. Asphalt Concrete (Surface Course): Class 1, 0.38-inch Type D, PG 70-22, in accordance with Section 403 of the KYTC Standards, AASHTO MP1, and AASHTO MP2.

E. Prime Coat: Comply with Section 406 of the KYTC Standards.

F. Tack Coat: Comply with Section 406 of the KYTC Standards.

PART 3 – EXECUTION

3.1 INSPECTION

A. Examine the subgrade on which bituminous concrete will be installed. Notify ENGINEER in writing of conditions detrimental to the proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions have been corrected in a manner acceptable to ENGINEER.

3.2 PRIME COAT

A. Apply prime coat to aggregate base course in accordance with the requirements of Section 406 of the KYTC Standards.

3.3 FRAME ADJUSTMENT

A. Set frames of drainage structures to final grade in an approved manner. Include existing frames and frames furnished under other Sections of these Specifications.

3.4 PAVEMENT INSTALLATION

A. Preparing the mixtures, paving equipment, placing the mixes, and compacting the mixes shall be in accordance with the State Standards.

B. Preparing the mixtures includes the plant equipment, stockpiling, heating, aggregate processing, mixing of aggregate and bituminous material, and transporting to job site.

C. Paving equipment includes bituminous pavers, rolling equipment and hand tools.

D. Placing the mixes includes paver placing, hand placing, spreading, tamping and jointing.

E. Compacting the mixes includes breakdown rolling, second rolling and finish rolling.

F. Finish pavement course shall not be installed until all other items of the Work have been substantially completed.

3.5 PAVEMENT QUALITY REQUIREMENTS

A. General: In addition to other specified conditions, comply with the following minimum requirements:
   1. Provide final surfaces of uniform texture, conforming to required grades and cross sections.

B. Density:
   1. If directed by ENGINEER, compare density of in place material against laboratory specimen or certificates on same bituminous concrete mixture. Use nuclear devices.
   2. Minimum acceptable density of in place course material will be 90% of the recorded laboratory specimen or certificate density. Maximum acceptable density will be 98%.

C. Thickness: In place compacted thicknesses shall average not less than the thicknesses specified.

D. Surface Smoothness:
   1. Shall be in accordance with KYTC Standard Specifications, Section 404. Latest Edition.

3.6 PATCHING

A. As directed by ENGINEER, remove and replace all defective areas. Cut-out such areas and fill with fresh bituminous concrete. Compact to the required density.

B. CONTRACTOR shall restore all existing paved areas damaged during construction in a manner acceptable to the ENGINEER.

3.7 CLEANING AND PROTECTION

A. Cleaning: After completion of paving operations, clean surfaces of excess or spilled bituminous materials and all foreign matter.

B. Protect newly finished pavement until it has become properly hardened by cooling.

C. Cover openings of drainage structures in the area of paving until permanent coverings are placed.

++ END OF SECTION ++

SECTION 02521

CONCRETE FLATWORK

PART 1 – GENERAL

1.1 DESCRIPTION

A. Scope:
1. CONTRACTOR shall provide all labor, materials, equipment and incidentals as shown, specified and required to furnish and install concrete sidewalks.
2. Provide concrete sidewalks in the areas shown on the Drawings or if existing concrete sidewalks are disturbed or damaged by the CONTRACTOR during the construction operations as determined by the OWNER.
3. Limits of replacement shall be as determined by the OWNER to restore disturbed or damaged areas to before construction conditions. No additional payment to the CONTRACTOR will be made by the OWNER for this repair Work and shall be incidental to the Contract Work.
4. Types of Work covered by these specifications are as follows:
   a. Conventionally formed or machine formed flatwork.
   b. The thickness and extent of concrete flatwork as shown on plans.

B. Related Sections:
1. Section 02220, Excavation and Backfill
2. Section 03300, Cast-In-Place Concrete

1.2 QUALITY ASSURANCE

A. Reference Standards: Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.
1. ASTM D1190, Specification for Concrete Joint Sealer, Hot Poured Elastic type.
2. ASTM D994, Specifications for Preformed Expansion Joint Filler for Concrete.

B. Applicator Qualifications: Minimum of two years installing concrete.

1.3 SUBMITTALS

A. Samples: Submit for approval the following:
1. Samples, manufacturer's product data, test reports and material certifications as required in referenced Sections for concrete work.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Reinforcing Bars and Welded Wire Fabric: Deformed steel bars and smooth wire fabric shall comply with requirements of Section 03300, Cast-in-Place Concrete.
1. If required, furnish wire fabric in flat sheets, not rolls.

B. Concrete Materials: Comply with requirements of applicable Section 03300, Cast-in-Place Concrete, for formwork, concrete materials, admixtures, bonding materials, curing materials and others as required.

C. Expansion Joint Material: Comply with requirements of Section 03300, Cast-in-Place Concrete, for preformed expansion joint fillers.

2.2 CONCRETE MIX, DESIGN AND TESTING

A. Comply with requirements of applicable provisions of Section 03300, Cast-in-Place Concrete, for concrete mix design, sampling and testing, and quality control.

B. Design the mix to produce concrete having properties of compressive strength, slump range and air content as specified in Section 03300.

PART 3 – EXECUTION

3.1 INSPECTION

A. CONTRACTOR and his installer shall examine the substrate and the conditions under which Work is to be performed and notify ENGINEER of unsatisfactory conditions. Do not proceed with the Work until unsatisfactory conditions have been corrected in a manner acceptable to ENGINEER.

B. Verify that earthwork is completed to correct line and grade.

C. Check that subgrade is smooth, compacted, and free of frost and excessive moisture.

D. Do not commence work until conditions are satisfactory and approved by ENGINEER.

3.2 SUBBASE MATERIAL

A. Place below concrete, properly wet and compact to the thickness shown.

B. Subbase material shall meet the gradation and requirements of Section 02220 Excavation and Backfill for subbase material.

3.3 FORM CONSTRUCTION

A. Set forms to line and grade. Install forms over full length of sidewalk.

3.4 REINFORCEMENT

A. Locate, place, and support reinforcement as specified in Section 03300, unless otherwise shown. Size of reinforcement shall be as shown or specified by SD1 or governing authority.

3.5 CONCRETE PLACEMENT

A. General: Comply with the requirements of Section 03300 for mixing and placing concrete, and as specified.

B. Place concrete in one course, monolithic construction, for the full width and depth of form work or designated joint.

C. Machine Formed: Automatic machine may be used for forming, at CONTRACTOR'S option. Concrete shall have properties as specified in Section 03300, except that maximum slump shall be 2-1/2 inches and air content shall be 2% of design. Machine forming shall meet the same requirements as specified for conventionally formed concrete. If results do not conform to requirements remove and replace.

3.6 JOINTS

A. General: Construct expansion, contraction, and construction joints with faces perpendicular to surface of the concrete. Construct transverse joints at right angles to the Work centerline and as shown.

B. Contraction Joints: Provide these joints at 5-feet on centers for sidewalks.

C. Construction Joints: Place joints at locations where specified placement operations are stopped for a period of more than 1/2 hour, except where such pours terminate at expansion joints.

D. Expansion Joints: Provide 1/2-inch expansion joint filler where Work abuts structures; at returns; and at 30-foot spacing for straight runs. If sidewalk is not poured monolithically, provide expansion joints where each abuts the other.
   1. Place top of expansion joint material not less than 1/2-inch or more than 1-inch below concrete surface. Apply joint sealer on top of expansion joint material flush with concrete surface, and in accordance with manufacturer's instructions.

3.7 CONCRETE FINISHING

A. Smooth the exposed surface by screeding and floating.

B. Work edges of concrete and transverse joints; and round to 1/4-in. radius.

C. Complete surface finishing by drawing a fine hair broom across surface, perpendicular to line of traffic.

3.8 CURING

A. Protect and cure finished concrete sidewalks, complying with applicable requirements of Section 03300.

3.9 REPAIR AND CLEANING

A. Repair or replace broken or defective sidewalk as directed by the ENGINEER.

B. Sweep Work and wash free of stains, discolorations, dirt and other foreign material.

++ END OF SECTION ++

SECTION 02606

SANITARY & STORM STRUCTURES

PART 1 – GENERAL

1.1 SUMMARY

A. CONTRACTOR shall provide all labor, materials, equipment and incidentals as shown on the Design Drawings, specified herein and required to furnish and install all sanitary and storm structures including but not limited to precast and cast-in-place manholes, air release manholes, bypass pumping vaults, drainage structures, headwalls, outfalls, etc.

1.2 RELATED WORK

- Division 2, Sections on Earthwork
- Section 02607, Sanitary Sewer Lining System
- Section 03300, Cast-In-Place Concrete
- Section 05501, Miscellaneous Metal Fabrications
- Section 05536 Floor Access Hatch Covers
- Section 05540, Castings
- Division 15, Sections on Piping

1.3 REFERENCES

A. KY Standard Specifications and Drawings: In this section, reference is made to the current Kentucky Transportation Cabinet (KYTC) Standard Specifications for Road and Bridge Construction and the KYTC Standard Drawings. In addition, construction requirements and material specifications not specifically covered in this section or in the referenced SD1 Technical Specifications shall conform to KYTC Standards. The ENGINEER or CONTRACTOR of a storm sewer project is responsible for obtaining a current edition of the KYTC Standard Specifications and the latest edition of the KYTC Standard Drawings when designing or performing work that either involves SD1 funding or is to be accepted by SD1.

B. Reference Standards:
   1. ASTM C 33, Standard Specification for Concrete Aggregate.
   2. ASTM C 76, Class III Reinforced Concrete Pipes.
   3. ASTM C 443, Specifications for Joints for Circular Concrete Sewer and Culvert Pipe, using Rubber Gaskets.
   4. ASTM C 478, Specification for Precast Reinforced Concrete Manhole Sections.
   5. ASTM C 579, Standard test method for compressive strength of chemical resistant mortars, grouts, monolithic surfacing and polymer concretes.
   6. ASTM C 857, Standard Practice for Minimum Structural Design Loading for underground Precast Concrete Utility Structures.

7. ASTM C 891, Standard Practice for Installation of Underground Precast Concrete Utility Structures
8. ASTM C 913, Standard Specification for Precast Concrete Water and Wastewater Structures
9. ASTM C 923, Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes, and Laterals.
10. ASTM D 695, Standard Test Method for Compressive Properties of Rigid Plastics.
11. ASTM D 790, Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
12. ASTM C 990, Standard Specification for Joints for Concrete Pipe, Manholes, Precast Box Sections Using Preformed Flexible Joint Sealants.
13. ASTM C 1244, Standard Test Method for Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test Prior to Backfill.
14. ASTM C 1478, Standard Specification for Storm Drain Resilient Connectors Between Reinforced Concrete Storm Sewer Structures, Pipes and Laterals
15. ASTM D 1737, Test Method for Elongation of Attached Organic Coatings with Cylindrical Mandrel Apparatus
16. ASTM D 2240, Standard Test Method for Rubber Property
17. ASTM D 412, Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers Tension
18. ASTM D 4161, Standard Specification for Fiberglass (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe Joints Using Flexible Elastomeric Seals.
19. ASTM D 6783, Standard Specification for Polymer Concrete Pipe.
20. ASTM F 477, Specification for Elastomeric Seals (gaskets) for Joining Plastic Pipe.
21. ASTM 4060, Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser
22. ASTM 4541, Standard Test Method for Pull Off Strength of Coatings using Portable Adhesion Testers
23. AWWA C 110, Ductile-Iron and Gray-Iron Fittings, 3 in. through 48 in., for Water and Other Liquids.
24. AWWA C 111, Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings. AWWA C 115, Flanged Ductile-Iron Pipe with Threaded Flanges.
25. AWWA C 151, Ductile-Iron Pipe, Centrifugally Cast, for Water or Other Liquids.
26. AWWA C 302, Reinforced Concrete Pressure Pipe, Noncylinder Type, for Water and Other Liquids.

1.4 SUBMITTALS

A. Shop Drawings: Submit for approval the following:
   1. Design Drawings showing design and construction details of all precast concrete and cast-in-place manholes including details of joints between the manhole bases and riser sections and stubs or openings for the connection of sewers. Design Drawings shall show invert elevations of all pipe connections entering and leaving the manhole along with flowline slope across the base. Shop Drawings shall show the delta angles for all points of intersection, except where more than

one line intersects at the same manhole. Where more than one line intersects, the angles relating all lines shall be shown. All angles shall be shown to the nearest second.

2. Manufacturer's name for all precast structures.

B. For the following submit:
   1. Manholes: Include plans, elevations, sections, details, and frames and covers.
   2. Drainage Structures: Include plans, elevations, sections, details, and frames, covers, and grates.
   3. Cast-in-place and Precast Structures: Include plans, elevations, reinforcing, concrete mix design, and structural calculations stamped by a Professional Engineer, registered in the State of Kentucky, competent in structural design.
   4. Pipe material and layout for prefabricated sections
   5. Any other items as requested by the ENGINEER or SD1.

C. Comply with all the requirements of Section 01340.

PART 2 – STRUCTURES

2.1 GENERAL

A. Concrete for all cast-in-place storm drainage structures (including channels and benches) shall conform to Section 03300 of the SD1 Technical Specifications including a minimum 28-day compressive strength of 4,000 psi.

B. Grout shall consist of a mixture of water and cement or cement with fly ash, one part cement or cement with fly ash to two parts mortar sand as defined in Section 601.03.03B of the KYTC Standard Specifications, by volume.

C. Non-shrink grout shall be an approved non-shrink, non-staining grout consisting of either a mixture of hydraulic cement, water, fine aggregate, and an approved nonferrous expansive admixture, or a packaged commercial product and shall meet the requirements of Section 601.03.03B of the KYTC Standard Specifications.

D. Round precast structures shall conform to ASTM C 478. Square and rectangular precast structures shall meet the requirements of ASTM C 913. Structural calculations shall be provided for all precast structures as requested by SD1.

E. Benching is required in the bottom of all structures (curb inlets, yard drains, standard inlets, manholes) per SD1 standard details. Cast-in-place benches shall be of 4,000 psi concrete. The invert channels shall be constructed as to cause the least possible resistance to flow. The shapes of invert channels shall conform uniformly to inlet and outlet pipes. Smooth and uniform finishes will be required. Inverts may also be precast into the structure.

2.2 PRECAST CONCRETE MANHOLES, AIR RELEASE MANHOLES, AND BYPASS PUMPING VAULTS

A. General:
   1. Precast manholes shall conform to the details shown on the Standard Details.
   2. Concrete shall be minimum 4,000 psi compressive strength.
   3. Except where otherwise specified precast manhole components shall consist of reinforced concrete pipe sections especially designed for manhole construction and manufactured in accordance with ASTM C 478 except as modified herein.
      a. Standard Manholes shall be six (6) feet or more in depth, measured from the base of the cover frame to the invert of the outlet and shall be concentric cone-type, top construction as shown on the Design Drawings.
      b. Shallow Manholes shall be less than six (6) feet in depth, measured from the base of the cover frame to the invert of the outlet and shall be of flat-top construction as shown on the Design Drawings.
   4. Precast, reinforced concrete manhole bases, riser sections, flat slabs and other components shall be manufactured by wet cast methods only, using forms which will provide smooth surfaces free from irregularities, honeycombing or other imperfections.
   5. All precast manhole components shall be of approved design and of sufficient strength to withstand the loads imposed upon them. They shall be designed for a minimum earth cover loading of 130 pounds per cubic foot, an H-20 wheel loading, and an allowance of 30% in roadways and 15% in rights-of-way for impact.
   6. Precast concrete manhole sections (including eccentric and concentric cones, risers and rings) shall conform to ASTM C 478 except sections deeper than 12-ft. shall have reinforcing equal to that of ASTM C76 Class III reinforced concrete pipes, unless otherwise noted on the Design Drawings.
   7. Lifting holes, if used in manhole components, shall be tapered, and no more than two shall be cast in each section. Tapered, solid rubber plugs shall be furnished to seal the lifting holes. The lifting holes shall be made to be sealed by plugs driven from the outside face of the section only. If lifting holes do not protrude completely through the wall, no sealing is required.
   8. Mark date of manufacture, manhole number as shown on the Design Drawings, and name or trademark of manufacturer on outside of barrel.

B. Manholes downstream of force mains
   1. Where a force main connects to a new or existing manhole, that manhole shall be lined with a corrosion resistant monolithic lining conforming to SD1's Technical Specifications. SD1 may also require existing manholes up to four manholes downstream of the new force main discharge be similarly lined on a case-by-case basis. The cover on the force main discharge manhole shall be a solid lid (not vented). SD1 may require that additional downstream vented manhole lids be replaced on a case-by-case basis.

2. Any existing manholes to be lined shall be inspected by the DESIGN ENGINEER and SD1 to determine the conditions of the manholes and confirm if the manholes are suitable for lining. If in the opinion of SD1, the existing manholes cannot be lined, then the manholes shall be replaced.

C. Manhole Bases Sections:
   1. Precast concrete manhole base sections shall be "monolithic", consisting of base slab and base riser (barrel) section.
      a. If floatation is found to occur based on the Design Engineer's review, the engineer shall specify thickness of precast base. Precast base sections shall be furnished with an integral anti-flotation footing, thickness as specified hereinafter, extending trench bank-to-bank as shown in the Standard Details (minimum 8" projection).
      b. Precast concrete manhole base slab thickness shall comply with the following schedule:

0.0' – 15.0'	Vertical Height	- 8" Slab
15.1' – 20.0'	Vertical Height	- 10" Slab
20.1' – 25.0'	Vertical Height	- 12" Slab
25.1' – 30.0'	Vertical Height	- 14" Slab

      c. Manholes over 30feet shall be designed by a Professional Engineer registered in the State of Kentucky. Submittals shall be provided to SD1 for review & approval.
      d. Manhole bases shall have two cages of reinforcing steel in their walls, each of the area equal to that required in the riser sections. Wall thickness shall not be less than 5 inches.
      e. There should be a minimum of 12 inches between the outside diameters of all pipe penetrations in the base section. The maximum inside diameter (or horizontal dimension) of pipe to be used with a given size manhole shall be as specified on SD1 standard detail.
      f. Base riser shall extend a minimum twelve (12) inches above the top of the highest pipe in the base.
   2. Flow channel (invert) and apron (bench) shall be poured separately at the point of manufacture to the dimensions shown on the Design Drawings.
      a. The flow channel through manholes should be made to conform in shape and slope to that of the sewers.
      b. Invert shall be smooth and semi-circular in cross-section of the same diameter of the pipe leaving the manhole.
      c. Changes of direction of flow or sewer centerline within the manhole shall be made by forming the flow channel along a smooth curve with as long radius as the inside of the manhole will allow.
      d. Bench shall slope toward invert at not less than one (1) inch per foot.
   3. All precast base sections with pipe openings shall fulfill the connection requirements identified hereinafter in 2.6 Flexible Pipe Joint Seal & Connections.

D. Manhole Barrel Sections:
   1. Manhole barrel sections shall have reinforcing steel in their walls, Wall thickness shall not be less than 5 inches.

2. The barrel of the manhole shall be constructed of various lengths of riser pipe manufactured in increments of one foot to provide the correct height with the fewest joints. Openings in the barrel of the manholes for sewers or drop connections will not be permitted closer than one foot from the nearest joint. Special manhole base or riser sections shall be furnished as necessary to meet this requirement.
3. The barrel sections shall be of the height required, but not less than one (1) foot in height. No opening shall be cut into a barrel section, the maximum dimension of which exceeds one-half (1/2) the section height.
4. Joints between manhole components shall be the tongue and groove. The circumferential and longitudinal steel reinforcement shall extend into the tongue and groove ends of the joint without breaking the continuity of the steel.
5. Precast manhole section joints shall be joined with one of the following products:
    a. ASTM C 443, a single, continuous rubber O-ring gasket and shall conform to AWWA C302.
    b. ASTM C-990, flexible butyl resin sealant such as Conseal CS-102, CS-202 as manufactured by Concrete Sealants, Inc.
    c. Hamilton-Kent “Kent-Seal No. 2”
    d. Press Seal Gasket “E-Z Stik”
    e. Or Equal

E. Cone Sections and Top Slab:
1. A precast concentric cone or precast top slab shall be provided at the top of the manhole barrel to receive the cast iron frame and cover or floor access hatch cover as shown on the Design Drawings. Eccentric cones will be evaluated on a case-by-case basis or where directed by SD1
2. Cone sections and top slabs shall be designed for an H-20 wheel loading.
3. Cone sections for standard manholes shall have a minimum 8” thick upper walls and shall not exceed 3’-0” in height.
4. Concrete top slabs shall not be less than 8 inches thick.

F. Drop Manhole:
1. Drop Manholes shall conform to all provisions specified herein, with the additional requirements for the drop pipe as shown on the Design Drawings.
2. The drop pipe shall be of the same material and diameter as the inlet sewer pipe used.
3. Drop pipe shall be totally enclosed in concrete, formed, with a minimum covering dimension of 6 inches.
4. No drop pipes shall be allowed inside of the manholes, unless otherwise approved by SD1.
5. Base shall be cast to support drop connection.

G. Acceptable Manufacturers
1. KOI
2. Hanson
3. or equal

2.3 MANHOLE RISERS

A. Manhole risers (adjusting rings) 6” to 10” height shall be concrete.

B. Manhole risers 2” to 5” height shall be high density polyethylene as manufactured by Ladtech, Inc or equal. Manholes that will be raised more than 10 inches will use 1-foot barrel section on inside of manhole.

C. Or other method approved by SD1 on a case-by-case basis.

2.4 PRECAST STORM CURB INLETS, STANDARD INLETS, CATCH BASINS & YARD DRAINS

A. Precast storm drainage structures with knockout panels shall only be used for curb inlets (catch basins) and yard drains no greater than 6-ft in depth, unless load calculations are supplied. For pre-cast rectangular structures (other than those with knockout panels), at least 6 inches of wall (measured from the interior corner) is required on each side of the pipe beyond the precast opening for the pipe. This rule is not applicable for structures which have pipe installed in opposite walls or where one outlet reinforced concrete pipe is utilized. Less than 6 inches of wall may be approved by SD1 with the submittal of design calculations.

B. Base and riser sections shall be custom-made with openings to meet indicated pipe alignment conditions. The minimum distance allowed between precast holes, measured from edge to edge in a standard inlet section shall be 6 inches.

C. Joints between yard drains and standard inlet sections in the roadway or yard areas shall be sealed with one of the following:
   1. ASTM C 443, a single, continuous rubber O-ring gasket and shall conform to AWWA C302.
   2. ASTM C-990, flexible butyl resin sealant such as Conseal CS-102, CS-202 as manufactured by Concrete Sealants, Inc.
   3. Hamilton-Kent “Kent-Seal No. 2”
   4. Press Seal Gasket “E-Z Stik”.
   5. Or equal

D. Joints between riser sections for curb inlets (catch basins) are not required to have gaskets or butyl sealant between sections. These joints can be stacked dry as long as there are no holes or gaps in the joints. All holes or gaps shall be filled with non-shrink grout.

E. For precast structures with openings cast into the unit, the minimum vertical distance from the pipe openings to the top of the structure or segment wall shall be 12 inches. If this distance is less than 12 inches, then additional reinforcing steel shall be furnished for this section. All pipe openings shall not be in joints between two precast sections unless specifically approved by SD1. The top slab must be designed for HS-20 loading in paved areas only.

F. All standard inlets shall conform to the appropriate Standard Drawings No. STM-08 through STM-11. All storm drains outside of the right-of-way shall be Standard Drawing No. STM-07, unless specifically approved otherwise by SD1. All curb inlets and catch basins shall conform to the appropriate Standard Drawings No. STM-01.1, STM-01.2, STM-04 and STM-12.

2.5 HEADWALLS AND OUTFALLS

A. Headwalls and outfalls shall be constructed of either cast-in-place or precast reinforced concrete that conforms to KTC Standard Specifications for Road and Bridge Construction.

B. Safety guards and railings: Safety guards and railings shall be provided along the top and sloped/winged sidewalls on all headwall inlet and outlet structures having a vertical drop of 4'-0" or greater. Such guards or railings shall be at least 42-inches in height measured vertically above the wall. Guards or railings shall not have an ornamental pattern that would provide a ladder effect. Vinyl coated chain link fencing and galvanized materials are an acceptable guard type.

C. Grates: Grates shall be provided on inlet headwalls for all pipes.

D. All headwalls and outfalls shall conform to the appropriate Standard Drawings, including but not limited to, No. STM-15, STM-16, STM-17.1, STM-18.1 and STM-19.

2.6 FLEXIBLE PIPE JOINT SEAL & CONNECTIONS

A. For sanitary structures and manholes:
   1. A flexible pipe joint seal shall be provided in the connection of pipe to manholes and other miscellaneous structures. The rubber seal shall meet the requirements given in ASTM C 923. The seal shall be of a size specifically designed for the pipe size and material.
   2. All connecting elements of the seal shall be Type 304 stainless steel.
   3. Flexible pipe joint seal shall allow for pipe alignment of up to 15 degrees deflection.
   4. Pipes entering manholes that do not have existing flows and have slopes greater than ten (10) percent may have fittings (22.5- or 11.25-degree bends) installed immediately outside the manhole. This is to be evaluated on a case-by-case basis by SD1 or ENGINEER.
   5. Acceptable Products:
      a. Kor-N-Seal by NPC, Inc.
      b. A-Lok by A-LOK Products, Inc.
      c. Dura-Seal III by Dura-Tech
      d. Or equal.

B. For storm structures and manholes with flexible pipe joint seals:
   1. CONTRACTOR may use flexible connections at storm manholes which shall be elastomeric gaskets or couplings, manufactured in accordance with ASTM C 1478, Standard Specification for Storm Drain Resilient Connectors between Reinforced Concrete Structures, Pipes, and Laterals.
   2. CONTRACTOR may use a concrete collar for opening around the pipe. The pipe shall be encased with minimum 6-inch collar of concrete from the inside face of the wall to 1'-0" outside the outer face of the wall. The pipe shall be adequately supported to prevent settling while the concrete encasement is curing. The inside faces of the structure walls shall be finished with a trowel. If a concrete collar is used, the collar shall be allowed to cure to 75% of its design strength before backfilling. The diameter of the opening shall be no more than 8 inches greater than the outside diameter of the pipe.
   3. For precast structures with knockout panels, all holes for pipes shall be via a controlled cut and shall not be cut into the structural members (i.e., top beams and corner columns) and non-shrink grout shall not be allowed to be placed around the pipes without prior approval from SD1 or its Engineer. The pipes shall be encased with a minimum 6-in. concrete collar all around the outside of pipe or a minimum of 3 inches beyond the hole knocked in the wall, whichever is greater. Also, the concrete encasement shall extend from the inside face of the wall to 1'-0" outside the outer face of the wall. The collar shall be allowed to cure to 75% of its design strength before backfilling.

2.7 STORM LATERAL CONNECTIONS

A. Roof downspouts, footing or foundation drains, and sump pumps shall discharge in accordance with the local governing subdivision regulations. All storm lateral connections (downspouts, footing or foundation drains, sump pumps, etc.) to the storm sewer shall be prohibited unless explicitly reviewed and approved by SD1 due to uncommon circumstances (i.e. inadequate discharge distances from foundations, narrow side yards, etc.).

2.8 MANHOLE, CATCH BASIN & STRUCTURE STEPS

A. Reinforced Polypropylene Manhole Steps: 1/2-inch Grade 60 steel reinforcing rod, ASTM A-615, encapsulated in copolymer polypropylene, ASTM D 2146-68 under Type II, Grade 16906.Steps shall be PS1-PF (Press Fit polypropylene plastic) as manufactured by MA Industries, or equal. Steps shall be epoxy grouted into specially sized holes cast into the manhole section. Holes shall be formed in the manhole section using an insert plug that is removed upon curing.

B. No steps shall be aligned over the flow channel. Step spacing shall be 16 inches as shown the Standard Detail Drawing.

C. Omit steps for structures that are less than 4-ft deep unless otherwise shown on the plans.

2.9 EXTERNAL SLEEVE FOR STRUCTURE (SANITARY ONLY)

A. Provide external sleeve around all manhole joints as designated on the plans. Any manholes located within 50-ft. or less of a creek/stream or within a floodplain shall have an external sleeve. External sleeve shall be a wraparound heat shrinkable sleeve that creates a barrier to water infiltration and protects support of the structure and frame from ground moisture prevents corrosion and freeze-thaw damage. The system shall be compatible with and bond to concrete, metal, and fiberglass using an adhesive-type primer. The sleeve shall have the following physical properties:

Softening Point	212 degrees Fahrenheit	ASTM E-28
Lap Shear Strength	12 PSI	DIN 30 672
Tensile Strength	2900 PSI	ASTM D-638
Elongation	600%	ASTM D-638
Hardness	46 Shore D	ASTM D-2240
Abrasion Resistance	45 mg	ASTM D-1044
Peel Strength	9PLI	ASTM D-1000
Water Absorption	0.05%	ASTM D-570
Low Temperature	-40 degrees Fahrenheit	ASTM D-2671D
Minimum Width	12 inches	

B. System shall accommodate ground movement and resists soil stress.

C. Acceptable Products:
   1. WrapidSeal – Manhole Encapsulation System by Canusa –CPS.
   2. Link- Seal Riser- Wrap Heat Shrink System.
   3. Or Equal.

2.10 PVC STORM DRAINAGE STRUCTURES AND CATCH BASINS

A. PVC storm drainage structures and catch basins shall be approved on a case-by-case basis by SD1.

PART 3 – EXECUTION

3.1 MANHOLE BASES

A. General
   1. Manholes shall be installed at the locations shown on the Design Drawings.
   2. The dimensions shall be as shown on the detail sheets and the depths shall be as indicated by either finished top elevation given or depth dimension given on the plans.
   3. Perform Site work as per the requirements of Specifications Sections 02050 Demolitions, 02110 Clearing and Grubbing, 02220 Excavation and Backfill, and 02222 Rock Removal.
   4. Excavation for manholes and other underground structures shall be of sufficient size to adequately accommodate installation and proper centering.

5. The bases shall be placed directly on an 8-in. to 12-in. deep pad (compacted thickness) of pipe bedding material as specified in Section 02220 Excavation and Backfill, placed to proper elevation and leveled, unless a deeper excavation is required to remove any loose sandy soils or soft to medium stiff, clayey soils down to a soil stratum suitable for support of the manhole and base.
    a. The excavated soils shall be replaced with an appropriate structural backfill material or with controlled, low-strength material (CLSM), lean concrete, or an extra thickness of manhole base concrete.
6. The excavation shall be kept free of water while the manhole is being constructed and manhole shall not be backfilled until inspected by the SD1.
7. CONTRACTOR will be required to compact bedding material around the entire circumference of the manhole and manhole excavation area to at least 12-inches above the highest incoming or outgoing pipe.
8. Compacted backfill as specified on the Design Drawings or Section 02220 Excavation and Backfill shall then be placed above the compacted bedding material up to finished grade.

B. Pre-Cast Bases
    1. The SD1 reserves the right to inspect precast manhole base sections at the construction site and to reject the use of such sections if the SD1 determines the products unsuitable for SD1's installation.
    2. Doghouse manholes shall not be permitted unless written approval by SD1 or SD1 representative.

C. Cast-in-Place Bases
    1. Cast-in-Place Bases shall be used when installing a doghouse manhole over an existing sewer or as approved by the ENGINEER.
        a. Cast-in-place bases shall be placed on suitable foundations after the pipes are laid as specified in 3.1A.5.
    2. The base shall be cast monolithically to an elevation at least 12 inches above the top of the highest pipe entering the manhole, except where a drop connection is to be installed.
        a. Base thickness shall be as per 2.2C.1.
        b. Base, walls and bottom shall be at least of the thickness shown and reinforced to withstand the loads to be expected.
        c. Connections for sewer pipes shall conform to SD1's Standard Detail.
        d. The base of the bell or groove end at joints between components shall be buttered with 1:2 cement-sand mortar to provide a uniform bearing between components.
        e. All joints shall be sealed with cement mortar inside and out and troweled smooth to the contour of the wall surface.
        f. Raised or rough joint finishes will not be accepted.

3.2 PRECAST MANHOLE SECTIONS

A. Set sections vertical with steps and sections in true alignment.

B. Install sections, joints and gaskets in accordance with manufacturer's recommendations.

3.3 STRUCTURE CHANNELS

A. All invert channels through structures shall be constructed of 4,000 psi concrete.

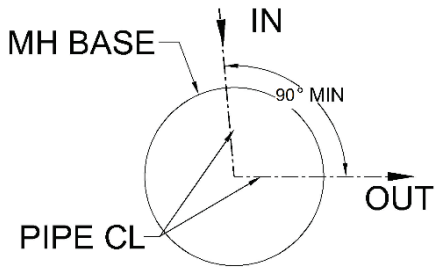
B. For precast bases, the flow line (channel) and benches shall be cast separately from the floor and side wall at the place of manufacture, unless otherwise approved by SD1.

C. Channels shall be properly formed to the sizes, cross sections, grades and shapes shown or as ordered.

D. Benches shall be built up to the heights shown or as ordered and given a uniform wood float finish.

E. Care shall be taken to slope all benches for proper drainage to the invert channel.

F. All flow channel angles between any new incoming pipe and new outgoing pipe shall be at least 90 degrees in the direction of flow as seen in the figure below. For any pipe with velocities exceeding 5 ft/s consult SD1 engineer for the required angle or for the need of an oversized manhole.



3.4 STORM CURB INLETS, STANDARD INLETS, CATCH BASINS, YARD DRAINS, HEADWALLS & OUTFALLS

A. Inlets, catch basins, drains, junction structures, and other drainage structures shall be neatly and accurately built in accordance with the plans or SD1 Standard Drawings. The structure shall be either of cast-in-place concrete or precast concrete. Precast structure sections shall be installed in accordance with ASTM C 891.

B. All cast-in-place structures shall be built using 4,000 psi concrete as described in 2.1. The structures shall be built on prepared foundations and conform to the dimensions and shapes shown on the Plans and SD1 Standard Drawings. The construction shall conform to the methods, forms, placement, protection, and curing for concrete as specified in accordance with KTC and SD1 Standards. Any required reinforcement shall conform to the Plans and SD1's Standard Drawings. Installed concrete reinforcing shall be inspected and approved by SD1 before any concrete is placed.

C. Headwalls and outfalls shall be constructed of either cast-in-place or precast reinforced concrete in conformance with SD1's Standard Drawings and KTC Standard Specifications for Road and Bridge Construction. All headwalls and outfalls built into slopes shall be properly seated as to avoid disconnection from the adjoined pipe.

3.5 DOGHOUSE MANHOLES

A. For joining new pipe to existing pipe, refer to 3.1B.2, for requirements. Doghouse manholes shall only be used for connections to sewer mains with high flows, as determined by the ENGINEER. Doghouse manholes must be approved by SD1. For applications using doghouse manholes, refer to 3.1C Cast-in-Place Bases and SD1 Standard Detail No. SD-106 for requirements.

3.6 PIPE CONNECTIONS TO NEW STRUCTURES

A. For connections to new structures:
   1. A flexible pipe-to-manhole joint connector shall be used for joining piping to manholes and other miscellaneous structures. The rubber seal shall meet the requirements given in ASTM C 923. The seal shall be of a size specifically designed for the pipe size and material and be as specified herein.
      a. If a Kor-N-Seal joint seal or equal with a stainless steel tightening band is used, CONTRACTOR shall tighten the band to the proper torque as specified by the manufacturer.
      b. If the slope of the incoming sewer exceeds 10% from the horizontal, a fitting may be used outside the manhole wall to facilitate a more perpendicular connection to the manhole wall. The use of this fitting is to be evaluated on a case-by-case basis by SD1.
   2. All pipe connections to manholes shall match crowns. If matching crowns is not possible, a drop manhole may be approved by SD1.
   3. All drop manholes shall be approved by SD1. Drop manholes may be acceptable under the following conditions:
      a. If the slope of the influent sewer is greater than or equal to 5%, SD1's drop connection detail No. SD-114 shall be followed. All other influent sewer slopes and drop connections will be evaluated on a case-by-case basis.
      b. All other drop manhole requests shall be approved on a case-by-case basis including but not limited to pipe realignments, connections to existing manholes, etc.
      c. If the total height of the drop is greater than sixteen (16) feet, a drop shaft assembly shall be specifically designed for the hydraulic conditions present by a licensed professional engineer in the Commonwealth of Kentucky for the hydraulic and shall be approved by SD1.
   4. Slide manholes shall not be used, unless otherwise approved by SD1.

3.7 PIPE CONNECTIONS TO EXISTING STRUCTURES

A. Perform by core drilling in accordance with Section 01045.

B. The connection to the structure shall be in accordance with the materials specified herein.

C. The flow channel and bench for the new connection shall be constructed onsite or the existing flow channel and bench modified to accept the new piping.

D. New connections to existing structures need to be greater than ninety (90) degrees to the existing flow channel in the direction of the flow.

E. Where new flows joining an existing 8-in. sewer that is flowing half pipe or greater, or the existing pipe is 12-in. or greater, an oversized manhole shall be installed to allow a smooth, sweeping flow transition. Consult SD1 for required manhole diameter.

F. For sanitary applications, perform all connections in accordance with 3.8 and 3.10 herein.

3.8 SANITARY SEWER STUBS FOR FUTURE CONNECTIONS

A. Installation of stubs for future connections shall be evaluated on a case-by-case basis and approved by SD1. If stubs are approved, PVC, ductile iron, or fiberglass pipe stubs with approved watertight plugs shall be installed in manholes. SD1 requires that future connections to existing manholes be cored and the benching modified to accept the new connection. Where pipe stubs, sleeves or couplings for future connections are shown or ordered, CONTRACTOR shall provide all materials and work for their construction.

B. If stubs are approved by SD1, stubs out of manholes shall be a two (2) to five (5) foot stick of pipe with sealed caps. When future connections are made to these manholes, the stubs shall be removed and a full stick of pipe shall be installed at the proper slope.

C. Where connections are made to existing manholes installed after May 15, 2000, the existing manhole shall be vacuum tested prior to the connection being made. If the manhole is vacuum tested prior to alterations and fails, it is the responsibility of SD1 to repair or replace the manhole. If the manhole passes the vacuum test prior to connection, but fails the vacuum test after the connection is made, then the CONTRACTOR shall repair or replace the manhole per SD1's direction and approval.

   If the CONTRACTOR fails to vacuum test the manhole prior to any connections being made, and the manhole fails the vacuum test after the connection, the CONTRACTOR shall repair or replace the manhole per SD1's direction and approval.

D. If the connection to an existing manhole is cored, the connection shall be booted and the existing manhole shall pass a vacuum test after all work is complete, if the existing manhole was installed after May 15, 2000.

E. If the elevation or grade of an existing manhole is altered, the existing manhole shall pass a vacuum test after all work is complete, if the existing manhole was installed after May 15, 2000.

3.9 GRADING AT MANHOLES & STRUCTURES

A. Manholes shall be installed to conform to the following convention unless otherwise called for on the plans. The ground surface shall be graded to drain away from the manhole. Final dimensions shall be determined after grading has taken place.
   1. Manholes in roads, parking lots, paved areas and lawns shall be installed flush with the surrounding area.
   2. Manholes in wooded or other inaccessible areas shall be installed twelve (12) inches above the final grade.
   3. Confirm with landowner prior to installation of manholes in cultivated fields, hay fields and pastures. If landowner agrees manhole shall be installed with the cone section flush with the final grade. After installation of the casting, a slope fill 1:5 (1 vertical to 5 horizontal) shall be installed to provide surface drainage away from the manhole.

B. Manholes in paved areas shall be constructed to meet the final surface grade. In paved areas on State Highways, all manholes shall be 1/2 inch below final wearing surfaces. Manholes shall not project above finished roadway pavements to prevent damage from snowplows.

C. CONTRACTOR shall be solely responsible for the proper height of all manholes necessary to reach the final grade at all locations. CONTRACTOR is cautioned that ENGINEER'S review of Shop drawings for manhole components will be general in nature and CONTRACTOR shall provide an adequate supply of random length precast manhole riser sections to adjust any manhole to meet field conditions for final grading.

3.10 MANHOLE WATERTIGHTNESS (SANITARY ONLY)

A. All manholes shall be free of visible leakage. Each manhole shall be tested for leaks and inspected. If the manhole fails a visual leakage inspection and/or vacuum testing, SD1 will consider the manhole defective and the Contractor shall provide the Engineer a plan for leak repairs for approval or replace the manhole and make any necessary reconnections to the new or existing pipelines at no additional cost to the SD1. No leak repairs shall be performed without the ENGINEER'S approval.

B. Vacuum test manholes to ASTM C 1244. Testing to be witnessed by SD1. Manholes not subject to vacuum testing must be in writing from SD1. This specification shall govern the negative air pressure (vacuum) testing of sanitary sewer manholes and structures and shall be used as a method of determining acceptability by the SD1, in accepting maintenance of a sanitary sewer manhole or structure on behalf of the public. Other forms of testing of some manholes may be required, as deemed necessary by the SD1.

C. Manholes shall be tested after installation with all connections in place along with the following completed prior to testing:
   1. Lift holes, if any, shall be plugged with an approved, non-shrinkable grout prior to testing.
   2. Drop connections shall be installed prior to testing.
   3. The vacuum test shall include testing of the seal between the cast iron frame and the concrete cone, slab or grade rings.
   4. The manholes shall be backfilled and finished to design grade prior to test.
   5. Test pressure requirements of ASTM C-923 shall be met.

D. Test Procedure:
   1. 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.
   2. The test head shall be placed inside the frame at the top of the manhole and inflated, in accordance with the manufacturer's recommendations.
   3. A vacuum of 10" of mercury shall be drawn on the manhole. Shut the valve on the vacuum line to the manhole and disconnect the vacuum line.
   4. The pressure gauge shall be liquid filled, having a 3.5-inch diameter face with a reading from zero to thirty inches of mercury.
   5. The manhole shall be considered to pass the vacuum test if it holds at least 9 inches of mercury for the following time durations:

Time (Minutes)			
Manhole Depth	4’ Diameter	5' Diameter	6' Diameter
20 Feet or Less	1	2	3
20.1 to 30 Feet	2	3	4

   Note: Consult SD1 on manhole diameters larger than six (6) feet. These test pressures exceed what is in ASTM C-1244
   6. If a manhole fails the vacuum test, SD1 will consider the manhole defective and the CONTRACTOR shall provide the Engineer a plan for leak repairs for approval or shall replace the manhole and/or defective components and make any necessary reconnections to the new or existing pipelines at no additional cost to the SD1. No repairs shall be made to the manhole unless approved by the ENGINEER.
   7. All temporary plugs and braces shall be removed after each test.
   8. Manholes will be accepted as having passed the vacuum test requirements if they meet the criteria stated above.

3.11 STRUCTURE ABANDONMENT

A. Structure abandonment shall be per SD1 Standard Drawings and consist of removing structure frames, covers, grates, cone section of manholes, and similar items. All connecting pipes shall be bulk headed. The walls shall be lowered to 2 feet below final grade if in earth or to 12 inches below subgrade if in pavement. The remaining structure shall be filled with crushed stone or sand compacted to match all backfill requirements here-in or shall be filled with controlled density fill.

++ END OF SECTION ++

SECTION 02607

SANITARY SEWER LINING SYSTEM

PART 1 – GENERAL

1.1 SCOPE OF WORK

A. The Contractor shall perform lining of concrete or brick manholes to protect against corrosion at the various locations indicated by the Contract Documents.
   1. Install Microbiologically Influenced Corrosion (MIC) protective coating system where shown on the drawings.

B. The Contractor shall provide all material, equipment, and labor as required to complete the work in accordance with the specifications.

1.2 RELATED SECTIONS

- Section 02606, Sanitary & Storm Structures
- Section 02610, Pipe & Fittings

1.3 SUBMITTALS

A. Shop Drawings including the following items shall be submitted in accordance with Section 01340.
   1. Manufacturer's product data and material safety data sheets for each coating product provided.
   2. Manufacturer’s installation instructions and recommendations specific to environmental conditions, minimum and maximum temperatures, surface preparation, substrate conditions, testing and application procedures.
   3. Complete shop drawings including location and details for all terminations and transitions.
   4. Certifications:
      a. Furnish affidavits from the manufacturer certifying that materials furnished conform to the requirements specified.
      b. Certify concrete repair and coating products have been checked for compatibility.
      c. Certification from manufacturer stating the applicator and applicator’s assigned personnel have received specific training for the application of the MIC coating system under similar conditions.
      d. Certificate from applicator stating the assigned personnel have received specific training for the application of the MIC protective coating system under similar conditions.
      e. Submit manufacturer’s representative and independent inspector/tester NACE or SSPC certification and contact information.
   5. Submit name, company name and telephone number of person(s) applicator.

6. Provide list of at least 10 applications in high H_2S environments in Midwest States including contact names, address, phone numbers and date of installation for both the coating system and the applicator.
7. Field Data Records and Installation Reports.
8. Product Warranty.
9. Closeout Submittals:
    a. As-built drawings which include coating application limits, transitions, and terminations.
    b. Photos with dates of photos taken
    c. Quality assurance records, field data records and installation reports
    d. Certificate of Surface Preparation
    e. Test and evaluation reports including pull-off strength (adhesion) and spark testing.
    f. Final Report
    g. Final Certified Warranty

1.4 QUALIFICATIONS

A. Products shall be manufactured by company specializing in manufacturing the products specified in this section with a minimum of five continuous years of experience for performance in similar applications in wastewater treatment plants and wastewater collection systems.

B. The Contractor performing the work shall be fully qualified, experienced and equipped to complete this work expeditiously and in a satisfactory manner and shall be an approved installer of the coating system as certified by the manufacturer. The Contractor shall have a manufacturer certification that the individual(s) performing actual material installation has been trained and approved in the handling, mixing and application of the products selected to be used.

C. Confirmation by the coating manufacturer that the equipment to be used for applying the products has been approved and installation personnel have been trained in the proper use of the equipment.

1.5 QUALITY ASSURANCE

A. The Contractor shall be responsible for the provisions of all test requirements specified in the referenced ASTM Standards as applicable. The Contractor shall also bear the cost of all tests specified in 3.9 Quality Assurance and Testing. In addition, all coating products to be installed under this Contract may be inspected at the plant for compliance with these specifications by an independent testing laboratory provided by SD1. The Contractor shall require the manufacturer's cooperation in these inspections. The cost of plant inspection of all products and materials approved for this Contract shall be borne by SD1. The cost of field testing as specified in 3.9 shall be included in the Bid Item for protective coating.

B. Inspections of the coating products and materials may also be made by the Engineer or other representatives of SD1 after delivery. The products and materials shall be subject to rejection at any time on account of failure to meet any of the Specification requirements, even though samples may have been accepted as satisfactory at the place of manufacture. Materials rejected after delivery shall be marked for identification and shall be removed from the job at once.
   1. Provide adequate time and access for inspections for the following major activities:
      a. Pre-surface preparation
      b. Monitoring of surface preparation
      c. Post-surface preparation
      d. Monitoring of repair and resurfacing product application
      e. Post repair and resurfacing products
      f. Monitoring of coating application
      g. Post application inspection and testing
      h. Corrective actions and final inspection

C. Pre-installation Meeting
   1. At least two weeks prior to beginning work, the Contractor shall conduct a Pre-installation Meeting to discuss coating procedures and submittals. Attendees shall include the Coating Applicator, SD1, Engineer, Manufacturer's Technical Representative, Testing and Inspection Agencies (if applicable), Concrete Repair subcontractor (if applicable) and the Contractor. The minimum agenda includes:
      a. Environmental condition requirements
      b. Surface temperature requirements
      c. Surface pH requirements
      d. Surface preparation procedures
      e. Cleaning procedures
      f. Testing procedures to determine moisture content of concrete
      g. Proper procedures to fill substrate
      h. Application equipment
      i. Proper application of primer
      j. Proper application of coating system
      k. Proper termination and transition details
      l. Inspection of coating during and after application
      m. Testing of coating
      n. Repair methods
      o. Documentation requirements
      p. Approval Procedures

D. Field Data Records
   1. Maintain daily Quality Assurance Records including the following:
      a. Date
      b. Atmospheric Temperature and Humidity
      c. Substrate pH
      d. Substrate Temperature
      e. Dew Point

f. Product Batch Numbers
g. Mixing Time for Each Part and the Combined Parts of a Coating System
h. Pot Life
i. Curing Time of Primer and Finish Layers
j. Holiday Test Results and Repair Data
k. Foreman or Supervisor's Signature

1.6 SERVICES OF MANUFACTURER'S TECHNICAL REPRESENTATIVE

A. Manufacturer's technical representative shall provide technical assistance and guidance for surface preparation and application of coating systems.

B. A manufacturer's technical representative shall observe the application of the complete system for a minimum of 2 days at the beginning of the project. The manufacturer's technical representative shall provide guidance to ensure proper application of the system.

C. The manufacturer's technical representative shall certify that the application was done in accordance with manufacturer's recommended procedures.

1.7 DELIVERY, STORAGE AND HANDLING

A. Care shall be taken in shipping, handling and placing to avoid damaging the products. Extra care may be necessary during cold weather construction. Any product or material damaged in shipment shall be replaced by the Contractor, as directed by the Engineer.

B. Products shall be delivered to the site in clearly labeled containers and packaging. While stored, the products shall be adequately packaged and protected. Products shall be stored in a manner as recommended by manufacturer.

C. Any product showing deterioration, or which has been exposed to any other adverse storage condition that may have caused damage, even though no such damage can be seen, shall be marked as rejected and removed at once from the work site by the Contractor.

1.8 WARRANTY

A. All lining and coatings installed shall be guaranteed by the Contractor for a period of two years from the date of final acceptance. During this period, all defects discovered in the coating, as determined by SD1 or SD1's Engineer shall be repaired or replaced in a satisfactory manner by the Contractor at no cost to SD1.

B. The Contractor is responsible for properly preparing the structures for coating prior to the installation of the systems, including stopping all leaks, patching voids, protecting or removing and handling all mechanical equipment such as valves and valve assemblies, weirs, cleaning surfaces and removing rubble, etc.

PART 2 – PRODUCTS

2.1 GENERAL

A. The materials used shall be designed, manufactured and intended for sewer manhole rehabilitation lining and the specific application in which they are used. The materials shall be supplied in factory-labeled containers.

B. All patching and waterproofing materials shall be mixed and applied in accordance with the manufacturers written instructions.

2.2 PVC LINING SYSTEMS

A. Lining for manholes shall be PVC Duraplate 100 Liner System as manufactured by ALOK Products, or equal. Liner shall be cast integral into the concrete at the point of precast manufacture.
   1. PVC Liner, Channel Joints, H-joints and Corner Joints; Manufactured from polyvinyl chloride resin. White in color to assist in providing a light reflective environment. All sheet compounds shall result in a semi-rigid material for thermoforming to the contour of the structure and shall have a minimum wall thickness of 1.7mm (0.065 inch).
   2. Lined manholes shall have a flat top that is lined with the same type of protective liner as the manhole.
   3. Rubber gasket between structures shall be provided for a watertight seal. Gasket shall be DURA-Plate-Lok-Sealant MT-320 measuring 0.5 inches by 1.5 inches to be placed on the return. When the two sections are coupled, the butyl-lok will displace over the return on the bell and tongue ends of the liner.
   4. Linings shall be installed by a certified lining manhole precaster, while constructing the manhole, in strict conformance with the manufacturer's requirements. The Precaster shall submit certification documentation from ALOK products with the manhole submittals.
      a. Inspect the form core for sharp or jagged edges that could damage the liner during the pre-casting and shipping process.
      b. Place Dura Plate 100 Liner panels level around the core of the form. Form release agent is not necessary.
      c. Install the vertical joints by placing the black rubber strip between the panel returns, making sure that the flap of the strip is fitted over one of the returns.
      d. Place backing plate on the inside return of panel that the flap fits over. Hold together with spring loaded clamps evenly spaced about 12 inches apart.
      e. Secure the panels together with fasteners placed every 3 inches, making sure that each fastener is tightened to 5 in-lbs.
         Note: The fasteners must be installed from the side opposite the flap, straight thru the backing plate, parallel to the liner.
      f. Repeat for all seams.
         Note: Caulk can be placed between the form core and liner returns to minimize concrete seepage during production.

g. Install reinforcement into form with any other necessary parts needed for the structure.
h. Pour concrete around the liner evenly to prevent shifting of the liner.
i. Vibrate and compact the concrete in a manner that will protect the liner and produce a dense, homogenous structure.
j. Take precaution to protect the liner from sharp or jagged objects while stripping from the form.
k. Visually inspect the liner after production for any cuts or tears. If repairs are needed, refer to Dura Plate 100 Liner repair bulletin for proper repair procedures.

B. Steps shall be installed in each manhole at the point of manufacture. Drill all holes in liner larger than the diameter of the step. Install steps or ladder then caulk area around step and liner with FR500 caulking material (lap Sealant) and seal with a minimum 0.5" thickness of ThoRoc SewerGuard epoxy.

C. All hole opening surfaces shall be coated with a minimum 0.5-in. thickness coverage of ThoRoc SewerGuard epoxy that overlaps the liner at least 1-½ inches.

D. Manhole Bench and Inverts – The benches and inverts shall be of the same material as the manhole, integral within the manhole and installed by the manhole manufacturer and as shown on the standard manhole detail drawings. The benches and inverts shall be coated with a minimum of 0.5" thickness of ThoRoc SewerGuard epoxy or approved equal. Thickness shall be tested in the field by SD1. CONTRACTOR shall patch all test holes.

E. The procedure below shall be followed at the factory to determine the thickness of epoxy applied to the benching in manholes and structures manufactured.
1. Utilizing a 40"L x 1.5"W x 0.5"H Nylon rod:
   a. Designate each rod with a corresponding number.
   b. Verify each rod dimension using a caliper.
   c. Initial and date the measurements.
2. Mark the rod with a line at 1" increments.
3. Cut the rod at each line to form segments of 1"L x 1.5"W x 0.5"H.
4. Once the concrete is formed in the base of the manhole or structure space the segments approximately 18" apart and adhere the segments to the concrete such that the 0.5"H is the distance from top of concrete to the tip of the nylon segment.
   a. Document the spacing of each segment on the back of the Manhole or Structure Assembly/Inspection Form.
   b. Initial and date the measurements.
5. As the benching is being applied, it should be above the segments, which are 0.5"H.
6. During the final inspection of the manhole/structure, there should be no visible segments.
   a. Document the observations on the back of the Manhole or Structure Assembly/Inspection Form.
   b. Initial and date the observations.

c. If the difference or thickness of the ThoRoc is 0.5“– 1.0“ at all reference points, the manhole is acceptable.
d. If the difference or thickness of the ThoRoc is less than 0.5“, the thickness is not correct. Inform proper production personnel of the problem.

2.3 PROTECTIVE COATING SYSTEM

A. The materials to be utilized in the lining of manholes shall be designed and manufactured to withstand the severe effects of corrosion in a wastewater environment. Manufacturer of corrosion protection products shall have a minimum of five continuous years of proven experience in the production of the lining products utilized and shall have satisfactory installation record.

B. Hydro blasting equipment shall be used to remove corroded materials from the existing concrete/brick structure.

C. Equipment for installation of lining materials shall be high quality grade and be as recommended by the manufacturer.

D. The lining system to be utilized for manhole structures shall be a multi-component liner system consisting of a primer, as needed, and a cementitious liner as specified hereinafter with a MIC protective coating as specified herein.

E. Provided MIC protective coating system is to be applied by trained applicators.

F. A MIC coating shall be used to form a monolithic liner to cover and protect all interior cementitious lined manhole surfaces subjected to municipal wastewater service conditions, including associated abrasive physical attack and chemical attack mechanisms related to hydrogen sulfide and organic acids generated by microbial sources. Approved products are Sauereisen SewerGard 210-X (80 to 125 mils); Raven 405 Series (80 to 250 mils), Mainstay DS-5 (125 mils); Tnemec Series 434 Perma-Shield H_2S Mortar (125 mils); Warren Environmental S-301 (125 to 250 mils); Carboline Plasite 5371 (125 mils); Sherwin-Williams Dura-Plate 6100 (100 to 125 mils), CCI Spectrum Spectrashield (primer, 50 mil modified polymer moisture barrier, 400 mil polyurethane/polymeric blend surfacer and 50 mil modified polymer corrosion barrier for a total thickness of 500 mils) or approved equal.
1. The thicknesses specified herein are the minimum dry film thickness required and do not include the primer thickness. The MIC Coating dry film thicknesses shall be based upon manufacturer’s recommendations.
2. Provide greater thickness where recommended by the manufacturer.
3. All MIC coating products shall meet the applicable ASTM standards.

G. Should the Contractor wish to use any brand or type of material other than as specified herein, they shall state in writing to the Engineer naming the proposed substitution and manufacturer. This statement shall be accompanied by:
1. A certificate of compliance from an approved independent testing laboratory that the proposed substitute meets or exceeds the specified requirements and has been tested in accordance with the specified test standards.

2. Documented proof that the proposed brand or type of material has a proven record of performance when used in the intended application as confirmed by actual field test or successful installations.
3. Certification that the two or more types of products identified in the specifications (which are intended to be used as part of a system) are supplied by the same manufacturer so as to insure compatibility of materials and to maintain single-source manufacturer responsibility.

H. When requested, the Contractor shall submit for the approval of the Engineer samples of the material he proposes to use in ample time for a proper determination.

2.4 PRIMER

A. To prevent out gassing of concrete, a primer is to be applied as required and recommended by the manufacturer of the MIC Coating System.

B. Primer shall be moisture tolerant, suitable for the environmental conditions, and compatible with the MIC coating. Primer shall be as recommended and preferably manufactured by the manufacturer of the MIC Coating System. If approved by manufacturer, MIC Coating System can be self-priming.

C. Primer shall be as recommended by the coating manufacturer to achieve a superior coating system performance. Manufacturer shall select primer based on substrate moisture, environmental conditions and humidity, substrate temperature, pH, achievement of maximum bond and other properties.

2.5 MANHOLE INTERIOR CONCRETE SUBSTRATE REPAIR (CEMENTITIOUS LINER)

A. Materials
1. The cementitious monolithic lining shall be designed to stop water infiltration through cracks, holes, or weeping in municipal wastewater collection and treatment systems. The product shall be in accordance with the MIC protective coating system manufacturer’s recommendations.

B. Area Preparation
1. All structures to receive a cementitious monolithic lining must be properly designed and capable of withstanding imposed loads. Surfaces must be examined to see that they are free of laitance, dust, loose particles, oils, grease, chemical contaminants, and previously applied paints or protective coatings. Surfaces should be prepared in accordance with the manufacturer’s recommendations.

C. Application
1. The application of the cementitious monolithic lining shall be in accordance with the manufacturer’s requirements and recommendations.

D. Setting/Curing
   1. The setting and curing time and temperature conditions shall be in accordance with the manufacturer's requirements and recommendations.

2.6 SAMPLES

A. At the option of the Engineer, the Contractor shall apply the material on a sample area not less than four square feet in size. When approved, the sample area shall serve as a standard of acceptance for all further work.

B. All mixing and application of the material shall be done in strict accordance with the printed instructions of the approved manufacturer and as directed by the Engineer or SD1. The Contractor shall submit to the Engineer evidence indicating that the proposed applicators are fully qualified to perform the work and any proposed applicator found to be not qualified shall (at the written request of the Engineer) be removed forthwith by the Contractor.

PART 3 – EXECUTION

3.1 PROTECTION OF IN-PLACE OR EXISTING CONDITIONS

A. Equipment, vehicles, buildings and other finished items shall be protected from damage and overspray. Sensitive equipment shall be wrapped in plastic and taped.

3.2 COATINGS

A. Coatings shall only be applied by an applicator who has been trained by the manufacturer in the application of the proposed lining system. The Contractor must provide evidence that personnel assigned to the project have successfully completed the manufacturer's training.

3.3 PREPARATORY CLEANING OF MANHOLES

A. Manholes that are to be coated internally shall first be cleaned by high-velocity water cleaning equipment in order to remove all foreign matter from the manhole walls.

B. All interior surfaces of the manhole shall be cleaned and free from oil, grease, loose mortar, paints, protective coatings, efflorescence, laitance, and curing compounds. The Engineer or an inspector representing SD1 will inspect the cleaned surfaces for conformance with the general specification, however, it is the responsibility of the contractor to make sure the surface preparation meets coating manufacturer's requirements.

C. The Contractor shall examine all surfaces to be coated and shall correct all surface defects per manufacturer's requirements before application of any coating.

3.4 PLUGGING, PATCHING, AND COATING MANHOLES

A. Leaks through mortar between bricks shall be grouted using method approved by SD1 or ENGINEER.

B. Application of the materials shall be in accordance with the material manufacturer's recommendations and as defined in this specification.

C. All plugging, patching, and coating shall be reviewed by the Engineer or by an inspector representing SD1 for conformance with the general specifications, however, it is the responsibility of the contractor to makes sure all surface preparation meets coating manufacturer’s requirements.

3.5 SEWAGE FLOW AND DIVERSION

A. Provide means, labor and equipment to divert flow from pipelines entering the manhole as necessary to prevent sewage flow from contacting surfaces to be coated.
   1. The Contractor shall maintain flow by approved means in accordance with SD1 Specifications.
   2. In no case shall the Contractor allow any sewage to surcharge and backup into homes or businesses, or in any way overflow into the environment. If the bypass pumping capacity is insufficient to prevent surcharge and/or overflow at any time, the Contractor shall pull the line plugs irrespective of the status of the application or curing process, and restart the application or curing process until the coating is applied to the manufacturer’s specifications.

3.6 DEFECT REPAIR

A. All surface defects including tie holds, any honeycombing or otherwise defective concrete or brick shall be repaired. All voids, holes, and rough or irregular surfaces shall be filled.

B. The Contractor shall use the repair and fill material recommended by the coating manufacturer and approved by SD1 to repair or fill all defects.
   1. Areas to be patched shall be cleaned.
   2. Minor honeycombed or otherwise defective areas shall be removed to solid concrete.
   3. The edges of the cut shall be perpendicular to the surface of the concrete.
   4. Patches on exposed surfaces shall be finished to match the adjoining surfaces after they have set.
   5. Finishes shall be equal in workmanship, texture, and general appearance to that of the adjacent undamaged concrete or brick.
   6. Concrete with exposed reinforcing steel or with defects that affect the structural strength shall be repaired per SD1 specifications or an approved method shall be approved by SD1’s Engineer.

3.7 SURFACE PREPARATION

A. Surfaces to receive coating shall be clean and free of dirt, oil, grease and other foreign material. All concrete repairs shall be completed prior to coating installation.

B. Surfaces should be prepared in accordance with the manufacturer's recommendations.

C. The independent testing company or manufacturer's representative will test surfaces to ensure they are within requirements of the manufacturer. Do not begin coating work until moisture and temperature is within manufacturer's recommended range. Any leaks shall be repaired as all surfaces shall be free of visible moisture and standing water.

D. Surface preparation of concrete shall provide a surface profile as required by the coating manufacturer. Remove all laitance, weak concrete, dirt, and other contaminants. Remove all fins, protrusions, and similar imperfections to allow a uniform surface after surface preparation. Under no circumstance shall surface preparation be less than manufacturer's recommendation to provide the best possible installation. Moisture levels of concrete and temperature shall be recorded, tested and documented and be within acceptable ranges prior to application of coating.

E. Provide written certification from independent testing company or manufacturer's representative that on organization's letterhead, signed by an officer of the company that the surface preparation for each structure meets the requirements of the coating manufacturer.

3.8 APPLICATION

A. All methods, procedures of mixing, application and curing of the primer, cementitious liner and coating material shall be applied in accordance with manufacturer's recommendations.

B. Coatings on new and existing manholes and other structures shall be applied within 48 hours of cleaning.

C. Confirm that the ambient temperature and humidity, the prepared surface temperature and moisture content, and the temperature of the coating material to be applied are within the manufacturer's recommended ranges. Coatings shall be applied at a time of day when the ambient temperature and humidity is expected to be steady or falling.

D. Protect surfaces from rapid drying due to heavy wind or hot sun.

E. Application shall produce at a minimum a totally bonded coating, corrosion proof, free of blisters, pinholes and any and all blemishes that may be precursors to failure. Promptly correct or remove, and repair areas that fail visual inspection or testing. Recoat time between coats shall be documented and shall not exceed manufacturer's requirements. Where recoat times are exceeded the coating shall be prepared in strict accordance with manufacturer's recommendations including scarification to provide sufficient profile.

F. Cure coatings in strict accordance with the manufacturer's recommendations, prior to putting in service.

3.9 QUALITY ASSURANCE AND TESTING

A. All coated surfaces shall be inspected and tested in accordance with the following requirements:
   1. Visual inspection: Coated surfaces shall be visually inspected for dry spots, blow out bubbles (Out Gas), blisters and voids in the finished coating.
   2. Spark (Holiday) Testing: All coated surfaces shall be tested for pinholes and discontinuities in accordance with ASTM D4787 or NACE SP 0188. The Spark Tester used shall provide 100 volts per mil of thickness. The Contractor shall repair identified pinholes and discontinuities as recommended by the manufacturer and retest. All testing and repair work shall be at the Contractor's expense.
   3. Adhesion Testing: Adhesion testing shall be performed to a minimum 200 psi in accordance with ASTM D7234. The maximum adhesion test load will not exceed manufacturer's recommendations for precast manholes that are not adequately bonded. All costs for any repair due to adhesion test failures shall be at the Contractor's expense.
   4. During application of MIC Coating, installer/applicator shall check wet film thickness in accordance with ASTM D4414.

B. There shall be no groundwater infiltration or other leakage through the structure walls after coating. If leakage is found, it shall be eliminated with an appropriate method as recommended by the coating manufacturer and approved by the Engineer at no additional cost to SD1.

C. All pipe connections shall be open and clear.

D. There shall be no cracks, voids, pinholes, uncured spots, dry spots, lifts, delamination, or other type of defects in the lining.

E. If any defective coating is discovered after it has been installed and prior to field acceptance, it shall be repaired or replaced in a satisfactory manner within 72 hours and at no additional cost to SD1. This requirement shall apply for the entire two-year warranty period, except that repairs shall be made within 30 days of discovery.

3.10 WORK IN CONFINED SPACES

A. The general contractor and any sub-contractors shall meet all OSHA requirements for work in confined spaces. The Contractor shall provide and maintain safe working conditions for all employees and subcontractors. Fresh air shall be supplied continuously to confined spaces through the combined use of existing openings, forced-draft fans and temporary ducts to the outside, or by direct air supply to individual workers. Fumes shall be exhausted to the outside from the lowest level of the confined space. Electrical fan motors shall be explosion-proof if in contact with fumes. No smoking or open fires shall be permitted in or near areas where volatile fumes may accumulate.

++ END OF SECTION ++

SECTION 02610

PIPE & FITTINGS

PART 1 – GENERAL

1.1 SUMMARY

A. CONTRACTOR shall provide all labor, materials, equipment, incidentals, and services as shown, specified, and required for furnishing, installing, and testing all buried piping, fittings, and specials specified herein. Piping herein specified includes force main & gravity sewer for sanitary and storm applications. Remove and replace all existing piping that interferes with installation of new pipe or structures or that is damaged by new installations in a manner approved by the ENGINEER.

B. The work includes, but is not limited to, the following:
   1. Piping beneath structures.
   2. Supports and restraints.
   3. Pipe encasements.
   4. Work on or affecting existing piping.
   5. Testing.
   6. Cleaning and disinfecting.
   7. Installation of all jointing and gasketing materials, specials, flexible couplings, mechanical couplings, harnessed and flanged adapters, sleeves, tie rods, and all other work required to complete the buried piping installation.
   8. Incorporation of valves, meters and special items shown or specified into the piping systems as required.
   9. Unless otherwise specifically shown, specified, or included under other Sections, all buried piping work required, beginning at the outside face of structures or structure foundations and extending away from structure.

C. Review installation procedures under other Sections and other contracts and coordinate with the work that is related to this Section.

1.2 RELATED WORK

- Section 02110. Clearing and Grubbing
- Section 02220. Excavation and Backfill
- Section 02606. Sanitary & Storm Structures
- Section 03300, Cast-In-Place Concrete
- Section 09900, Painting
- Division 15, Sections on Piping, Valves & Appurtenances
- Section 15052, Exposed Piping Installation
- Section 15100, Valves and Appurtenances
- Section 15121, Wall Pipes, Floor Pipes and Pipe Sleeves
- Section 15122, Piping Specialties
- Section 15140, Pipe Hangers and Supports

1.3 LIMITATIONS

A. All existing piping as shown on the Design Drawings is based on the best information available, but SD1 and the ENGINEER makes no guarantees as to the accuracy of the locations or type of piping depicted. All new piping which ties into existing lines must be made compatible with that piping. So that piping conflicts may be avoided, CONTRACTOR shall open up his trench well ahead of the pipe laying operation to confirm exact locations and sizes of existing piping before installing any new piping. CONTRACTOR shall provide all fittings and adapters necessary to complete all connections to existing piping as approved by SD1.

1.4 QUALITY ASSURANCE

Requirements of Regulatory Agencies:

A. Comply with requirements of UL, FM and other jurisdictional authorities, where applicable.

B. Refer to the General and Supplementary Conditions regarding permit requirements for this Project.

1.5 REFERENCES

Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified:

- AWWA C104, Standard for Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water.
- AWWA C105, Polyethylene Encasement for Ductile-Iron Piping for Water and Other Liquids
- AWWA C110, Standard for Ductile-Iron and Gray-Iron Fittings, 3 In.-48 In. (76 mm-1,219 mm), for Water.
- AWWA C111, Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
- AWWA C115, Standard for Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges.
- AWWA C150, Standard for Thickness Design of Ductile-Iron Pipe.
- AWWA C151, Standard for Ductile-Iron Pipe, Centrifugally Cast, for Water.
- AWWA C600, Installation of Ductile-Iron Water Mains and Their Appurtenances.
- AWWA C606, Grooved and Shouldered Joints.
- AWWA C800, Underground Service Line Valves and Fittings.
- AWWA C900, Polyvinyl Chloride (PVC) Pressure Pipe, and Fabricated Fittings, 4 In.-12 In. (100 mm-300 mm), for Water Dist.
- AWWA M23, PVC—Design and Installation
- ASTM A 27, Standard Specification for Steel Castings, Carbon, for General Application.
- ASTM A 82, Standard Specification for Steel Wire, Plain for Concrete Reinforcement.
- ASTM A 185, Welded Steel Wire Fabric for Concrete Reinforcement.
- ASTM A 496, Deformed Steel Wire for Concrete Reinforcement.

- ASTM A 497, Steel Welded Wire Fabric, Deformed for Concrete Reinforcement.
- ASTM A 1011, Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.
- ASTM A 615, Standard Specification for Deformed and Plain Billet Steel Bars for Concrete Reinforcement.
- ASTM C 14, Standard Specification for Concrete Sewer, Storm Drain and Culvert Pipe.
- ASTM C 76, Standard Specification for Reinforced Concrete Culvert, Storm Drain and Sewer Pipe.
- ASTM C 118, Concrete Pipe for Irrigation or Drainage.
- ASTM C 150, Standard Specification for Portland Cement
- ASTM C 361, Standard Specification for Reinforced Concrete Low-Head Pressure Pipe.
- ASTM C 443, Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets.
- ASTM C 478, Standard Specification for Precast Reinforced Concrete Manhole Sections.
- ASTM D 1238, Measuring Flow Rates of Thermoplastics by Extrusion Plastometer.
- ASTM D 1598, Time-to-Failure of Plastic Pipe Under Constant Internal Pressure.
- ASTM D 1599, Short Time Hydraulic Failure Pressure of Plastic Pipe, Tubing, and Fittings.
- ASTM D 1784, Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.
- ASTM D 1785, Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120
- ASTM D 2122, Determining Dimensions of Thermoplastic Pipe and Fittings
- ASTM D 2412, Standard Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading.
- ASTM D 2464, Threaded Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.
- ASTM D 2467, Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.
- ASTM D 2564, Standard Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems.
- ASTM D 2774, Practice for Underground Installation of Thermoplastic Pressure Piping.
- ASTM D 3034, Bell and Spigot-Type Poly (Vinyl Chloride) (PVC) Plastic Pipe and Fittings.
- ASTM D 3212, Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals
- ASTM D 3261, Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing.

- ASTM D 3262, Standard Specification for Fiberglass (Glass-Fiber-Reinforced Thermosetting-Resin) Sewer Pipe.
- ASTM D 3350, Standard Specification for Polyethylene Plastics Pipe and Fittings Materials.
- ASTM D 3754, "Fiberglass" (Glass-Fiber-Reinforced-Thermosetting-Resin) Sewer and Industrial Pressure Pipe.
- ASTM D 4161 Standard Specification for Fiberglass (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe Joints Using Flexible Elastomeric Seals.
- ASTM D 5685, "Fiberglass" (Glass-Fiber-Reinforced-Thermosetting-Resin) Pressure Pipe Fittings.
- ASTM F 437, Threaded Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80.
- ASTM F 439, Socket-Type Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80.
- ASTM F 441, Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe and Fittings.
- ASTM F 493, Solvent Cements for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe and Fittings.
- ASTM F 714, Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter.
- ASCE MOP No. 37, Design and Construction of Sanitary and Storm Sewers
- ASTM C 507, Standard Specification for Reinforced Concrete Elliptical Culvert, Storm Drain and Sewer Pipe
- ASTM F 679, Standard Specification for Polyvinyl Chloride (PVC) Large-Diameter Plastic Gravity Sewer Pipe and Fittings
- ASTM F 794, Standard Specification for Polyvinyl Chloride (PVC) Profile Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter
- ASTM F 949, Standard Specification for Polyvinyl Chloride (PVC) Corrugated Sewer Pipe with Smooth Interior and Fittings
- ASTM F 477, Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe
- ASTM F 2306, Standard Specification for 12-60 inch Annular Corrugated Profile-Wall Polyethylene (PE) Pipe and Fittings for Gravity-Flow Storm Sewer and Subsurface Drainage Applications
- ASTM D 2321, Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications

1.6 SUBMITTALS

A. In addition to the requirements of Section 01340, provide the following:
   1. Size, class and other details of pipe to be used.
   2. Full details of piping, specials, joints, harnessing, and connections to existing piping, structures, equipment and appurtenances.

B. Tests: Submit description of proposed testing methods, procedures and apparatus. Prepare and submit report for each test.

C. Certificates: Submit certificates of compliance with referenced standards.

D. As requested by SD1, all pipe manufacturers that supply pipe for the project shall provide a detailed structural design taking in account the depth of burial, highway loads, bedding and backfill requirements, water elevation, soil conditions and installation procedures. All designs submitted shall have a Professional ENGINEER's stamp from Kentucky. Such design shall be received, reviewed, and approved prior to manufacture.

E. As requested by SD1, pipe manufacturer for each pipe type used shall be present and instruct CONTRACTOR on proper installation technique per shop drawings and manufacturer's recommended procedures. As requested by SD1, pipe manufacturer's representative shall visit job site to monitor progress of pipe installation and shall notify in writing the CONTRACTOR and SD1 of any discrepancy, changes, or incorrect procedures that would prevent the pipe from performing as designed.

F. Record Drawings: Submit record drawings in accordance with Section 01721.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Piping herein specified includes force main & gravity sewer. Refer to the pipe material schedule shown below to determine which pipe materials are acceptable for each application.

Type	**Size**	**Depth**	**Acceptable Materials**
Sanitary - Aerial	Any		Ductile Iron; PVC SDR 35 inside casing pipe
Sanitary - Gravity	Any	Less than 20'	PVC SDR 35; Fiberglass Polymer Mortar Pipe SN 46; Ductile Iron; HDPE; RCP, polypropylene (HDPP)
Sanitary - Gravity	Any	20.1' to 30'	PVC SDR 26; Ductile Iron; Fiberglass Polymer Mortar Pipe SN 72
Sanitary - Gravity	Any	30.1' or greater	Fiberglass Polymer Mortar Pipe; Ductile Iron
Sanitary - Horizontal Directional Drill	Any	Any	HDPE ; Ductile Iron; Restrained Joint PVC C-900

Sanitary - Force Main	Any	Any	HDPE; Ductile Iron; PVC C-900
Sanitary – Low Pressure Force Main	Smaller than 4”	Any	PVC SDR 21, PVC Schedule 40, HPDE
Sanitary – Low Pressure Force Main	4”and Larger	Any	PVC C900, HDPE, Ductile Iron
Storm – Gravity	Any	Less than 20’	RCP; CMP; Ductile Iron; PVC SDR 35; HDPE Corrugated; Polypropylene (HDPP), Fiberglass Polymer Mortar Pipe SN 72
Storm – Gravity	Any	20.1’ or greater	RCP; CMP; Ductile Iron; PVC SDR 26; HDPE Corrugated; Polypropylene (HDPP), Fiberglass Polymer Mortar Pipe SN 72

Note: Pipe selected shall be designed for the cover and loading requirements to each project. Design calculations for pipe wall thickness and structural design shall be provided by the ENGINEER, as requested by SD1. Restrained joint calculations for force mains shall be provided for all projects. Depth is based on maximum cover to top of pipe between structures or manhole runs. Pipe shall be the same thickness between structures or manholes.

B. Refer to applicable Sections for material specifications.

C. General:
   1. Marking Piping:
      a. Cast or paint material, type and pressure designation on each piece of pipe or fitting 4 inches in diameter and larger.
      b. Pipe and fittings smaller than 4 inches in diameter shall be clearly marked by manufacturer as to material, type and rating.

2.2 DUCTILE IRON PIPE AND FITTINGS

A. Piping furnished hereunder shall be complete with all joint gaskets, bolts, and nuts required for installation of valves and equipment furnished by others for installation under this contract.

B. Pipe Manufacturer's Experience and Field Services.
   1. All ductile iron pipe, fittings, and specials shall be fabricated, lined and coated by the pipe manufacturer. Minimum required experience shall include manufacture of a similar pipeline in length to this contract, of equal or larger diameter than the pipe to be provided with joints, lining, and coating suitable for the same or greater pressure rating specified herein, which has performed satisfactorily for the past 5 years.
   2. An experienced, competent, and authorized field service representative shall be provided by the pipe manufacturer to perform all pipe manufacturer's field services specified herein. The field service representative's minimum required experience qualifications shall include 5 years of practical knowledge and experience installing ductile iron pipe with joints, lining, and coating of the pipe to be provided.
   3. All ductile iron pipe shall be installed in accordance with the pipe manufacturer's recommendations. The pipe manufacturer's field service representative shall visit the site and inspect, check, instruct, guide, and direct CONTRACTOR's procedures for pipe handling and installation at the start of the pipe installation. The pipe manufacturer's field service representative shall coordinate his services with CONTRACTOR.
   4. Each joint, including all restrained joints, shall be checked by CONTRACTOR as instructed by the pipe manufacturer's field service representative to determine that the joint and the restraints are installed properly.
   5. As requested, the pipe manufacturer's field service representative shall furnish to SD1, through ENGINEER, a written report certifying that CONTRACTOR's installation personnel have been properly instructed and have demonstrated the proper pipe handling and installation procedures. The pipe manufacturer's field service representative shall also furnish to SD1, through ENGINEER, a written report of each site visit. The pipe manufacturer's field service representative shall revisit the site as often as necessary until all trouble is corrected and the pipeline installation and operation are satisfactory in the opinion of the ENGINEER.
   6. All costs for these services shall be included in the Contract Price.

C. Materials
   1. Where ductile iron pipe is required, it shall conform to ANSI/AWWA C151/A21.51, Table 1 or Table 3. Pressure class 350 shall be used for all piping, unless otherwise shown on the drawings or specified. Fittings shall conform to ANSI/AWWA C110/A21.10, or ANSI/AWWA C153/A21.53, with a minimum working pressure rating of 350 psi. All fittings shall be suitable for a test pressure as specified herein without leakage or damage.
   2. All buried pressure piping shall be push-on joint or mechanical joint. Restrained joint pipe shall be installed at the station locations shown on the Contract Drawings. All above ground piping or piping in vaults shall be flanged.
   3. All gravity sewer piping shall be push-on joint or mechanical joint.
   4. Push-on joints and mechanical joints shall be in accordance with ANSI/AWWA C111/A21.11.

5. As requested, restrained joint pipe shall be fabricated to the lengths required as determined by the laying schedule to be submitted as specified herein. If deviations from the approved laying schedule are required in the field as approved by SD1 and ENGINEER and field-cuts are required, CONTRACTOR shall provide restraint on the field-cut piping using, EBAA Iron "Megalug" restrained joints as specified below.
6. Field cuts shall be minimized and will be limited to only locations as necessary to install pipe, when no other alternative to using factory provided joint restraint exists.

D. Joints
1. Certification of joint design shall be provided in accordance with ANSI/AWWA C111/A21.11-90, Section 4.5, Performance Requirements, as modified herein.
2. The joint test pressure for each type of joint used on this project shall be 1-1/2 times the working pressure at the lowest elevation of the pipeline for a duration of two hours or as specified by the design engineer. The same certification and testing shall also be provided for restrained joints. For restrained joints, the piping shall not be blocked to prevent separation and the joint shall not leak or show evidence of failure.
3. It is not necessary that such tests be made on pipe manufactured specifically for this project. Certified reports covering tests made on other pipe of the same size and design as specified herein and on the drawings and manufactured from materials of equivalent type and quality may be accepted as adequate proof of design.
4. Nuts, bolts, and tie -rods used on buried pressure pipe and fittings shall be low alloy steel T- bolts with Zinc anode caps for all T-bolts and rods. The entire installation shall be wrapped in one layers of polyethylene encasement. Nuts, bolts and stiffener plates which will be in contact with sewage shall be stainless steel Type 316.

E. Material Schedule

Push-on Joints and Mechanical Joints	ANSI/AWWA C111/A21.11
Restrained Push-on Joints Positive locking segments and/or rings (4 inch through 64 inch)	American "Flex-Ring", or "Lok-Ring"; U.S. Pipe "TR Flex"; Clow Corp., "Super-Lock", or equal
Restrained Push-on Joints, (field-cut spigot) locking wedge type	EBAA Iron "Megalug" Series 1700, or equal. Shall only be used in locations approved by the ENGINEER.
Restrained Mechanical Joints (Factory prepared spigot) (4 inch through 48 inch)	American "MJ coupled Joints"

Restrained Mechanical Joints (field cut spigot)	EBAA Iron “Megalug” Series 1100, without exception. Shall only be used in locations approved by the ENGINEER.
Fittings	ANSI/AWWA C110/A21.1, or ANSI/AWWA C153/A21.53, all with minimum working pressure of 350 psi, and suitable for the test pressure based on the project design without leakage or damage.
Flanged Joints & Fittings	Ductile Iron, ANSI/AWWA C115/A21.5 suitable for the test pressure based on the project design without leakage or damage. Faced and drilled, ANSI B16.1 125-pound flat face. Threaded conforming to AWWA C115/A21.15.
Bolting	125-pound flat–faced flange: ASTM A 307, Grade A carbon steel hex head bolts and ASTM A563 Grade A carbon steel hex head nuts
Gaskets	Restrained Push-on and Mechanical Joints: Synthetic rubber conforming to AWWA C111/A21.11. Natural rubber is not acceptable. Flanged: 1/8 inch thick, red rubber (SBR), hardness 80 (Shore A), rated to 200 degrees F., conforming to ANSI B16.21, AWWA C207, and ASTM D1330, Grades 1 and 2. Full face for 125-pound flat-faced flanges, or specially designed gaskets with required properties per ANSI/AWWA C111/A21.11 to meet the test pressure rating. Blind flanges shall be gasketed covering the entire inside face with the gasket cemented to the blind flange. Gasket pressure rating to equal or exceed the system hydrostatic test pressure.
Joint Lubricant	Manufacturer’s standard

Tapping Sleeves	316 SS, with 316 SS body and bolting, and rubber sealing gasket, suitable for the test pressure specified herein. JCM Industries, Model JCM 452 or approved equal.
Polyethylene Encasement	Seamless, ANSI/AWWA C105/A21.5; LLD-8 mil or HDCL-4 mil

F. Lining and Coating Ductile Iron Pipe and Fittings (For Sanitary Sewers Only)

1. All buried ductile iron pipe and fittings shall have manufacturers outside standard asphaltic coating and ceramic epoxy lining inside, factory applied. Ceramic epoxy lining shall be Protecto 401 as manufactured by Vulcan Painters, Inc. of Birmingham, AL, or NovoCoat SP-2000W as manufactured by NovoCoat Protective Coatings, of Addison, Texas, or equal, and as specified herein. Flange faces shall be coated externally with a suitable manufacturer's standard rust-preventative compound.
2. Application of Lining:
   The interior of the pipe exposed to liquids and gases shall be blasted and cleaned to remove all loose oxides and rust. After cleaning, the lining material shall be applied to yield 40 mils for the complete system using a centrifugal lance applicator. No lining shall take place over grease, oil, etc., that would be detrimental to the adhesion of the compound to the substrate. The compound shall not be applied when the substrate temperature is below 40 degrees F., or in adverse atmospheric conditions which will cause detrimental blistering, pinholing or porosity of the film.
3. Lining Material
   The material shall be a two-component epoxy with the following minimum Requirements:
   a. A permeability rating of 0.0 perms when measured by ASTM E96-66, Procedure A. Duration of test - 6 weeks.
   b. A direct impact resistance of 125 in-lbs with no cracking when measured by ASTM-D-2794.
   c. The ability to build at least 50 mils dry in one coat.
   d. The material shall be recoatable with itself for at least seven days with no additional surface preparation when exposed to direct summer sun and a temperature of 90 degrees F.
   e. The material shall contain at least 20% by volume of ceramic quartz pigment.
   f. A test and service history demonstrating the ability of the material to withstand the service expected.
   g. Each requirement of 2.2F.3 Lining Material above must be certified by the material supplier.
4. Field Cuts
   a. All manufacturer's procedures and recommendations shall be followed when making field cuts. Note proper field preparations and curing time of the coating.

G. All items used for jointing pipe shall be furnished with the pipe and tested before shipment. The joints shall be made with tools and lubricant in strict conformity with the manufacturer's instructions. If requested, three (3) copies of such instructions shall be delivered to the ENGINEER at start of construction.

H. Encasement
   1. Polyethylene encasement shall be provided for all buried ductile iron pipe, including all straight pipe, bends, tees, wyes, adapters, closure pieces, field restraint devices, valves and other fittings or specials, in accordance with ANSI/AWWA C105/A21.5, Method A. Preparation of the pipe shall include, but not be limited to: removing lumps of clay, mud, cinders, etc., prior to installation.
   2. Where ductile iron pipe is also embedded or encased in concrete the polyethylene encasement shall be installed over the ductile iron pipe prior to concrete placement. Polyethylene encasement is only required in a casing pipe, if grouting of the annular space is required.
   3. The pipe shall be wrapped with 8-mil thickness polyethylene tube wrap, using the recommended minimum flat tube widths for the specified pipe sizes. The polyethylene tube wrap shall be of virgin polyethylene as produced from DuPont Alathan resin or equal.
   4. The polyethylene tube seams and overlaps shall be wrapped and held in place by means of 2-inch-wide plastic backed adhesive tape. The tape shall be Polyken Number 900, Scotchrap Number 50, or equal. The tape shall be such that the adhesive shall bond securely to both metal surfaces and polyethylene film.
   5. The polyethylene film supplied shall be clearly marked at a minimum of 2-ft along its length, containing the following information:
      a. Manufacturer's name or trademark
      b. Year of Manufacture
      c. ANSI/AWWA C105/A21.5
      d. Minimum film thickness and material type (LLDPE or HDCLPE)
      e. Applicable range of nominal pipe diameter size(s)
      f. Warning--Corrosion Protection--Repair any Damage

2.3 POLYVINYL CHLORIDE (PVC) PIPE AND FITTINGS (GRAVITY LINES)

A. Polyvinyl Chloride (PVC) and Chlorinated Polyvinyl Chloride (CPVC) Piping – Schedule Rated Pipe:
   1. Pipe and Fitting Material:
      a. Standard: ASTM D 1784.
      b. Type: Type I, Grade 1, rigid (12454-B).
   2. Pipe:
      a. PVC:
         1) Standard: ASTM D 1785.
         2) Designation: PVC 1120.
      b. CPVC:
         1) Standard: ASTM F 441.

3. Joints:
    a. General: Connect pipe by solvent cementing except where flanged or threaded fittings are required at expansion joints, valves, flow meters, equipment connections or otherwise shown or directed.
    b. Flanged Joints:
        1) Use flanges joined to pipe by solvent cementing.
        2) Flange Drilling and Dimensions: Comply with ANSI B16.1.
        3) Flange Gaskets: Viton full face.
        4) Bolts, Nuts and Washers: Type 316 stainless steel.
        5) Provide washers on each face of the bolted connection.
    c. Threaded Joints:
        1) Taper Pipe Threads: ANSI B2.1.
        2) Joint Preparation: Teflon tape.
        3) Use PVC dies for taper pipe threads.
    d. Primer and Solvent Cement:
        1) Standard:
            a) PVC: ASTM D 2564.
            b) CPVC: ASTM F 493.
4. Fittings:
    a. Socket-Type:
        1) PVC:
            a) Standard: ASTM D 2467.
            b) Designation: PVC I.
        2) CPVC:
            a) Standard: ASTM F 439.
            b) Threaded Type:
                i. PVC:
                    (a) Standard: ASTM D 2464.
                    (b) Designation: PVC I.
                ii. CPVC:
                    (a) Standard: ASTM F 437.

B. Polyvinyl Chloride (PVC) Piping – Gravity Sewer Pipe and Fittings:
1. Pipe and Fitting Material:
    a. Standard: ASTM D 1784.
2. Pipe and Fittings:
    a. Standard:
        1) 4-in.through 15-in. diameter: ASTM D 3034.
        2) 18-in. through 27-in. diameter: ASTM F 679.
    b. Thickness Class: As shown in 2.1B.1a.
3. Joints:
    a. Push On Joints: Connect pipe with integral wall bell and spigot joints. The bell shall consist of an integral wall section with a solid cross section rubber gasket, factory assembled, securely locked in place to prevent displacement during assembly. Joints shall be assembled in accordance with the pipe manufacturer’s recommendations and ASTM D 3212.

b. Gaskets: Rubber gaskets shall be in compliance with ASTM F 477 and shall be suitable for the service specified.

C. Profile Wall Polyvinyl Chloride (PVC) Piping (For Storm Sewers Only)
1. PVC open or closed profile pipe meeting the requirements of ASTM F 794, Standard Specification for Polyvinyl Chloride (PVC) Profile Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter.
2. Joints for PVC pipe shall be gasket, bell and spigot, push-on types which meet the requirements of ASTM D 3212, Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals. Gaskets shall meet the requirements of ASTM F 477, Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

D. Corrugated Polyvinyl Chloride (PVC) Piping (For Storm Sewers Only)
1. Corrugated PVC pipe meeting the requirements of ASTM F 949, Latest Revision, "Polyvinyl Chloride (PVC) Corrugated Sewer Pipe with a Smooth Interior and Fittings".
2. Joints for PVC pipe shall be gasket, bell and spigot, push-on types which meet the requirements of ASTM D 3212, Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals. Gaskets shall meet the requirements of ASTM F 477, Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

2.4 POLYVINYL CHLORIDE (PVC) PIPE – C900 PIPING (FORCE MAINS)

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. See Table 1 below for pipe material depth and pressure limitations.

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-ft. ± 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. The integral bell shall be tested with the pipe.

D. Fittings for all lines 4 inches in diameter or larger shall be restrained 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.

E. Fittings for all lines less than 4 inches in diameter shall be PVC gasketed push on type or socket glue-type manufactured specifically for the pipe class being utilized. All socket-glue type connections shall be joined with PVC solvent cement conforming to

ASTM D2564. Product and viscosity shall be as recommended by the pipe and fitting manufacturer to assure compatibility. Solvent cement joints shall be made up in accordance with the requirements of ASTM D2855.

F. Appropriate restraint shall be provided for all fittings. Fittings shall be restrained with EBAA Iron Mega-Lugs, or equal. Pipe joints on either side of the fittings shall also be restrained to the distance required by the restrained joint calculations with the appropriate EBAA Iron Mega- Lug. The appropriate restraints are listed below:
   1. Series 2000SV& 2000PV: MEGALUG Restraint for existing C900 PVC Pipe at DIP
   2. Series 2800: MEGALUG Restraint Harness for C900
   3. Series 2200: MEGALUG Restraint for C900 at DIP Mechanical Joint fitting

G. Pipe material depth and pressure limitations (Table 1)

Table 1 – Pipe Material Depth and Pressure Limitations

Pipe Material	Minimum Depth of Bury[1, 2]	Maximum Depth of Bury[1, 2]	Pressure Class / Rating	Maximum Surge Pressure Capacity
Pressure Class 350 – DIP	3 ft.	30 ft.	350 psi	450 psi
DR 25 – C900 PVC	3 ft.	10 ft.	165 psi.[3]	264 psi[5]
DR 18 – C900 PVC	3 ft.	20 ft.	235 psi.[3]	376 psi[5]
DR 14 – C900 PVC	3 ft.	30 ft.	305 psi.[3]	488 psi[5]

Table Notes:

1. Depth of bury limitations are provided as a general rule. At the discretion of SD1, greater depths may be allowed provided special pipe bedding is provided. Under some combinations of pipe material, soil type and bedding conditions, maximum acceptable depths may be reduced. For all applications where depth of bury is greater than or equal to thirty (30) feet, DIP shall be used.
2. Design ENGINEER shall consult appropriate references to ensure selected pipe material is suitable for each application. Such references may include the DIPRA *Design of Ductile Iron Pipe brochure, Uni-Bell Handbook of PVC Pipe Design and Construction*, PWEagle Technical Bulletins TB-D5 and TB-D8 (for PVC pipe), or Performance Pipe Bulletin PP 503 and PP 508 (for HDPE pipe) or other appropriate sources.
3. Total System Pressure (i.e. maximum working pressure plus any routine pressure surge) shall be less than the Pressure Class, as defined by AWWA C900-07 (values given in the above table are at 73.4˚F). "Maximum working pressure" is the maximum steady-state, sustained operating pressure applied to the pipe exclusive of transient pressures.

4. Maximum working pressure shall be less than the Pressure Class, and Total System Pressure (i.e. maximum working pressure plus any routine pressure surge) shall be less than 1.5 times the Pressure Class, as defined by AWWA C906-07 (values given in the above table are at 73.4˚F). "Maximum working pressure" is the maximum steady-state, sustained operating pressure applied to the pipe exclusive of transient pressures.
5. For C900 PVC pipe, maximum working pressure plus occasional or "emergency" surges shall not be greater than the Maximum Surge Pressure Capacity (1.6 times the Pressure Class of the pipe) as defined by AWWA C900(2007).

2.5 HIGH DENSITY POLYETHYLENE (HDPE) PIPE AND FITTINGS

A. Smooth Wall
   1. Qualification of Manufacturers: Qualified manufacturers shall be firms regularly engaged in the manufacture of HDPE pipe and pipe fittings of the same size, type, and joint configuration specified, and whose products have been in satisfactory use for not less than 5 years.
   2. Heat Fusion Training/Certification: The CONTRACTOR shall ensure and certify that persons making heat fusion joints have received training in the manufacturer's recommended procedure not more than 12 months prior to commencing construction.
      a. An experienced, competent, and authorized field service representative shall be provided by the pipe manufacturer to perform all pipe manufacturer's field services specified herein. The field service representative's minimum required experience qualifications shall include 5 years of practical knowledge and experience in making heat fusion joints and installing HDPE pipe.
      b. All HDPE pipe shall be installed in accordance with the pipe manufacturer's recommendations. The pipe manufacturer's field service representative shall visit the site and inspect, check, instruct, guide, and direct CONTRACTOR's procedures for pipe handling and installation at the start of the pipe installation. The fusion pipe manufacturer's field service representative shall coordinate his services with CONTRACTOR.
      c. Each joint shall be checked by CONTRACTOR as instructed by the pipe manufacturer's field service representative to determine that the pipe is properly fused.
      d. As requested, the pipe manufacturer's field service representative shall furnish to SD1, through ENGINEER, a written report certifying that CONTRACTOR's installation personnel have been properly instructed and have demonstrated the proper pipe handling, fusion, and installation procedures. The pipe manufacturer's field service representative shall also furnish to SD1, through ENGINEER, a written report of each site visit. The pipe manufacturer's field service representative shall revisit the site as often as necessary until all trouble is corrected and the pipeline installation and operation are satisfactory in the opinion of the ENGINEER.
      e. All costs for these services shall be included in the Contract Price.
   3. Interchangeability of Pipe and Fittings: Within Contract limits, pipe and fittings from different approved manufacturers shall not be interchanged.

4. HDPE shall be manufactured in accordance with ASTM F 714, Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter, and shall be so marked. Each production lot of pipe shall be tested for (from material or pipe) melt index, density, percent carbon, (from pipe) dimensions and ring tensile strength.
5. Materials used for the manufacture of HDPE pipe and fittings shall be PE3408 HDPE, meeting cell classification 345434C or 345434E per ASTM D 3350 and meeting Type III, Class B or Class C, Category 5, Grade P34 per ASTM D 1248; and shall be listed in the name of the pipe and fitting manufacturer in Plastics Pipe Institute (PPI) TR-4, Recommended Hydrostatic Strengths and Design Stresses for Thermoplastic Pipe and Fittings Compounds, with a standard grade rating of 1,600 psi at 73° F. The manufacturer shall certify that the materials used to manufacture pipe and fittings meet those requirements.
6. Fabricated fittings shall be made by heat fusion joining specially machined shapes cut from pipe, polyethylene sheet stock, or molded fittings. Fabricated fittings shall be rated for internal pressure service at least equal to the full service pressure rating of the mating pipe. Directional fittings 16-inch IPS and larger such as elbows, tee, etc., shall have a plain end inlet for butt fusion and flanged directional outlets.
7. Molded fittings shall be manufactured in accordance with ASTM D 3261, Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing, and shall be so marked. Each production lot of molded fittings shall be subjected to the test required under ASTM D 3261.
8. Flange adapters shall be made with sufficient through-bore length to be clamped in a butt fusion joining machine without the use of a stub-end holder. The sealing surface of the flange adapter shall be machined with a series of small V-shaped grooves to provide gasketless sealing, or to restrain the gasket against blow-out.
9. Flange adapters shall be fitted with back-up rings pressure rated equal to or greater than the mating pipe. The back-up ring bore shall be chamfered or radiused to provide clearance to the flange adapter radius. Flange bolts and nuts shall be Grade 2 or higher.
10. Joints between HDPE pipes and between HDPE fittings and pipes shall be fusion bonded as described in 3.4A.1.
11. The exterior of the HDPE pipe shall be color coded and striped in a way to identify the difference in pipe service, size and application.
12. HDPE pipe shall be black.
13. All piping used for horizontal directional drilling shall be permanently striped.
14. Internal 316 stainless steel stiffeners as manufactured by JCM Industries, Inc., or approved equal shall be used at all locations where external connectors or restraint clamps are installed. MJ adapters as manufactured by Central Plastics Company or equal, with creation of positive restraint to the pipe from heat fusion of the adapter to the pipe, and creation of positive restraint at the connection through bolting of the backup ring to the MJ valve or fitting, can be used in lieu of the JCM internal stainless steel stiffeners and external restraint clamps.
15. Except as noted in 2.5A.14 above, all mechanical connections shall be stiffened and restrained. Restraints shall be as manufactured by JCM Industries, Inc., or approved equal.

16. External restraint clamps utilized for transition from ductile iron pipe to polyethylene pipe shall be as manufactured by JCM Industries, Inc., or approved equal. Restraints must be compatible with stiffeners and pipe. JCM restraints shall not be used with HDPE pipe in locations where test pressures will exceed 150 psi. In locations where HDPE pipe will have test pressures exceeding 150 psi, provide an MJ adapter as described in 2.5A.14 above.
17. The Dimension Ratios (DR's) are shown on the table (Table 2) below:

Table 2 – Pipe Material Depth and Pressure Limitations

Pipe Material	Minimum Depth of Bury[1, 2]	Maximum Depth of Bury[1, 2]	Pressure Class / Rating	Maximum Surge Pressure Capacity
DR 17 – HDPE	3 ft.	10 ft.	100 psi[4]	200 psi[6]
DR 13.5 – HDPE	3 ft.	15 ft.	128 psi[4]	256 psi[6]
DR 11 – HDPE	3 ft.	20 ft.	160 psi[4]	320 psi[6]
DR 9 – HDPE	3 ft.	25 ft.	200 psi[4]	400 psi[6]
DR 7.3 – HDPE	3 ft.	25 ft.	254 psi[4]	508 psi[6]

Table Notes:

1. Depth of bury limitations are provided as a general rule. At the discretion of SD1, greater depths may be allowed provided special pipe bedding is provided. Under some combinations of pipe material, soil type and bedding conditions, maximum acceptable depths may be reduced. For all applications where depth of bury is greater than or equal to 30-ft, DIP shall be used.
2. Design ENGINEER shall consult appropriate references to ensure selected pipe material is suitable for each application. Such references may include the DIPRA *Design of Ductile Iron Pipe brochure, Uni-Bell Handbook of PVC Pipe Design and Construction*, PWEagle Technical Bulletins TB-D5 and TB-D8 (for PVC pipe), or Performance Pipe Bulletin PP 503 and PP 508 (for HDPE pipe) or other appropriate sources.
3. Total System Pressure (i.e. maximum working pressure plus any routine pressure surge) shall be less than the Pressure Class, as defined by AWWA C900-07 (values given in the above table are at 73.4˚F). "Maximum working pressure" is the maximum steady-state, sustained operating pressure applied to the pipe exclusive of transient pressures.
4. Maximum working pressure shall be less than the Pressure Class, and Total System Pressure (i.e. maximum working pressure plus any routine pressure surge) shall be less than 1.5 times the Pressure Class, as defined by AWWA C906-07 (values given in the above table are at 73.4˚F). "Maximum working pressure" is the maximum steady-state, sustained operating pressure applied to the pipe exclusive of transient pressures.

5. For C906 HDPE pipe, maximum working pressure plus occasional or "emergency" surges shall not be greater than the Maximum Surge Pressure Capacity (2.0 times the Pressure Class of the pipe) as defined by AWWA C906(2007).
    a. The DR's shall be verified by the Design ENGINEER and the manufacturer for the laying and pressure conditions shown on the drawings, including full consideration of vacuum, with calculations submitted to SD1 for review. NOTE: Manufacturers who do not comply with this requirement will not be considered an equal. The CONTRACTOR shall be liable if the pipe fails or pulls apart. The minimum DR shown above shall be used unless a thicker wall DR is recommended by the manufacturer during his verification. For horizontal directional drilling (HDD), pipe installed at depths from 0'-15' deep shall have a minimum DR 9 rating or manufacturer's minimum recommended DR, whichever is more conservative. HDD pipe installed at depths greater than 15' shall also have a minimum DR 9 rating or manufacturer's minimum recommended DR, whichever is more conservative. **CONTRACTOR shall note that depending on the wall thickness of the pipe to be furnished, an increase in pipe size may be required to provide comparable internal diameter to ductile iron pipe.**

18. Mechanical joint ductile iron fittings for DIP sized HDPE pipe meeting all requirements of ANSI A211.11 (AWWA C111) may be used in lieu of HDPE pipe fittings. Restraints shall be Sur-Grip as manufactured by JCM Industries, Inc., or approved equal.
19. Nuts, bolts, and tie -rods used on buried pressure pipe and fittings shall be low alloy steel T- bolts with Zinc anode caps for all T-bolts and rods. The entire installation shall be wrapped in two layers of polyethylene encasement. Nuts, bolts and stiffener plates which will be in contact with sewage shall be stainless steel Type 316.
20. HDPE pipe shall have OD of ductile iron pipe.
21. HDPE pipe shall be as manufactured by CP Performance Pipe, or equal.

B. Corrugated HDPE (For Storm Sewer Only)
    1. Corrugated polyethylene pipe with an integrally formed smooth interior shall meet the requirements of AASHTO M 294, Standard Specification for Corrugated Polyethylene Pipe, 12-to-36-inch diameter, for Type S pipe. SD1 will consider the use of large diameter HDPE on a case-by-case basis; approval shall be at SD1's discretion.
    2. HDPE pipe shall be joined using an inline bell (IB) & spigot joint or fitting meeting AASHTO M294 or ASTM F2306. The joint or fitting shall be soil-tight and gaskets shall meet the requirements of ASTM F477.

2.6 FIBERGLASS REINFORCED POLYMER MORTAR (FIBERGLASS) PIPE AND FITTINGS (GRAVITY LINES)

A. Fiberglass reinforced polymer mortar (fiberglass) pipe and fittings for gravity sewers shall conform to the requirements of ASTM D-3262, current approval, "Standard Specification for 'Fiberglass' (Glass-Fiber-Reinforced Thermosetting Resin) Sewer Pipe."

B. Materials
   1. Resin Systems: The manufacturer shall use only polyester resin systems with a proven history of performance in this particular application. The historical data shall have been acquired from a composite material of similar construction and composition as the proposed product.
   2. Glass Reinforcements: Chopped glass reinforcement fibers used to manufacture the components shall be of highest quality commercial grade E-glass filaments with binder and sizing compatible with impregnating resins. Continuous circumferential glass reinforcement fibers, where utilized, shall be of grade ECR-glass with binder and sizing compatible with impregnating resins.
   3. Silica Sand: Sand shall be a minimum of 98% silica with a maximum moisture content of 0.2%.
   4. Additives: Resin additives, such as curing agents, pigments, dyes, fillers, thixotropic agents, etc., when used, shall not detrimentally affect the performance of the product.
   5. Elastomeric Gaskets: Gaskets shall be supplied by qualified gasket manufacturers and be suitable for the service intended.

C. Manufacture and Construction
   1. Pipes: Manufacture pipe by a process that will result in a dense, non-porous, corrosion-resistant, consistent composite structure.
   2. Joints: Unless otherwise specified, the pipe shall be field connected with fiberglass couplings that utilize elastomeric EPDM or REKA sealing gaskets as the sole means to maintain joint watertightness. The joints shall meet the performance requirements of ASTM D4161. Additionally, the joints shall be rated to a pressure of 80% of -14.7 psi as installed. Joints at tie-ins, when needed may utilize fiberglass, gasket-sealed closure couplings.
   3. Fittings: Flanges, elbows, reducers, tees, wyes, laterals and other fittings shall be capable of withstanding all operating conditions when installed. They must be made and delivered from Manufacturer. All fittings and couplings shall be pressure rated for a minimum of 50 psi.
   4. End Coating: Protective spigot end resin coating shall be applied at the time of manufacture. CONTRACTOR shall similarly coat the ends of all field cut pipes if the wall of the pipe is completely de-aerated during the production process and glass and sand are not impregnated with 100% pure resin to form a wall that cannot be penetrated by water.
   5. Fiberglass pipe shall be as manufactured by: Hobas Pipe USA, Inc., or approved equal.
   6. For bury depths greater than 20 feet, CONTRACTOR shall comply with special trench construction requirements recommended by the manufacturer.

D. Dimensions:
   1. Diameters: The actual outside diameter of the pipe barrel shall be in accordance with ASTM D3262. The internal diameters of all pipes shall be as specified on the Contract Drawings for each pipe diameter.

2. Lengths: Pipe shall be supplied in nominal lengths of 20 feet. Actual laying length shall be nominal +1, -4 inches. At least 90% of the total footage of each size and class of pipe, excluding special order lengths, shall be furnished in nominal length sections.
3. Wall Thickness: The minimum wall thickness shall be the required design thickness for the laying conditions. Manufacturer shall provide information in writing to SD1 per the submittal requirements.
4. End Squareness: Pipe ends shall be square to the pipe axis with a maximum tolerance of 1/4".

E. Testing:
1. Pipes: Pipes shall be manufactured and tested in accordance with ASTM D3262.
2. Joints: Joints shall meet the requirements of ASTM D4161.
3. Stiffness: As tested in accordance with ASTM D2412. Any fiberglass pipe run that exceeds 20 feet, but less than 30 feet, in depth to invert anywhere along the run length from one manhole or structure to a second manhole or structure shall be a minimum stiffness of 72 psi for the entire run.

F. Customer Inspection
1. SD1 or other designated representative shall be entitled to inspect pipes at the factory or witness the pipe manufacturing.
2. Manufacturers Notification to Customer: Should SD1 request to see specific pipes during any phase of the manufacturing process, the manufacture must provide SD1 with adequate advance notice of when and where the production of those pipes will take place.

G. Packaging, Handling, and Shipping shall be done in accordance with the manufacturer's instructions.

2.7 REINFORCED CONCRETE PIPE (RCP)

A. Circular reinforced concrete pipe shall meet the requirements of ASTM C 76, Standard Specification for Reinforced Concrete Culvert, Storm Drain and Storm Pipe. Elliptical reinforced concrete pipe shall meet the requirements of ASTM C 507, Standard Specification for Reinforced Concrete Elliptical Culvert, Storm Drain and Sewer Pipe.

B. Rubber and plastic joints, or approved equal, shall be the jointing method for RCP and shall meet the requirements of AASHTO M 315 / ASTM C 443. Other methods of joining RCP will only be allowed upon explicit approval from SD1.

C. When RCP is used under pavement or driveways, a minimum of Class III RCP shall be required, or higher class as noted on drawings.

2.8 CORRUGATED METAL PIPE (CMP) (FOR STORM SEWERS ONLY)

A. Corrugated steel pipe shall meet the requirements of AASHTO M36. Corrosion protection shall be provided through an aluminized coating conforming to AASHTO M274. Aluminum alloy spiral pipe shall meet the requirements of AASHTO M196.

Coating materials shall be evaluated on a per project basis. Asphalt coatings shall not be permitted for corrugated metal pipe.

B. Joints for CMP shall be made using coupling bands and gaskets meeting the requirements of AASHTO M 36 and AASHTO M 274.

2.9 HIGH-PERFORMANCE POLYPROPYLENE PIPE

A. For sanitary sewer applications, high-performance polypropylene pipe shall meet the requirements of ASTM F2736 for 12”-30” pipe, and ASTM F2764 for 30”-60” pipe.

B. For sanitary sewer applications, pipe shall be joined with an extended reinforced integral bell & double gasketed spigot to provide a watertight seal in accordance with ASTM D3212.

C. For storm sewer application, high-performance polypropylene pipe shall meet the requirements of ASTM F2881 and AASHTO M330.

D. For storm sewer application, pipe shall be joined with an extended reinforced integral bell & gasketed spigot in accordance with ASTM D32212.2.9.

2.10 TRACER WIRE

A. All pressure pipe shall have marking tape 6” wide. Marking tape for the manhole shall be green with the words “Sanitary Sewer” installed approximately twelve (12) inches above the pipe and shall continue for the length of the pipe installation.

B. All pipe for sanitary force mains shall be installed with a 12-gauge solid copper (PVC coated) tracing wire taped to the top of the pipe every five 5 feet. No tracing wire length shall exceed 1,500 feet between air release valves and/or discharge manhole, where system becomes gravity, without terminating in a curb stop box marked with “Sewer”. Tracing wire must run continuously through air release valves and made accessible from ground level. Sanitary force mains that end in a discharge manhole, at which point system becomes gravity, shall terminate tracing wire in a curb stop box next to the discharge manhole. Curb stop boxes shall not be located in pavement areas. Splices in the tracing wire shall be kept to a minimum and approved by SD1. If splices are required, they shall be made with copper split bolt (Ilsco #1K-8 or approved equal) and taped with electrical tape. Tracer wire shall be tested to confirm it is functioning properly after installation.

2.11 PIPE COUPLINGS

A. For new pipe installation, transition between two differing pipe materials must be done at manhole terminations, unless another method is approved by SD1. For connections to existing sewers of differing pipe material, Frenco “flexible couplings” or equal shall be used.

B. For any other field cut connection, the pipe couplings shall be of a gasketed, sleeve-type with diameter to properly fit the pipe. Each coupling shall consist of one (1) stainless steel middle ring, of thickness and length specified, two (2) stainless steel followers, two (2) rubber-compounded wedge section gaskets and sufficient track-head steel bolts to properly compress the gaskets. 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. The coupling shall be Dresser, Style 38, as manufactured by Dresser Manufacturing Division, Bradford, PA, or equal.

2.12 WYE BRANCH FITTINGS AND LATERALS FOR NEW CONSTRUCTION

A. Tee or wye branch fittings shall be used for household or service connection lines to the sewer collector line. The fittings shall meet the requirements of the mainline pipe materials as specified herein. The wyes and tees shall be located as shown on the Contract Drawings or as directed by the ENGINEER. The wyes and tees shall be positioned as to require the least number of fittings per lateral connection. Regular wye connections shall be in accordance with Standard Drawing No. 120. Stack wye connections shall include vertical piping, elbows, wye, and concrete encasement in accordance with Standard Drawing No. 108. If a single sweep tee connection is used, the sweep must be in the direction of sanitary sewer main

B. Inserta Tee pipe fittings are permitted as an alternate lateral tap connection in lieu of wye fittings when main pipe nominal diameter is greater than 12” or on a case-by-case basis for new construction. Inserta Tee type shall be compatible for the pipe type be tapped. Contractor shall be responsible for supplying the proper Tee. Install Inserta Tees using procedures and equipment as referenced in the manufacturer’s written installation instructions and in accordance with Standard Drawing No. 102.

C. Lateral extensions shall be installed from the end of the regular or stack wye connection to the limit of easement or public right-of-way in accordance with Standard Drawing No. 120.

2.13 CONNECTIONS TO EXISTING SEWERS

A. Connections to existing public sewers shall be made at the nearest wye or tee available on the public sewer. Connections to existing sewers where wyes or tees are not available shall be made by one of the following methods:
   1. Install a wye or tee branch fitting per the manufacturer’s recommendations or an approved method by SD1.
   2. Inserta Tee Pipe Fittings: Install Inserta Tees using procedures and equipment as referenced in the manufacturer’s written installation instructions and in accordance with Standard Drawing No. 102.
   3. Tapping Saddles: Tapping saddles shall only be used with the explicit approval of SD1 on a case-by-case basis. If approved install per manufacturer’s recommendations.

2.14 STORM LATERAL CONNECTIONS

A. Roof downspouts, footing or foundation drains, and sump pumps shall discharge in accordance with the local governing subdivision regulations. All storm lateral connections (downspouts, footing or foundation drains, sump pumps, etc) to the storm sewer shall be prohibited unless explicitly reviewed and approved by SD1 due to uncommon circumstances (i.e. inadequate discharge distances from foundations, narrow side yards, etc).

PART 3 – EXECUTION

3.1 GENERAL

A. Contractor shall refer to Section 02220 Excavation and Backfill for all excavation, trench preparation, bedding and backfill requirements.

B. After being delivered alongside the trench, the pipe, fittings, and specials shall be carefully examined for cracks, soundness, or damage, or other defects while suspended above the trench before installation. No piece of pipe or fitting which is known to be defective shall 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. Before each piece of pipe is lowered into the trench, it shall be thoroughly cleaned out. Each piece of pipe shall be lowered safely and separately in the trench. 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.

C. The bell and spigot of the joint shall be thoroughly wire brushed and cleaned of dirt and foreign matter immediately prior to jointing. The contact surfaces shall be coated with the lubricant, primer or adhesive recommended by the manufacturer, and then the pipe shall be pushed together until the joint snaps distinctly in place. The pushing together of the pipe may be done by hand or by the use of a bar.

D. Place pipe to the grades and alignment indicated, runs of pipe between manholes shall be within 95% of the slope shown on the plans unless otherwise directed by the ENGINEER. Remove and relay pipes that are not laid correctly. Slope piping uniformly between elevations shown.

E. Trenches shall be kept dry during pipe laying. Before pipe laying is started, all water that may have collected in the trench shall be removed. Ensure that ground water level in trench is at least 12 inches below bottom of pipe before laying piping. Do not lay pipe in water. Maintain dry trench conditions until jointing and backfilling are complete and protect and keep clean water pipe interiors, fittings and valves.

F. All pipe shall be laid starting at the lowest point and proceed towards the higher elevations, unless otherwise approved by ENGINEER. Place bell and spigot pipe so that bells face the direction of laying, unless otherwise approved by ENGINEER.

G. When laying of the pipe is stopped, the end of the pipe shall be securely plugged or capped. Plugging shall prevent the entry of animals, liquids, or persons into the pipe or the entrance or insertion of deleterious material.
   1. Install standard plugs into all bells at dead ends, tees or crosses. Cap all spigot ends.
   2. Fully secure and block all plugs and caps installed for pressure testing to withstand the specified test pressure.
   3. Where plugging is required for phasing of the Work or for subsequent connection of piping, install watertight, permanent type plugs.

H. As required by SD1, pipe manufacturer for each pipe type used shall be present and instruct CONTRACTOR on proper installation technique per shop drawings and manufacturer's recommended procedures prior to the start of the Work.

I. Install piping as shown, specified and as recommended by the manufacturer. If there is a conflict between manufacturer's recommendations and the Drawings or Specifications, request instructions from SD1 before proceeding.

J. Deflections at joints shall not exceed 75% of the amount allowed by the pipe manufacturer.

K. Field cut pipe, where required, with a machine specially designed for cutting piping. Make cuts carefully, without damage to pipe or lining, and with a smooth end at right angles to the axis of pipe. Cut ends on push-on joint shall be tapered and sharp edges filed off smooth. Flame cutting will not be allowed.

L. Touch up protective coatings in a satisfactory manner prior to backfilling. See pipe material section for specific requirements.

M. Place concrete pipe containing elliptical reinforcement with the minor axis of the reinforcement in a vertical position.

N. Laying Pipe and Service Laterals
   1. Conform to manufacturer's instructions and requirements of the standards listed below, where applicable:
      a. Ductile Iron Pipe: AWWA C600, AWWA C105.
      b. Concrete Pipe: AWWA M9, Concrete Pipe Handbook.
      c. Thermoplastic Pipe: ASTM D 2774.
      d. ASCE Manual of Practice No. 37.

3.2 PIPE INSTALLATION – GENERAL

A. Excavation for Pipeline Trenches: Refer to Section 02220 Excavation and Backfill. Trenches in which pipes are to be laid shall be excavated to the depths shown on the Drawings or as specified by the ENGINEER. Minimum cover for all pipelines shall be 36 inches minimum cover as measured from top of pipe, unless otherwise shown on the Drawings or approved by the ENGINEER. Trench excavations maybe inspected by ENGINEER prior to laying pipe. Notify SD1 48 hours in advance of all

excavating, bedding and pipe laying operations.

B. Jointing: The types of joints described herein shall be made in accordance with the manufacturer's recommendations.

C. Separation of Sanitary Sewers and Potable Water Pipe Lines:
   1. Horizontal Separation:
      a. Wherever possible, existing and proposed potable water mains and service lines, and sanitary and storm sewers and service lines shall be separated horizontally by a clear distance of not less than 10 feet.
      b. If local conditions preclude a clear horizontal separation of not less than 10 feet, the installation will be permitted provided the potable water main is in a separate trench or on an undistributed earth shelf located on one side of the sewer and at an elevation so the bottom of the potable water main is at least 18 inches above the top of the sewer.
      c. Exception:
         1) Where it is not possible to provide the minimum horizontal separation described above, the potable water main must be constructed of cement lined ductile iron slip-on or mechanical joint pipe complying with the public water supply design standards of the governing agency. Sewer must be constructed of epoxy lined ductile iron slip-on or mechanical joint pipe complying with SD1's requirements.
   2. Crossings:
      a. Provide a minimum vertical distance of 18 inches between the outsides of pipes.
      b. Center one full length section of potable water main over the sewer so that the sewer joints will be equidistant from the potable water main joints.
      c. Provide adequate structural support where a potable water main crosses under a sewer to maintain line and grade.
      d. Exceptions:
         1) See requirements in 3.2C.1c.1) above.
         2) Concrete encase as directed by SD1.

D. Permanent slope anchors shall be installed on all pipe with slopes over20%. See the SD1's standard detail for Concrete Anchor Block. Consult with SD1 on spacing of the anchors.

E. Reaction Anchorage (Pressure Pipe Only):
   1. All tees, Y-branches, bends deflecting 11-1/4 degrees or more, and plugs which are installed in buried piping shall be provided with proprietary restrained joint systems for preventing movement of the pipe and joints caused by the internal test pressure.

F. Thrust Restraint
   1. Provide thrust restraint on pressure piping systems where shown and specified.
   2. Thrust restraint for DIP shall be accomplished by means of restrained pipe joints.

3. Thrust restraints shall be designed for the axial thrust exerted by the system design pressures as specified by the Design ENGINEER.

G. Dewatering and Ground Water
1. Discharging of sediment laden groundwater or rainwater from excavations directly to watercourses or storm sewers is prohibited. Failure of the CONTRACTOR to comply with the requirements of this specification may result in SD1 issuing a stop work order or non-approval of pay estimates until the CONTRACTOR puts measures in place to comply with this specification. All costs associated with the stop work or non-approval of pay estimates shall be at the CONTRACTOR's sole expense.
2. Pipe trenches and excavations for appurtenances shall be kept free from water during trench bottom preparation, pipe laying and jointing, pipe embedment and building of appurtenances in an adequate and acceptable manner.
3. Where the trench or excavation bottom is mucky or otherwise unstable because of ground water, or where the ground water elevation is above the bottom of the trench or excavation, the ground water shall be lowered by means acceptable to the ENGINEER to the extent necessary to keep the trench or excavation free from water while the trench or excavation is in progress. The discharge of ground water from the trench or excavation area shall be by the methods specified below to natural drainage channels, gutters, drains, or storm sewers which will conduct the water away from the trench or excavation area. Means of diverting any surface water away from the trench or excavation area shall be taken and surface water prevented from entering the trench or excavation area.
4. Dewatering equipment shall be provided to remove and dispose of all surface water and groundwater entering excavations, trenches, or other parts of the work. Each excavation shall be kept dry during sub grade preparation and continually thereafter until the structure to be built, or the pipe to be installed therein, is com-pleted to the extent that no damage from hydrostatic pressure, flotation, or other cause will result.
5. All excavations for concrete structures or trenches which extend down to or below groundwater shall be dewatered by lowering and keeping the groundwater level beneath such excavations a minimum of 6 inches or more below the bottom of the excavation.
6. Surface water shall be diverted or otherwise prevented from entering excavations or trenches to the greatest extent possible without causing damage to adjacent property.
7. Groundwater and rainwater removed during dewatering shall be discharged onto undisturbed ground where vegetative cover exists or through sediment and erosion controls and allowed to flow overland to filter out any sediments before discharging to any drain, storm sewer, or watercourse specified above. No such flows are permitted onto exposed soils, stream banks, or other areas subject to erosion.
8. Where overland flow on existing undisturbed ground is not sufficient to adequately remove all sediment from dewatering operations prior to discharge to any drain, storm sewer, or watercourse, or other erosion control measure acceptable to SD1 or ENGINEER shall be used to remove the sediment from the

water prior to discharge. The method of discharging ground water or rainwater from the trench or excavation area shall be such as to not create any erosion of existing ground.

9. All discharge locations shall be approved prior to construction by the ENGINEER and SD1.
10. CONTRACTOR shall take measures to prevent damage to properties, structures, sewers, and other utility installations and other work.
11. CONTRACTOR shall repair all damage, disruption, or interference resulting directly or indirectly from groundwater control system operations at no additional cost to SD1.
12. The CONTRACTOR shall maintain the components of the dewatering system and surface water erosion and sediment controls within the project site. Deficiencies identified during visual inspection by SD1, SD1's representatives, or the governing regulatory authority shall be remedied by the CONTRACTOR at no additional cost to SD1.
13. Dewatering system components shall be located where they will not interfere with construction activities adjacent to the work area.
14. The CONTRACTOR shall be responsible for the condition of any pipe or conduit which he may use for drainage purposes, and all such pipe or conduit shall be left clean and free of sediment.

H. Ground Water Barriers:
   1. Where specified, continuity of bedding material shall be interrupted by low permeability groundwater barriers to impede passage of water through the bedding. Groundwater barriers for all pipelines shall be soil plugs of 3 feet in thickness, extending the full depth and width of the pipe bedding material in the trench, and spaced not more than 400 feet apart. The soil plugs shall be constructed from soil meeting ASTM D2487 classification GC, SC, CL, or ML, and compacted to 95% of maximum density at or near the optimum moisture content (ASTM D698).

I. Pipe Encasements:
   1. Concrete Encasement
      a. Wherever pipe encasement is called for on the plans or ordered in by SD1, the CONTRACTOR shall construct the encasement as shown on the drawings or in accordance with SD1's Standard Drawings.
      b. Support the pipe sections on solid concrete blocks, being sure to keep the pipe sections on line and grade and then pour concrete, completely under each section, along each side and up to a point at least twelve (12) inches above the top of each section, making sure that all voids are filled. In lieu of blocks, the CONTRACTOR may use a bed of concrete, to initially support the pipe sections.
      c. The minimum dimension of concrete under the pipe sections shall be six (6) inches and on each side of the sections shall be twelve (12) inches. This encasement shall be reinforced around the top and sides of the pipe as shown on the Contract Drawings for creek crossings and other locations. If the trench walls are nearly vertical from the bottom of the trench up to a point to

which the encasement is to be poured, forms for forming the encasement may be omitted and the concrete poured to and against the trench walls. Where trench walls are not nearly vertical, proper forms shall be set for forming the encasement, unless otherwise called for by SD1. The space between the trench walls and any formed encasement shall be filled and compacted with approved pipe bedding or backfilling material.

d. Care shall be taken to assure that the pipe sections remain on line and grade during the placing of concrete and that the joints are not disturbed. Backfill shall not be placed for a minimum of six (6) hours after encasement is completed, unless otherwise approved by SD1.

e. Exercise care to avoid flotation when installing pipe in cast-in-place concrete.

2. Casing Pipe

a. Whenever casing pipe is called for on the plans, the CONTRACTOR shall install a casing pipe of the size and of the material called for on the plans by means of jacking, boring, or trenching.

b. When the casing pipe is to be installed under a highway or railroad, and at other locations specifically designated on the Drawings, the method of installation shall be jacking or boring as specified in Section 02400, unless trenching is specifically allowed.

1) For force mains inside casing pipe all pipe joints shall be restrained joint connections. Casing spacers shall be used to center the pipe in the casing. The annular space between the force main and casing pipe shall be completely filled with 500 psi or higher compressive strength grout.

2) For gravity pipe inside casing pipe, casing spacers shall be used to center the pipe within the casing. The annular space does not have to be filled.

c. Casing Spacers- Include in casing pipe. Centered/Restrained Casing spacers shall be installed to position the carrier pipe within the center of the casing pipe. The required spacing and installation shall be per the manufacturer's recommendation, except that for PVC carrier pipe, a minimum of 3 spacers shall be installed on each length of pipe with a maximum 6 feet spacing between spacers. All spacers shall be 316 stainless steel as manufactured by Cascade Waterworks MFG Co., Advance Products and Systems (APS) or other approved equal. Casing spacers shall also be provided with height field-adjustment capability for installation of gravity sewer on a constant slope.

d. Casing pipe end seals shall be installed at each end of the casing pipe and shall consist of a proper sized rubber seal and attached to the carrier and casing pipe with stainless steel bands per the manufacturer's recommendation. Casing pipe end seals shall be manufactured by Cascade Waterworks MFG Co., Advanced Products and Systems (APS) or other approved equal.

J. Work Affecting Existing Piping

1. Location of Existing Piping:

a. Locations of existing piping shown should be considered approximate.

b. CONTRACTOR shall determine the true location of existing piping to which connections are to be made, and location of other facilities which could be disturbed during earthwork operations, or which may be affected by CONTRACTOR'S Work in any way.
c. Conform to applicable requirements of Division 1 pertaining to cutting and patching, and connections to existing facilities.

2. Taking Existing Pipelines Out of Service:
   a. Do not take pipelines out of service unless specifically noted on the Drawings, or approved by SD1.
3. Work on Existing Pipelines:
   a. Cut or tap pipes as shown or required with machines specifically designed for this work.
   b. Install temporary plugs to prevent entry of mud, dirt, water and debris.
   c. Provide all necessary adapters, fittings, pipe and appurtenances required to complete the Work.

K. Install service laterals per SD1's standard details and per the requirements specified in this specification.

L. Bedding and backfilling of pipeline trenches shall be in accordance with the requirements set forth in Section 02220 Excavation and Backfill, and as shown on SD1's trench compaction detail.

M. Before final acceptance, the CONTRACTOR will be required to level all trenches or to bring the trench up to grade. The CONTRACTOR shall also remove from roadways, rights-of-way and/or private property all excess earth or other materials resulting from construction.

3.3 DUCTILE IRON PIPE INSTALLATION REQUIREMENTS

A. Jointing Pipe:
1. Ductile Iron Mechanical Joint Pipe:
   a. Wipe clean the socket, plain end and adjacent areas immediately before making joint. Make certain that cut ends are tapered and sharp edges are filed off smooth.
   b. Lubricate the plain ends and gasket with soapy water or an approved pipe lubricant, in accordance with AWWA C111, just prior to slipping the gasket onto the plain end of the joint assembly.
   c. Place the gland on the plain end with the lip extension toward the plain end, followed by the gasket with the narrow edge of the gasket toward the plain end.
   d. Insert the pipe into the socket and press the gasket firmly and evenly into the gasket recess. Keep the joint straight during assembly.
   e. Push gland toward socket and center it around pipe with the gland lip against the gasket.
   f. Insert bolts and hand tighten nuts.

g. Make deflection after joint assembly, if required, but prior to tightening bolts. Alternately tighten bolts 180 degrees apart to seat the gasket evenly. The bolt torque shall be as follows:

Pipe Size (inches)	Bolt Size (inches)	Range of Torque (ft-lbs)
3	5/8	45-60
4-24	3/4	75-90
30-36	1	100-120
42-48	1-1/4	120-150

2. Ductile Iron Push-On Joint Pipe:
   a. Prior to assembling the joints, the last 8 inches of the exterior surface of the spigot and the interior surface of the bell shall be thoroughly cleaned and all mud, debris, etc. removed and joint recesses wiped clean.
   b. Rubber gaskets shall be wiped clean and flexed until resilient. Refer to manufacturer's instructions for procedures to ensure gasket resiliency when assembling joints in cold weather.
   c. Insert gasket into joint recess and smooth out the entire circumference of the gasket to remove bulges and to prevent interference with the proper entry of the spigot of the entering pipe.
   d. Immediately prior to joint assembly, apply a thin film of approved lubricant to the surface of the gasket which will come in contact with the entering spigot end of pipe. CONTRACTOR may, at his option, apply a thin film of lubricant to the outside of the spigot of the entering pipe.
   e. For assembly, center spigot in the pipe bell and push pipe forward until it just makes contact with the rubber gasket. After gasket is compressed and before pipe is pushed or pulled all the way home, carefully check the gasket for proper position around the full circumference of the joint. Final assembly shall be made by forcing the spigot end of the entering pipe past the rubber gasket until it makes contact with the base of the bell. When more than a reasonable amount of force is required to assemble the joint, the spigot end of the pipe shall be removed to verify the proper positioning of the rubber gasket. Gaskets which have been scoured or otherwise damaged shall not be used.
   f. Maintain an adequate supply of gaskets and joint lubricant at the site at all times when pipe jointing operations are in progress.
3. Proprietary Joints:
   a. Pipe which utilizes proprietary joints such as Fastite, by American Cast Iron Pipe Company, Tyton by U.S. Pipe Incorporated, restrained joints, or other such joints shall be installed in strict accordance with the manufacturer's instructions.

B. Polyethylene Tube Wrap Installation

The polyethylene tube wrap shall be installed on ductile iron pipe in accordance with AWWA C105 and the following:

1. Pick up the pipe by a crane at the side of the trench using either a sling or pipe tongs, and raise the pipe about three feet off the ground. Slip a section of the polyethylene tubing over the spigot send of the pipe and bunch up, accordion

fashion, between the end of the pipe and the sling. The tubing should be cut to a length approximately 4 feet longer than the length of the pipe.

2. Lower the pipe into the trench, seat the spigot end in the bell of the adjacent installed pipe and then lower the pipe to the trench bottom. A shallow bell hole shall be provided in the trench bottom to facilitate the wrapping of the joint.
3. Make up the pipe joint in the normal fashion.
4. Remove the sling from the center of the pipe and hook into the bell cavity and raise the bell end 3 or 4 inches to permit the polyethylene tubing to be slipped along the full length of the barrel. Enough of the tubing should be left bunched up, accordion fashion, at each end of the pipe to overlap the adjoining pipe approximately 2 feet.
5. To make the overlap joint, pull the tubing over the bell of the pipe, fold around the adjacent spigot and wrap with approximately three (3) circumferential turns of the 2-inch-wide plastic adhesive tape to seal the tubing to the pipe.
6. The tubing on the adjacent pipe shall then be pulled over the first wrap on the pipe bell and sealed in place behind the bell using approximately three circumferential turns of the 2-inch plastic adhesive tape.
7. The resulting wrap on the barrel of the pipe will be loose, and it should be pulled snugly around the barrel of the pipe and the excess material folded over at the top, and held in place by means of 6-inch strips of the 2-inch-wide plastic adhesive tape at intervals of approximately 3 feet along the pipe barrel.
8. Fittings, valves, hydrants, etc., shall be hand wrapped, using polyethylene film that is held in place with the plastic adhesive tape.
    a. Bends, reducers, and offsets can be wrapped with the polyethylene tubing in the same manner as pipe.
    b. Valves can be wrapped by bringing the tube wrap on the adjacent pipe over the bells or flanges of the valve and sealing with a flat sheet of the polyethylene passed under the valve bottom and brought up around the body to the stem and fastened in place with the adhesive tape.
    c. Hydrants can be wrapped with polyethylene tubing slipped over the hydrant to encase the hydrant from the lead-in valve to the ground level of the hydrant. To provide drainage of the hydrant, it is necessary to cut a small hole in the film and insert a short pipe nipple to drain the water to the soil outside the film wrap.
    d. All fittings that require concrete backing should be completely wrapped prior to pouring the concrete backing block.

3.4 HDPE INSTALLATION REQUIREMENTS

A. Pipe Joining
    1. Joints between plain end pipes and fittings shall be made by butt fusion, and joints between the main and saddle branch fittings shall be made using saddle fusion using only procedures that are recommended by the pipe and fittings manufacturer.
    2. Butt fusion shall be performed between pipe ends, or pipe ends and fitting outlets, of like outside diameter and wall thickness (SDR or DR). Butt fusion jointing between like diameters, but unlike wall thickness, shall not be permitted.

Transitions between unlike wall thicknesses shall be made with a transition nipple (a short length of the heavier wall pipe with one end machined to the lighter wall) or by mechanical means.

3. Heat-joining of HDPE pipe shall conform to applicable portions of AWWA C-906.
4. HDPE pipe and fittings shall be joined together or to other materials by means of flanged connections (flange adapters and back-up rings) or mechanical couplings designed for joining HDPE pipe or for joining HDPE pipe to another material. Mechanical couplings shall be fully pressure-rated and fully thrust restrained such that when installed in accordance with manufacturer's recommendations, a longitudinal load applied to the mechanical coupling will cause the pipe to yield before the mechanical coupling disjoins. External joint restraints shall be used in lieu of fully restrained mechanical couplings.

B. Installation
1. Installation shall be in accordance with ASTM D 2321, manufacturer's recommendations, and this specification. All necessary precautions shall be taken to ensure a safe working environment in accordance with all applicable safety codes and standards.
2. Mechanical joints and flange connections shall be installed in accordance with the manufacturer's recommended procedure. Flange faces shall be centered and aligned to each other before assembling and tightening bolts. In no case shall the flanged bolts be used to draw the flanges into alignment. Bolt threads shall be lubricated, and flat washers shall be fitted under the flange nuts. Bolts shall be evenly tightened according to the tightening pattern and torque step recommendations of the manufacturer. At least one (1) hour after initial assembly, flange connections shall be re-tightened following the tightening pattern and torque step recommendations of the manufacturer. The final tightening torque shall be 100 ft.-lbs. or as recommended by the manufacturer.
3. Pipe shall be laid on grade and on a stable foundation in accordance with Section 02220 Excavation and Backfill.
4. When lifting with slings, only wide fabric choker slings shall be used to lift, move, or lower pipe and fittings. Wire rope or chain shall not be used.
5. CONTRACTOR shall be liable to correct any pipe installed off line or grade (whether by horizontal directional drilling or other means).

3.5 POLYVINYL CHLORIDE (PVC) GRAVITY PIPE INSTALLATION REQUIREMENTS

A. Push-on Joints
1. Bevel all field-cut pipe, remove all burrs and provide a reference mark the correct distance from the pipe end.
2. Clean the pipe end and the bell thoroughly before making the joint. Insert the O-ring gasket, making certain it is properly oriented. Lubricate the spigot well with an approved lubricant; do not lubricate the bell or O-ring. Insert the spigot end of the pipe carefully into the bell until the reference mark on the spigot is flush with the bell.

3.6 FIBERGLASS PIPE INSTALLATION REQUIREMENTS

A. Pipe Handling: Use textile slings, other suitable materials or a forklift. Use of chains or cables is not permitted.

B. Jointing:
   1. Clean ends of pipe and coupling components.
   2. Apply joint lubricant to pipe ends and elastomeric seals of coupling. Use only lubricants approved by the pipe manufacturer.
   3. Use suitable equipment and end protection to push or pull the pipes together.
   4. Do not exceed forces recommended by the manufacturer for coupling pipe.
   5. Join pipes in straight alignment then deflect to required angle. Do not allow the deflection angle to exceed the deflection permitted by the manufacturer.

3.7 SANITARY SEWER TESTING REQUIREMENTS

A. General:
   1. Test all piping.
   2. All piping shall be tested prior to post-construction CCTV operations.
   3. Notify SD1 at least 48 hours in advance of testing.
   4. Conduct all tests in the presence of SD1.
   5. Remove or protect any pipeline-mounted devices which may be damaged by the test pressure.
   6. Provide all apparatus and services required for testing, including but not limited to, the following:
      a. Test pumps, bypass pumps, hoses, calibrated gauges, meters, test containers, valves and fittings.
      b. Temporary bulkheads, bracing, blocking and thrust restraints.
   7. Provide air if an air test is required and power if pumping is required.
   8. CONTRACTOR shall provide fluid required for testing.

B. Force Mains Test Schedule:
   1. The required hydrostatic test pressures shall be as specified by the Design ENGINEER and approved by SD1.
   2. Unless otherwise specified, the required hydrostatic test pressures are at the lowest elevation of the pipeline.

C. Pressure Test Procedure for Force Mains:
   1. Complete backfill and compaction of entire pipe before testing, unless otherwise required or approved by ENGINEER.
   2. Fill section to be tested slowly with water and expel all air. Install corporation cocks, if necessary, to remove all air.
   3. Apply specified test pressure for two hours and observe pressure gage. Check carefully for leaks while test pressure is being maintained.
   4. A successful test shall be defined as zero drop in the specified test pressure during the two-hour testing period.

D. Displacement of Pipe
   1. The sewer pipe sections may be checked by SD1 to determine if any displacement of the pipe sections from alignment and grade have occurred as each portion of the sewer is completed between manhole locations. When the test is required by SD1, it shall be as follows:
      a. Flashing a light beam by means of a strong flashlight or reflecting sunlight through the portion of the sewer between manhole locations or by utilizing a laser beam.
      b. When viewed from the opposite end of the portion of the sewer from the light location, the light beam should be full throughout the sections, but not less than two-thirds full under any circumstances. There shall be no "dips" in the grade of the pipe invert.
      c. If the pipe sections show any misalignment, displacement or any other defects in the sections or joints, the CONTRACTOR shall remedy the defect to the satisfaction of SD1.
      d. This test may be done after the pipe sections have been laid, the joints completed and the bedding completed to 12 inches above the pipe sections, or after completion of the sewer and all backfilling has been undertaken or both.

E. Deflection of Pipe
   1. A deflection test shall be performed on all gravity sanitary sewers using flexible pipe. The test shall be conducted after the final backfill has been in place at least thirty (30) days. No pipe shall exceed a deflection of five percent (5%). The deflection test is to be run by using a rigid mandrel, or equal means approved by SD1, and shall have a diameter equal to ninety-five percent (95%) of the inside diameter of the pipe, including the pipe manufacturer’s tolerances. The test shall be performed without mechanical pulling devices. All tests must be witnessed and approved by a representative of SD1.

F. Air Test for Gravity Sewers 42” and Smaller
   1. The CONTRACTOR shall test the tightness of the pipe sections, joints and appurtenances of all gravity sewers by means of the low-pressure air test.
   2. No tests shall be made until the backfill is consolidated over the pipe and all service lines in the section to be tested have been connected and plugged.
   3. The low-pressure air test shall be conducted in accordance with procedures outlined in UNIBELL Specification UNI B-6. If the section of sewer being tested is below the elevation of ground water in the trench, the test pressure shall be 0.5 psi for each foot of ground water above the invert of the pipe.
   4. All tests must be witnessed and approved by a representative of SD1.
   5. Any leaks determined from the air test shall be fixed by the CONTRACTOR using an SD1 approved method.
   6. The minimum air test pressure for all gravity sewers shall be 4 psi.

G. Individual Pipe Joint Testing for Gravity Sewers 48” and Greater.
   1. The CONTRACTOR shall test each individual joint of the gravity sewers using the following procedure:

a. Center the joint tester over the joint. Using the manufacturers approved testing apparatus and other recommendations, Inflate the outer element filling the center of the joint tester cavity with water or air, dependent upon test used, until it flows evenly from the bleed off valve, which removes air from the outer cavity. The bleed off valve shall be located at the top of the joint tester assembly. Close the bleed –off valve and pressurize the cavity to 3.5 to 5.5 psig depending on groundwater back pressure. Allow pressure to stabilize for 10 to 15 seconds and turn off pressure source. If pressure holds or drops less than 1 psi for 1 minute the joint is acceptable. The pressure gage used shall read in one (1) psi increments.

3.8 STORM SEWER TESTING REQUIREMENTS

A. Pipe shall be fully backfilled and compacted at least 30 days prior to testing.

B. Deflection: Under normal circumstances, the CONTRACTOR shall test approximately 20% of all flexible storm sewer piping, as determined and at locations directed by SD1, by use of a calibrated mandrel or other device/method approved by SD1, to ensure that no pipe deflection has occurred greater than 5% of the inside diameter of the pipe. If, however, SD1 determines additional deflection testing is required based on the condition of the system or other circumstances, SD1 reserves the right to require such testing at no additional cost to SD1. The CONTRACTOR shall test the entire length of the sewer installed from structure to structure. Any pipe section exhibiting greater than 5% deflection shall be repaired in a manner approved and acceptable to SD1 and retested, at no additional cost to SD1. If the pipe fails a second deflection test, the pipe shall be replaced and retested at no additional cost to SD1.

C. Displacement: Storm sewer pipe sections may be checked by SD1 to determine if any displacement of the pipe sections from alignment and grade has occurred as each portion of the sewer is completed between structure locations. When the test is performed, it shall be as follows:
   1. Flashing a light beam by means of a strong flashlight or reflecting sunlight through the portion of the sewer between structure locations or by utilizing a laser beam.
   2. When viewed from the opposite end of the portion of the sewer from the light location, the light beam should be full throughout the sections, but not less than two-thirds full under any circumstances. There shall be no "dips" in the grade of the pipe invert.
   3. If the pipe sections show any misalignment, displacement or any other defects in the sections or joints, the CONTRACTOR shall remedy the defect, at the CONTRACTOR’S sole cost, to the satisfaction of SD1.

3.9 REPAIR OF FAILED PIPE SECTIONS

A. If a pipe section failed testing as outlined in Section 02610 3.7 & 3.8, the Contractor shall repair the failed pipe sections as follows:
   1. Contact SD1 24 hours prior to making any repairs to failed pipe sections. SD1 shall be present during the entire duration of time repairs are being made to failed sections of pipe.
   2. The CONTRACTOR shall remove and replace, at no extra cost to SD1 all sections of pipe which fail any of the tests specified in this section in accordance with the following procedures:
      a. Excavate failed sections of pipe in accordance with Section 02220 Excavation and Backfill.
      b. Cut out and/or remove failed sections and relay new pipe beginning at nearest joint.
      c. Close pipe with pipe coupling per manufacturer's recommendation and approval of SD1.
   3. The CONTRACTOR shall provide all material, labor, and equipment necessary to remove and replace the failed pipe section.
   4. Retest the replaced sewer sections to meet the applicable requirements listed in Section 02610 3.7 & 3.8.

3.10 PIPE ABANDONMENT

A. Pipe abandonment in non-paved roadway:
   1. Pipe abandonment under non-paved roadways shall be as outlined in SD1 Standard Detail No. 107 (SD-107). Ends of pipe shall be filled with minimum of 1' of concrete.

B. Pipe abandonment in paved roadway:
   1. Pipe abandonment under paved roadways shall consist of completely filling the designated pipes with controlled density fill (CDF), grout or other approved materials. Appreciable deposits of debris shall be removed from other pipes prior to placement of CDF, grout or other approved materials. Pipes under roadways shall be filled completely

C. On Pipe abandonment in for manholes that remain, re-work bench to eliminate invert.

3.11 CLEANING FOR SEWERS

A. Cleaning:
   1. Thoroughly clean all piping and flush in a manner approved by ENGINEER, prior to placing in service.

3.12 CLEAN-UP

A. Upon completion of the installation of the piping and appurtenances, the CONTRACTOR shall remove all debris and surplus construction materials resulting from the work. The CONTRACTOR shall grade the ground along each side of pipe trenches in a uniform and neat manner leaving the construction area in a shape as near as possible to the original ground line. Refer to Section 02900 Landscaping, for restoration.

++ END OF SECTION ++

SECTION 02651

TELEVISION INSPECTION

PART 1 – GENERAL

1.1 DESCRIPTION

A. Scope:
   1. CONTRACTOR shall provide all labor, materials, tools, equipment and incidentals as shown, specified, and required to perform Post-Installation television (TV) inspection of all sanitary and storm sewers, as specified herein.

1.2 DEFINITIONS

A. Post-Installation TV Inspection: Video inspection to determine that rehabilitation of an existing sewer or construction of new sanitary and/or storm sewers have been completed according to Specifications.

1.3 PERFORMANCE REQUIREMENTS

A. Inspection shall be done one sewer line section (i.e. manhole-to-manhole) at a time.

B. Quality of inspection recording shall be acceptable to SD1 when viewed on a 19" monitor.

C. Inspection shall be performed by a SCREAM™ or NASSCO *Pipeline Assessment Certification Program* (PACP) certified operator and shall meet the coding and reporting standards and guidelines as set by SCREAM™ or PACP. All report annotations, pipe conditions and pipe defects shall be identified properly using SCREAM™ or PACP codes as defined by SCREAM™ or NASSCO.

1.4 SUBMITTALS

A. Submit one copy of Electronic Inspection Reports and TV videos on portable hard drive, CD, DVD, or other digital media.

1.5 REFERENCE STANDARDS

A. NASSCO prepared *Pipeline Assessment and Certification Program* (PACP), Current Edition Reference Manual. This manual includes a standard TV inspection form and sewer condition codes.

PART 2 – PRODUCTS

2.1 TELEVISION EQUIPMENT

A. Closed Circuit TV Equipment: Select and use closed-circuit television equipment that will produce a color digital recording.

B. Pipe Inspection Camera: Produce a video using a pan-and-tilt, radial viewing, pipe inspection camera or a hand-held video camera that pans ± 275 degrees and rotates 360 degrees. Use an accurate footage counter to measure the exact distance of the camera from the centerline of the starting point. Use a camera with camera height adjustment so that the camera lens is always centered at one-half the inside diameter, or higher, in the pipe being televised. Provide a lighting system that allows the features and condition of the pipe to be clearly seen. A reflector in front of the camera may be required to enhance lighting in humidity conditions. The camera shall be operative in 100% humidity conditions. The camera, television monitor and other components of the video system shall be capable of producing a minimum 500-line resolution colored video picture. Picture quality and definition shall be to the satisfaction of the ENGINEER. If unsatisfactory, equipment shall be removed and no payment made for an unsatisfactory inspection.

C. Television Inspection Logs: Prepare printed location records to clearly identify the location of each source of infiltration or defect discovered using a standard stationing system. Other data of significance includes:
   1. Estimation of extraneous flows observed from holes, joints, cracks, and from the annular space between rehabilitated sliplined pipe.
   2. Unusual conditions.
   3. Roots.
   4. Cracked or collapsed sections.
   5. Sags or low spots in the pipe.
   6. Presence of scale and corrosion.
   7. Structural deficiencies.
   8. Signs of previous leakage.
   9. Sewer line sections that the camera failed to pass through and reasons for the failure.
   10. Other discernible features.

D. For off-road work, CONTRACTOR shall provide the appropriate vehicle(s) for the terrain in order to access the sewers and allow for proper inspection of the sewers and manholes.

E. Data shall be recorded digitally and a copy of the television inspection logs shall be supplied to the OWNER or ENGINEER in the form of a bound report. A table listing acronyms and their meaning shall be included in the report. CONTRACTOR shall also supply the OWNER a copy of the television inspection logs on an electronic file that is Microsoft Excel compatible.

F. Video Capture - Full time live color video files shall be captured for each pipe segment inspected. The files shall be stored in industry standard MPEG format viewable from an external hard drive on an external personal computer that utilizes a standard digital media player to view the recording. The MPEG video shall be ISO-MPEG Level 1 (MPEG-1) coding with a resolution of at least 352 pixels (x) by 240 pixels (y) and an encoded frame rate of 29.97 frames per second. System shall perform an automatic disk image/file naming structure to allow saved video/data sections to be saved to a

portable hard drive. The video recording shall be free of electrical interference and shall produce a clear and stable image. The digital recordings and inspection data shall be cross-referenced to allow instant access to any point of interest within the digital recording.

PART 3 – EXECUTION

3.1 POST INSTALLATION TELEVISION INSPECTION

ALL NEWLY CONSTRUCTED SEWERS SHALL BE CLEANED AND FREE FROM DEBRIS PRIOR TO PERFORMING THE POST INSTALLATION TELEVISION INSPECTION. THIS COST SHALL BE CONSIDERED INCEDENTAL TO THE POST INSTALLATION TELEVISION INSPECTION.

A. Televise each sewer line to document the structural and maintenance conditions of the line. The sewer inspections shall be compatible with the SCREAM™ defect coding system for sewers and manholes, which is SD1's standard defect coding system. The CONTRACTOR shall either use the SCREAM™ sewer defect coding system or SD1 will allow the CONTRACTOR to use an industry standard defect coding system, such as NASSCO PACP in lieu of using the SCREAM™ sewer defect codes, to conduct the sewer inspections.

The following data for the defect observations shall be recorded:

- Observation Data
- Observation#, unique per defect
- Footage
- Clock position (1 – 12)
- Defect/Description (use code)
- Comments

B. In addition to recording the defects for the sewers and manholes, CONTRACTOR shall also record the following attribute data as "fields" in their inspections:

- Upstream MH#
- Downstream MH#
- Date of inspection
- Direction of inspection
    - 1 = upstream to downstream
    - 2 = downstream to upstream
- Length of pipe (as noted by last observation footage)
- Diameter/height (inches)
- Shape (use shape code or text)
- Material (use pipe material code or text)
- Pipe width, non-circular (inches)
- Crew
- Video (name as USMH_DSMH_Direction_date.mpg)
- Comments

C. Immediately after cleaning, televise the sewer line to document its condition and to locate existing points of infiltration or other defects. Notify the OWNER and ENGINEER 24 hours in advance of any TV inspection so that the OWNER and ENGINEER may observe inspection operations.

D. Perform TV inspection of the sewer as follows:
   1. A NEW inspection shall be started where a manhole, junction, or diversion chamber is located. This includes new manholes, junctions, or diversion chambers identified in the field, but not previously identified in SD1 mapping. Therefore, no manholes, junctions, or diversion chambers shall be at a midpoint of an inspection log, only at the beginning and the end of each inspection. Inspection runs shall begin and end at manholes or junctions unless an obstruction is encountered. Lateral connections from inlets/catch basins, material changes or breaks in grade are not approved locations to begin/end an inspection. Said features shall be logged on the recording. If CONTRACTOR uses a lateral connection from inlets/catch basins, material changes or breaks in grade as a begin/end point for televising, SD1 will reject said segment and the sewer data shall be reorganized to match the data requirements at no additional cost to SD1.
   2. Perform Survey TV Inspection immediately after cleaning.
      a. Move the camera through the line in either direction at a uniform rate not exceeding 30 feet per minute, stopping when necessary to ensure proper documentation of the sewer's condition. The intent is to perform the inspection per the NASSCO and SCREAM™ standards. It may be necessary for a lower rate of speed depending on the defects encountered.
      b. Use manual winches, power winches, TV cable and powered rewinds or other devices that do not obstruct the camera view or interfere with proper documentation of the sewer conditions to move the camera through the sewer line.
      c. Quantify visible leakage of extraneous flow into the sewer or other sags or defects in the sewer and record on electronic log and audio videotape. The video recording may be paused during observation. Record results of the flow observed on videotape and inspection logs.
   3. Perform Post-Installation TV Inspection to confirm completion of rehabilitation work or proper installation of new sewers. Verify that the rehabilitation work or new sewer construction conforms to the requirements of the Specifications. Provide a color, digital recording showing the completed Work. Prepare and submit a log providing location of any discrepancies.
   4. Camera shall pan beginning and ending manholes to demonstrate that all debris has been removed. Camera operator shall slowly pan clamped joints, and when pipe material transitions from one material to another. A log shall be completed for every segment that is submitted to the OWNER.
   5. Inspections shall be from center of the starting manhole to the center of the ending manhole. Distances along the pipe should be measured from the center of the upstream manhole. Measurement meters shall be accurate to the nearest foot per 100 feet of sewer being televised within the particular section of pipe (section of pipe being defined as the length of pipe between the upstream and downstream MHs). Prior to recording the location of defects and service connections, slack

in the cable of the television inspection camera shall be taken up to assure metering device is designating proper footage. Accuracy of the measurement meters shall be checked daily by use of a walking meter, roll-a-tape, or other suitable device.

6. Center the camera in the middle of the pipe.
7. Stop at every defective joint for a time long enough to properly assess and code the defective joint. Pan and tilt to observe and document areas of apparent deteriorated pipe surface.
8. Stop at every lateral connection. Center the camera so that the lighting and the pan and tilt view can be used to inspect as far into the lateral connection as possible. Record all defects found in the service connection. Observe top, bottom and sides of lateral connections. Where lateral flow is observed, observe flows from service connections for a length of time long enough to ascertain if the flow is sanitary or extraneous flow. The video recording may be paused during observation. Record results of the flow observed on the inspection. The inspection of the service lateral itself is not to be performed as part of the sewer mainline inspection.
9. TV inspection recordings shall be continuous for each pipe segment.
10. CONTRACTOR is responsible for adjusting light levels, cleaning fouled or fogged lenses, and allowing vapor to dissipate from camera lights in order to produce acceptable recordings.
11. Sewer inspections not meeting the requirements set forth in this specification as determined by SD1 shall be re-performed at no additional cost to SD1 until the inspection meets to SD1's satisfaction.
12. CONTRACTOR shall complete the post-installation CCTV within 30 days after the acceptance of the Mandrel test.

3.2 FLOW CONTROL

A. No flow will be allowed in the line while performing Post-Installation TV Inspection.

3.3 ACCEPTANCE OF WORK

A. Rehabilitation or completion of new sewer installation work shall only be accepted if no defects are found in the line upon TV inspection as determined by the OWNER.

B. Contractor shall repair all defects to the piping in a manner acceptable to the OWNER at no additional cost to the OWNER.

3.4 INSPECTION DELIVERABLES

A. Pipe inspection logs shall be submitted as specified in 2.1.

B. The CCTV videos shall be provided as specified in 2.1.

C. All videos shall be divided into separate files for each manhole-to-manhole segment.

D. Digital Inspection Recordings

1. Provide digital inspection recordings. Inspection recordings must be viewable on a standard 19" computer monitor.
2. Recording shall be of a quality sufficient for the ENGINEER to evaluate the condition of the sewer and manholes, locate the sewer service connections, and verify cleaning. If SD1 determines that the quality is not sufficient, CONTRACTOR shall re-televise the sewer segment and/or re-inspect the manhole and provide a new recording and report at no additional compensation. Camera distortions, inadequate lighting, dirty lens, or blurred/hazy picture will be cause for rejection.
3. Multiple project areas may be included on a given submittal, but the files must be organized in individual project folders. Each pipe segment must be its own electronic file. Electronic recording file must allow snap scrolling to allow easy and quick access of the entire recording.
4. Each submittal must have a file index whose name contains the pipe segment reference number.
5. Label each submittal with the following information:
    a. Pipe Segments
    b. CONTRACTOR's Name
    c. Project Name
    d. Contract Number
    e. Inspection Type
    f. Date Televised

++ END OF SECTION ++

SECTION 02760

SEWER CLEANING

PART 1 – GENERAL

1.1 DESCRIPTION

A. CONTRACTOR shall provide all labor, materials, tools, equipment and incidentals as shown, specified, and required to clean the sewers and manholes as specified in contract documents.

B. The cleaning work required includes, but is not limited to, the following:
   1. Cleaning of sewers.
   2. Cutting of roots and grease from existing sanitary sewers.
   3. Removal of debris from the sewer.
   4. Disposal of material at a suitable facility.
   5. Cleaning up as the project progresses and after the completion of all project activities.
   6. All other work required for the complete and satisfactory cleaning of the sewer.

1.2 DEFINITIONS

A. Cleaning – work effected using water jets (at flow rate, pressure and rate of travel appropriate for the size of pipe), mechanical cutting devices, or other equipment, such as bucket machines, etc., to scour and remove debris, roots, grease, etc. from pipe and manhole. Cleaning includes personnel confined space entries as needed to eliminate any point issues over the length of the segment such as but not limited to boulders, root balls and heavy deposits such as those that cannot be removed by vacuum and/or pumping equipment.

1.3 RELATED SPECIFICATION SECTIONS

- Section 01025, Measurement and Payment
- Section 01570, Maintenance and Protection of Traffic
- Section 02651, Television Inspection

1.4 GENERAL PRECAUTIONS

A. CONTRACTOR shall be aware that the Contract requires work in active sewers and shall follow all federal, state and local requirements for safety in confined spaces.

B. The CONTRACTOR shall be solely responsible for safety during the performance of all work. The CONTRACTOR shall not enter any sewer segment where hazardous conditions may exist until such time as the source of those conditions is identified and eliminated by the CONTRACTOR and/or Owner. CONTRACTOR shall perform all work in accordance with OSHA confined space entry regulations and the project specific Site Safety Plan. The CONTRACTOR shall coordinate its work with all local

fire, police and emergency response authorities.

C. CONTRACTOR shall take precautions to protect sewer mains and manholes from damage that might be inflicted by the improper selection of the cleaning process or improper use of equipment. Pre-Cleaning inspection revealed some segments where structural defects that may make the pipe susceptible to damage in the course of certain cleaning operations. CONTRACTOR is responsible for identifying such situations and adjusting cleaning methods accordingly. CONTRACTOR is responsible for restoration or repair of any facility, public or private, which is damaged by CONTRACTOR actions.

D. When using hydraulically propelled devices, CONTRACTOR take precautions to ensure that the water pressure created does not cause damage or flooding to public or private property.

E. CONTRACTOR will not surcharge the sewer beyond the elevation that could cause overflow of sewage into area waterways, homes, buildings, or onto the ground.

1.5 SUBMITTALS

A. The Selected CONTRACTOR will submit two copies of each of the following for District review prior to commencing work:
   1. CONTRACTOR must submit information on the proposed licensed disposal facility and waste hauler, if used. The CONTRACTOR shall select landfills that are established, fully operational, and in compliance with all applicable Federal, State and local regulations. The District currently uses the Rumpke facility in Campbell County. The information for the selected facility or facilities shall include the following:
      - Facility name
      - Address
      - Name and title of contact person
      - Telephone number of contact person
   2. A work plan, including description of proposed methods and equipment to be used for execution of this work. The description of sewer cleaning equipment must include performance data on pumps, hose diameter and length, tank capacity, and intended nozzles, root cutters and equipment for mechanical removal of debris to be employed. Provide a detailed sequence of cleaning operations, including cleaning process, schedule of activities, references where the CONTRACTOR has used the identified cleaning method successfully in the past and a list of actions the CONTRACTOR plans to take in order to mitigate the impact of cleaning operations on the public.
   3. Valid waste disposal permit as issued by the licensed disposal facility or facilities used.

4. Plan and description of Water Source that will be used. Hydrant use will require the appropriate permits, certified hydrant meter, and backflow preventer from the appropriate water authority. Copies of the approved permits shall be submitted to the District. All associated costs of permits shall be included in the cost of cleaning. The following contact information can be used to gain access to water in the various areas:

   Northern Kentucky Water District (NKWD) –**859-578-9898**

   a. All fire hydrant permit connections shall be properly metered and shall have proper backflow protection. Metering devices and backflow prevention devices shall be furnished by the District and obtained at the issuance of permit. No Fire Hydrant Permit shall be issued for a period of more than 30 days without renewal. No Fire Hydrant Permit shall be issued for construction purposes where a permanent service will be required at a future date.
   b. Hydrant Usage Deposit - A refundable deposit shall be placed with the Water District, from which any charges shall be deducted for damages and unbilled water, and the balance returned to the holder of the permit.

      Deposit Charges are as follows:
      1 to 5 days = $250.00
      5 to 30 days = $1,000.00

      Each Fire Hydrant Permit will require a daily fee. The daily fee is as follows:

      1" meter assembly with 5/8" outlet = $15.00 per business day
      3" meter assembly with 2 %I1 outlet = $30.00 per business day

B. On a weekly basis the CONTRACTOR will submit the following:
   1. Television inspection deliverables to be reviewed by DISTRICT for all sewers cleaned the previous week, see Section 02651 Television Inspection.
   2. Volume of debris removed from pipe segments
   3. Records of transportation and disposal (including weigh tickets and disposal receipts) shall be submitted to the District with each request for payment
   4. Daily work logs describing the work location, work times, labor and equipment used, and work progress

1.6 QUALITY ASSURANCE

A. Refer to Field Quality Assurance as specified herein

B. CONTRACTOR shall provide all data including files, software programs, and hardware devices compatible with the District's information systems as per Section 02651 Television Inspection.

C. If, following submittal of television documentation as per Section 02651 Television Inspection, cleaning of any segment is found to be inadequate, the CONTRACTOR shall perform additional cleaning at no cost to the District. If the CONTRACTOR does not remedy to the District's satisfaction within 30 days, payment will be withheld and the District reserves the right to cancel the contract.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 GENERAL

A. The CONTRACTOR shall provide all equipment necessary for the proper high pressure water jetting, rodding, bucketing, brushing, and flushing of the sewers.

B. CONTRACTOR shall notify the District on a daily basis where the CONTRACTOR will be working in advance of any cleaning so that the District staff knows the locations of the CONTRACTOR's crews and may observe operations.

C. Pre-cleaning inspections are required to determine the necessary scope for cleaning. **All pre-cleaning inspections will be submitted a minimum of 30 days prior to the start of cleaning.** The OWNER will work with the CONTRACTOR to determine if cleaning is to be required in each segment. The CONTRACTOR will provide the submittals outlined in 1.4.

D. The sewer shall be cleaned with a method acceptable to the District. Cleaning techniques shall result in removal of grease, sediment, roots and debris from the sewer, including all loose particles and unstable or unsound materials. If the cleaning method employed is insufficient to achieve desired results, sewers shall be cleaned using other means acceptable to the District at no additional cost.

E. After the cleaning is completed each pipe shall be inspected using CCTV/SONAR (Section 02651 Television Inspection) and documentation submitted to confirm that it has been cleaned properly and all collected debris has been removed. This inspection shall be logged as a separate inspection record for each pipe. This documentation will be used by the District to confirm cleaning and determine payment. See Section 02651 Television Inspection and 1.6C.

F. The CONTRACTOR shall use extreme caution during cleaning operations to avoid injury to workers, and damage or collapse of sewer sections.

G. Cleaning of upstream reaches of sewers shall be completed before the downstream reaches are cleaned.

H. Cleaning equipment shall be inserted in the downstream manhole of a given reach and the collected debris shall be pulled downstream. Without prior approval, no material is to pass to adjacent pipe segments. A reverse setup (cleaning a segment from its upstream manhole) will be employed if attempts at cleaning from the downstream side

are unsuccessful because pipe conditions preclude the passage of equipment. A reverse setup also may be employed without first cleaning from the downstream manhole if the CONTRACTOR feels there is justification to do so (for reasons of access, for example). In such cases, the CONTRACTOR will present evidence for this approach and seek permission from the DISTRICT prior to proceeding.

I. Winching equipment used shall be rigged so as not to damage the existing pipeline or manholes.

J. Any blockages of lateral building connections resulting from the cleaning or other items of Work shall be removed by cleaning of the building connection by CONTRACTOR at no additional compensation. Any damage caused by flood of lateral building connections shall be corrected by CONTRACTOR at no additional compensation.

K. CONTRACTOR shall provide all flushing water required for the cleaning of sewers either by truck or by an agreement with the potable water system entity. CONTRACTOR shall be required to provide copies of all permits obtained to use local hydrants. All water used for cleaning must be acquired lawfully. The CONTRACTOR also bears all responsibility of conveying the water to and around the work site. The costs associated with this requirement shall be considered incidental to the cleaning unit price of the specified diameter.

L. The CONTRACTOR's materials shall not be allowed to wash down into the sewer system. Any material removed from the pipeline resulting from the CONTRACTOR's activities shall be handled and disposed of as debris. Material will not be allowed to accumulate in grit pits. Grit pits shall be cleaned to ensure that flow is not inhibited.

M. The debris to be removed may vary in consistency and type, and may include any combination of small grit-like particles, silty or sandy materials, soft organic materials, cobble size pieces, rope, wire, brick, large bulky items and concrete objects and other items not yet identified.

N. CONTRACTOR shall clean associated manholes, benches, and drop connections.

3.2 REMOVAL OF DEBRIS

A. All sludge, dirt, sand, rocks, grease, roots, and other solid or semisolid material resulting from the cleaning operation shall be removed at the downstream structure of the section being cleaning (unless a reverse setup is employed). Passing material from structure to structure, which can cause line stoppages, accumulations of sand in wet wells or damage to pumping equipment, shall not be permitted. All debris removed shall be measured by cubic yard and submitted with the weekly submissions. The discharge and drainage stream shall be returned to the sewer and discharged downstream for disposal. Under no circumstances shall sewage or solids be dumped onto the ground surface, street, stream, ditches, catch basins, or storm drains. All solids and semi-solids shall be placed in a watertight container so that no spillage or leakage will occur, covered to minimize odors, and disposed by CONTRACTOR.

CONTRACTOR is responsible for all operations and costs associated with removal, transportation, and disposal of debris collected during the cleaning operations.

3.3 FIELD QUALITY ASSURANCE

A. CONTRACTOR shall provide daily logs upon request and notify the District immediately of any existing field conditions considered out of the scope of this project or potentially damaging to the sewer system.

B. CONTRACTOR shall notify the District immediately of any damage to the existing sewer, as a result of the cleaning operation, that may cause partial or complete collapse of the sewer.

C. Refer to 3.4 Inspection Deliverables.

3.4 CLEANING EQUIPMENT

A. The CONTRACTOR shall:
   1. Furnish all equipment, materials, pumps and incidentals required to execute the work as specified herein, and in full compliance with all regulatory requirements.
   2. Provide personnel with personal protective equipment and protective clothing consistent with the CONTRACTOR's Safety, Health, and Emergency Response Plan as approved by the District.
   3. Preformed cleaning using equipment appropriate for the project and approved by the District.

3.5 CLEANING

A. The CONTRACTOR shall select cleaning equipment which best suits the condition of the pipelines to be cleaned at the time the Work commences.

B. The CONTRACTOR shall use properly selected equipment to remove all sediment, sand, rock, roots, grease and other deleterious material and obstructions from the pipelines.

C. Cleaning, as defined in 1.2A, shall be performed. Cleaning shall be paid for under the contract unit price per linear foot (of the specified diameter). Cleaning shall be performed with caution in order to prevent damage to the pipe. After the cleaning is completed, the pipe shall be inspected following the specifications of Section 02651 Television Inspection to confirm that it has been cleaned properly and all debris has been removed.

D. CONTRACTOR shall provide appropriate screening to stop passing of materials into downstream sewers. All solid or semisolid materials dislodged during cleaning operations shall be removed from the sewer by CONTRACTOR at the downstream manhole or grit pit of the sewer section being cleaned, unless a reverse setup is employed. These materials shall become the property of the CONTRACTOR, shall be removed from the site at the end of each workday, and shall be disposed of in a lawful

manner by CONTRACTOR in accordance with 3.6 Debris Disposal.

E. The passing of dislodged materials downstream of the sewer segment being cleaned shall not be permitted without prior approval of the District. Should such an event occur without the District's prior approval, as observed or detected by the District or any disinterested party, the CONTRACTOR shall be responsible for cleaning the affected downstream sewers in their entirety, at no additional cost to District.

F. The CONTRACTOR shall protect all existing sewers from damage caused by improper use of cleaning equipment. Pipelines damaged by the CONTRACTOR's cleaning activities or equipment shall be repaired by the CONTRACTOR at no additional cost to the District.

G. Mechanical Cleaning Equipment
   1. Bucket machines shall be in pairs. Machines shall be belt operated or have an overload device. Machines with direct drive which could cause damage to the pipe are not acceptable.
   2. Self-propelled equipment for moving sediment inside the pipeline will be permitted, but the CONTRACTOR is responsible for any damage such equipment causes.

3.6 DEBRIS DISPOSAL

A. All dirt, debris, roots, and other material removed from the sewers during cleaning operations shall become the CONTRACTOR's property. This debris shall be removed from the site and disposed at a facility licensed to accept such waste. The CONTRACTOR shall control odor by keeping the storage containers, trucks, and handling equipment clean and by using watertight hauling containers. Wastewater from cleaning operations shall be properly disposed.

B. The CONTRACTOR shall handle, haul, and dispose of debris at a certified solid waste landfill per local, state and federal requirements. The CONTRACTOR shall also arrange and pay for the testing of debris to meet all landfill, local, state and federal requirements.

C. At the point where debris is removed from the sewer, provide suitable containment such that sediments, debris, and other unsatisfactory material are not washed down into the sewer system. The CONTRACTOR shall provide suitable means to contain and dispose of any sewage runoff which may leach from debris containment.

D. The CONTRACTOR shall dewater the liquid from the debris in a closed container for 12 hours or more prior to removing the debris from the work area. The dewatered liquid may be returned to the local sewer or taken to the WWTP by a tanker truck specifically designed for sewage hauling.

E. If sewage is spilled, discharged, leaked, or otherwise deposited in the open environment, the CONTRACTOR shall be responsible for any clean-up and disinfection of the affected area.

3.7 MANHOLE CLEANING

A. CONTRACTOR shall wash the wall, bench, and rungs of the manholes to remove accumulated debris, sediment, grit, etc. from the cleaning operation, as needed.

3.8 SEWER REPAIR

A. CONTRACTOR shall repair any damaged caused by the cleaning operation at their cost. The materials and techniques used to affect the repair will be approved by the District prior to the repair work.

3.9 ACCEPTANCE

A. Cleaning shall restore a minimum of 95% of the original pipe height throughout the length and circumference of the cleaned segment. Nowhere along the length or circumference of any cleaned segment will any silt or debris protrude more than 5% of the original pipe height into the pipe. All attached deposits shall be removed. Roots shall be cut down to the barrel of the pipe. The sewers shall be adequately cleaned to provide unobstructed view of the entire pipe by CCTV/SONAR equipment to discern pipe condition. The Owner will make the final determination if a pipe section is cleaned to acceptable levels. In the event that a pipe section is not accepted, the CONTRACTOR will be responsible to reclean the line to meet the requirement and re-televise at no additional cost to the Owner within the time allotted by these cleaning specifications.

B. If cleaning is found to be inadequate and the CONTRACTOR does not respond or remedy within 30 days, payment will be withheld and the District reserves the right to cancel the contract.

++ END OF SECTION ++

SECTION 02900

LANDSCAPING

PART 1 – GENERAL

1.1 DESCRIPTION

A. Scope:
1. CONTRACTOR shall provide all labor, materials, equipment and incidentals as shown, specified and required to furnish and perform landscaping Work.
2. The extent of the landscaping Work shall be performed as shown and includes establishment of turf for all areas disturbed during the Work.
3. The types of landscaping Work required include the following:
   a. Topsoil stockpiled for reuse.
   b. Topsoil from off-site sources if topsoil stockpiled is insufficient to complete the Work of this Section.
   c. Lawn areas.
   d. Maintenance Work as specified until completion of the Contract.
   e. Soil amendments.
   f. Fertilizers.
   g. Fencing.
   h. Signs.
   i. Mailboxes.
   j. Guardrails.
   k. Shrubs and ornamental landscaping.
   l. Other miscellaneous items impacted by construction.
   m. Guarantees.

B. Coordination:
1. Review installation procedures under other Sections and coordinate the installation of items that must be installed with the landscaping.
2. Notify other contractors in advance of the installation of the landscaping to provide the other contractors with sufficient time for the installation of items included in their contracts that must be installed before the landscaping.

C. Related Sections:
1. Section 02220, Excavation and Backfill

1.2 QUALITY ASSURANCE

A. Source Quality Control:
1. General:
   a. Ship landscape materials with certificates of inspection as required by governmental authorities.
   b. Comply with governing regulations applicable to landscape materials.

c. ENGINEER will request inspection of delivery slips for materials to verify specified quantities of bulk deliveries of soil amendments and fertilizers.

2. Analysis and Standards: Package standard products with manufacturers certified analysis. For other materials, provide analysis by recognized laboratory made in accordance with methods established by the Association of Official Analytical Chemists, wherever applicable or as further specified.
3. Off-Site Topsoil: Obtain topsoil from local sources or from areas having similar soil characteristics to that found at the site of the Work. Obtain topsoil only from naturally well drained sites where topsoil occurs in depth of not less than 4-inches; do not obtain from bogs or marshes.
4. Topsoil stockpiled for reuse: Topsoil will be inspected by ENGINEER before reuse. At the time of inspection ENGINEER shall require representative soil samples to be tested for physical properties, hydrogen ion value, organic matter, and available phosphoric acid and potassium. Supply twenty pound samples and make tests at no additional expense to OWNER. If deficiencies in the topsoil are found, as a result of this analysis, they shall be corrected at no additional expense to OWNER.

B. Reference Standards: Comply with applicable provisions and recommendations of the following, except where otherwise shown or specified.
1. ANSI Z60.1, American Standard for Nursery Stock.
2. ASTM C 602, Agricultural Liming Materials.
3. ASTM D 2487, Classification of Soils for Engineering.
4. ASTM D 977, Emulsified Asphalt.
5. Association of Official Analytical Chemists, Official Methods of Analysis.
6. American Joint Committee on Horticultural Nomenclature, Standardized Plant Names.
7. Official Seed Analysists of North America, Standards of Quality.
8. FSO F 241D, Fertilizer, Mixed, Commercial.
9. FSO P 166E, Peat Moss; Peat, Humus; and Peat, Reed sedge.

1.3 SUBMITTALS

A. Shop Drawings: Submit for approval the following:
1. Before delivery of off-site topsoil, a written statement giving the location of the properties from which the topsoil is to be obtained and the names and addresses of the suppliers.
2. Manufacturer's specifications and installation instructions for all materials required.

B. Test Reports: Submit for approval the following:
1. Before delivery of off-site topsoil, a soil analysis made by an approved soil testing laboratory stating porosity, the percentages of silt, clay, sand and organic matter, the pH and the mineral and plant nutrient content of the topsoil. Supply topsoil with 5 percent organic matter minimum.

C. Certificates: Submit for approval the following:
   1. Certificates of inspection as may be required by governmental authorities to accompany shipments, and manufacturers or vendors certified analysis for soil amendments and fertilizer materials. For standard products submit other data substantiating that materials comply with specified requirements.
   2. Certificates from seed vendors certified statement for each seed mixture required, stating botanical and common name, percentage by weight and percentages of purity, germination, and weed seed for each species.

1.4 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Delivery of Materials:
   1. Do not deliver seed until site conditions are ready for planting.
   2. Deliver packaged materials in original, unopened containers showing weight, analysis and name of manufacturer. Protect materials from deterioration during delivery.
   3. Furnish seed in sealed, standard containers.
   4. Notify ENGINEER of delivery schedule in advance so plant material may be inspected upon arrival at job site.
   5. Remove unacceptable material immediately from project site.

B. Storage of Materials:
   1. Store and cover materials to prevent deterioration. Remove packaged materials which have become wet or show deterioration or water marks from the site. Replace at no further cost to OWNER.
   2. Seed that is wet or moldy or that has been otherwise damaged in transit or storage is not acceptable. Replace at no further cost to OWNER.

1.5 JOB CONDITIONS

A. Environmental Requirements:
   1. Proceed with and complete the Work as rapidly as portions of the site become available, working within the seasonal limitations for each kind of landscape Work required.
   2. Minimize the disturbed construction area and begin temporary stabilization and restoration within 14 days per the Erosion Prevention and Sediment Control Plan.
   3. Do not spread seed when wind velocity exceeds 5 miles per hour.
   4. Do not plant when drought, or excessive moisture, or other unsatisfactory conditions prevail.

B. Scheduling:
   1. Plant or install materials only during normal planting seasons for each type of landscape Work required. Correlate planting with specified maintenance periods to provide maintenance until occupancy by OWNER.
   2. Minimize the disturbed construction area and begin temporary stabilization and restoration within 14 days per the Erosion Prevention and Sediment Control Plan.

3. Fall seeding shall be performed between the dates of August 15 and October 1. Spring seeding will be permitted as soon as the ground can be worked to May 31, provided severe drought and high wind conditions do not exist.

1.6 ALTERNATIVES

A. Do not make substitutions. Substitutions may be allowed, by ENGINEER, at the varietal level only. Submit to ENGINEER proof of non-availability and proposal for use of equivalent material.

1.7 GUARANTEE

A. Guarantee lawns through the specified maintenance period, and until Final Acceptance of the Work.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Topsoil:
   1. Topsoil may not be available onsite for landscape/restoration Work. If topsoil is available, it shall be removed and stockpiled onsite for reuse. If topsoil stockpiled is insufficient to complete the Work in this section as specified, or if topsoil is not available onsite, topsoil from approved offsite sources shall be provided. No additional costs will be paid by OWNER for this Work.
   2. Provide off site topsoil as required, which is fertile, friable, natural loam, surface soil, capable of sustaining vigorous plant growth, free of any admixture of subsoil, clods of hard earth, plants or roots, rocks, sticks or other extraneous material harmful to plant growth. Supply topsoil with the following analysis:
      a. No. 10 Sieve: 95 to 100% passing by weight.
         No. 270 Sieve: 40 to 85% passing by weight.
         Silt (0.05 – 0.005 mm): 20-65% passing by weight.
         Clay (passing 0.005 mm): 10-35% passing by weight.
      b. pH 5.0 to pH 7.5. If approved by ENGINEER, natural topsoil not having the hydrogen-ion value specified may be amended by CONTRACTOR at his own expense.
      c. Organic content not less than 5 percent and no more than 20 percent, as determined by ignition loss.
      d. Free of pests and pest larvae.

B. Soil Amendments:
   1. Lime: Natural limestone containing not less than 85% of total carbonates, ground so that not less than 90% passes a 10-mesh sieve and not less than 50% passes a 100-mesh sieve.

2. Peat Humus: Provide peat humus which is a natural product of either sphagnum moss, reed, or sedge peat, taken from a fresh water site. Supply shredded material, free from lumps, roots, stones, and other extraneous foreign matter, capable of passing through a 1/2-inch screen, which can easily be incorporated with the topsoil. Supply material which has been conditioned in storage piles after excavation for at least 6 months, including one freezing and thawing period. Supply peat humus with the following analysis:
   a. Not less than 90% organic matter by weight on an oven dry basis.
   b. pH range 5 to 7.5.
   c. Moisture content 35% at time of incorporation into soil.
   d. Water absorbing ability 150% to 350% by weight.
3. Sand: Washed of fine to medium texture.
4. Ferrous Sulfate: Commercial grade and unadulterated.

C. Commercial Fertilizers:
1. Complete fertilizer of neutral character, with a minimum of 75% nitrogen derived from natural organic sources or ureaform; 40-50% of the nitrogen shall be water soluble. Available phosphoric acid derived from superphosphate, bone, or tankage. Potash derived from muriate of potash, containing 60% potash. Uniform in composition, free-flowing and suitable for application with approved equipment. Provide fertilizer with the following percentages of available plant nutrients:
   a. For lawns, provide fertilizer with not less than 4% phosphoric acid and not less than 2% potassium, and the percentage of nitrogen required to provide not less than 1.5 pounds of actual nitrogen per 1000 square feet of lawn area. Provide nitrogen in a form that will be available to the lawn during the initial period of growth.

D. Grass Materials:
1. Grass Seed Mixture: Provide fresh, clean, new crop seed complying with the tolerance for purity and germination established by the Official Seed Analysts of North America. Provide seed of the grass species, proportions and minimum percentages of purity, germination, and maximum percentage of weed seed, as specified.
2. The seed shall comply with seed laws and noxious weed restrictions in strict accordance with the standards of the American Association of Nurserymen as set forth in the latest edition of American Standard for Nursery Stock, ANSI-Z60.1. Seed shall also meet the requirements for purity and germination as specified in the Proceedings of the Association of Official Seed Analysis, Rule for Testing Seeds.
3. Seed shall be furnished in sealed standardized containers of the vendor bearing the date of last germination, which shall be within a period of 6 months prior to planting. Seed which has become wet, moldy, or otherwise damaged in transit or storage will not be acceptable.
4. The Schedule of Grass Seed Requirements is as follows. One of the following mixes shall be used:

SCHEDULE OF GRASS SEED REQUIREMENTS

MIX #1 (For shaded lawn areas only)

By Weight	Name of Grass	Purity	Germination	Application per 1000 square feet
60% (minimum)	Kentucky Bluegrass Blend * - Poa pratensis	95%	80%	1.8 pounds
20% (minimum)	Chewings Red Fescue - Festuca rubra commutata	97%	85%	0.6 pounds
20%	Certified Pennfine Rye Grass - Lolium perenne	98%	90%	0.6 pounds
				3.0 pounds

MIX #2 – Fielder's Choice Turfgrass Mixture Finished Lawns (CWS)

By Weight	Name of Grass	Purity	Germination	Application per 1000 square feet
29.90%	Crew Cut Tall Fescue	95%	94%	2.4 pounds
29.90%	Tulsa Tall Fescue	95%	94%	2.4 pounds
19.95%	Grande Tall Fescue	95%	94%	1.6 pounds
19.30%	ICE Perennial Ryegrass	95%	91%	1.6 pounds
				8.0 pounds

MIX #3 – Team Mates Turfgrass Mixture Finished Lawns (Lesco)

By Weight	Name of Grass	Purity	Germination	Application per 1000 square feet
29.52%	Stetson Tall Fescue	95%	94%	2.4 pounds
29.42%	Legitimate Tall Fescue	95%	94%	2.4 pounds
29.32%	Padre Tall Fescue	95%	94%	2.4 pounds
9.74%	Evening Shade Perennial Ryegrass	95%	91%	0.8 pounds
				8.0 pounds

MIX #4 – Riparian and Natural Areas

By Weight	Name of Grass	Purity	Germination	Application per 1000 square feet
27%	Annual Rye	95%	90%	0.14 pounds
9%	Creeping Red	95%	85%	0.05 pounds
18%	Canada Wild Rye	70%	75%	0.09 pounds
18%	Riverbank Wild Rye	70%	75%	0.09 pounds
5%	Indian Grass	70%	75%	0.02 pounds
5%	Big Blue Stem	70%	75%	0.02 pounds
9%	Little Blue Stem	70%	75%	0.05 pounds
5%	Fox Sedge	90%	75%	0.02 pounds
5%	Frank’s Sedge	90%	75%	0.02 pound
				0.51 pounds

5. The following requirements apply to all mixes:
    a. Weed seed content not over 0.25 percent and free of noxious weeds.
    b. Provide bluegrass blend consisting of half of each of the following:
        1) Adelphi.
        2) Glade.
    c. All seed shall be rejected if the label lists any of the following grasses:
        1) Timothy.
        2) Orchard.
        3) Sheep Fescue.
        4) Meadow Fescue.
        5) Canada Blue.
        6) Alta Fescue.
        7) Bent Grass.

E. Miscellaneous Landscape Materials:
    1. Mulch:
        a. Anti-Erosion Mulch: Provide clean, seed free salt hay or threshed straw of wheat, rye, oats or barley, free from noxious weeds. Materials which are low grade and unfit for farm use such as "U.S. Sample Grade" are acceptable.
    2. Water: Potable.

PART 3 – EXECUTION

3.1 RESTORATION

A. CONTRACTOR shall restore all areas disturbed by construction activity as the Work progresses. All pipeline installation shall have disturbed areas, where pipeline construction is complete, Permanently or Temporarily restored as the CONTRACTOR proceeds with construction activity farther along the length of the line. During construction, no more than 500 feet of length as measured along the pipeline shall be left non- Permanently or Temporarily Restored after pipeline construction in the area is complete. Temporarily restoring areas will only be permitted when site conditions are such that Permanent Restoration cannot be accomplished as described in 1.5 Job Conditions. Areas that are Temporarily Restored shall be restored with Mulch as described in Section 02900 2.1E and 3.4.

B. Failure to provide restoration and landscaping as the work progresses and as specified herein to the OWNER’s satisfaction may be grounds for non-approval of the CONTRACTOR’s applications for payment.

C. All areas of the project site disturbed by construction activity shall comply with the sediment and erosion control requirements of SD1 and as shown on the drawings. These requirements shall be in addition to the restoration requirements specified herein.

3.2 INSPECTION

A. CONTRACTOR and his installer shall examine the subgrade, verify the elevations, observe the conditions under which Work is to be performed, and notify ENGINEER of unsatisfactory conditions. Do not proceed with the Work until unsatisfactory conditions have been corrected in a manner acceptable to ENGINEER.

3.3 PREPARATION

A. Seed Turfbed Preparation:
   1. Loosen subgrade of turfbed areas to a minimum depth of 4 inches. Remove stones over 1-1/2-inches in any dimension and sticks, roots, rubbish and other extraneous matter. Limit preparation to areas which will be planted promptly after preparation.
   2. Spread topsoil to minimum depth of 6-inches after natural settlement and light rolling.
      a. Do not spread topsoil while in a frozen condition or when moisture content is so great that excessive compaction will occur nor when so dry that dust will form in the air or clods will not break readily.
   3. Apply ground limestone, by machine, over all areas to receive turf, as required, to bring the soil to a neutral pH. Work lightly into the top 3 inches of topsoil at least five days before applying the commercial fertilizers. Soils in all areas to receive turf must reach a neutral pH by a means satisfactory to SD1.
   4. Apply commercial fertilizers in the following quantities:
      a. For grass apply only at a rate sufficient to supply 1 pound phosphoric acid and not less than 1.5 pounds potassium, and provide not less than 0.75 pounds of actual nitrogen per 1000 square feet of lawn area. For 18-24-12 with 25% SCU use 7 pounds per 1000 square feet
   5. Apply commercial fertilizers just prior to seeding.
   6. Apply commercial fertilizers in two operations. First application shall be 3/4 of total amount.
   7. Thoroughly and evenly incorporate commercial fertilizers with the soil to depth of 3 inches by discing, or other approved method.
      a. In areas inaccessible to power equipment, use hand tools.
      b. Adjacent to existing trees, adjust depth to avoid disturbing roots.
   8. Apply superphosphate for grass areas at the rate of 20 pounds per 1000 square feet and incorporate into the top 3 inches of topsoil.
   9. Spread peat humus at rate of six 18-inch by 18-inch by 36-inch bales per 1000 square feet and incorporate into top 4 inches of topsoil.
   10. Grade turfbed areas to smooth, even surface with loose, uniformly fine texture. Remove all stones and extraneous foreign material in excess of 1-inch in diameter. Roll and rake and remove ridges and fill depressions, as required to meet finish grades. Limit fine grading to areas which can be planted immediately after grading.
   11. Apply a second dressing of fertilizer. Use 1/4 of the total required amount.

12. Moisten prepared turfbed areas before planting if soil is dry. Water thoroughly and allow surface moisture to dry before planting. Do not create a muddy soil condition.
13. Restore turfbed areas to specified condition if eroded or otherwise disturbed after fine grading and prior to planting.

3.4 INSTALLATION

A. Determine location of underground utilities and perform Work in a manner which will avoid possible damage. Hand excavate, as required, to minimize possibility of damage to underground utilities. Maintain grade stakes until removal is mutually agreed upon by all parties concerned.

B. CONTRACTOR shall provide all materials, labor, and equipment to complete all seeding work. Seeded areas shall be uniform in color, leaf texture, and shoot density, and reasonably free of weeds, with plants at two inches tall, minimum.

C. Seeding Lawns:
   1. Sow seed using a spreader or seeding machine.
   2. Distribute seed evenly over entire area by sowing equal quantity in 2 directions at right angles to each other.
   3. Sow not less than the quantity of seed specified.
   4. Cultivator-packer, or approved similar equipment, may be used to cover the seed and to firm the seedbed in one operation. In areas inaccessible to cultivator-packer:
      a. Rake the seeded ground and roll in two directions with a water ballast roller, weighing not less than 100 pounds per linear foot.
      b. Take care during raking that seed is not raked from one spot to another.
   5. Protect seeded areas against erosion by spreading specified lawn mulch after completion of seeding operations.
      a. Spread uniformly to form a continuous blanket not less than 1-1/2 inch loose measurement over seeded areas. Provide mulch. Place mulch using either of the following methods:
         1) Place mulch with equipment that will blow or eject, by means of a constant air stream, controlled quantities of the mulch in a uniform pattern over the specified area to achieve 80 to 90% of the ground is covered. If the mulch is excessively cut or broken, take measures to reduce the cutting or breakage to a limit approved by ENGINEER.
      b. Thru all residential yards mulch must be anchored using either of the following methods:
         1) Anchor mulch in place with UV degradable netting. Netting should start to decompose after one month with 80% breakdown occurring within three months. All edges and center of netting should be stapled to hold the mat in place with not more than 4-6 feet between staples. All staples should be inserted flush with the ground surface. Netting shall be held in place using 11-gauge wire staples, geotextile pins or wooden stakes.

Once seed as germinated to a height of 3-4 inches all netting and staples must be removed before first lawn mowing.

2) Anchor mulch in place with a mechanical crimper to incorporate straw mulch into the soil.
3) A tackifying agent maybe used to slue the straw mulch together with the soil surface. The tackifier agent shall be selected based on longevity and ability to hold the mulch in place. Apply tackifier at a rate of 125 pounds per acre.

6. Do not leave seeded areas unmulched for longer than 1 day. Reseed areas which remain without mulch for longer than 1 day.
7. Mulch shall be sufficiently anchored into the soil by crimping or other suitable methods to prevent loss or bunching of the mulch by wind or other causes.
8. Prevent damage or staining of construction or other plantings adjacent to mulched areas.
9. Prevent foot or vehicular traffic, or the movement of equipment, over the mulched area. Reseed areas damaged as a result of such activity.
10. Water seeded areas thoroughly with a fine spray.

D. Steep-Sloped, Low-Maintenance Areas:
1. For slopes steeper than 4:1, walk bulldozer or other tracked equipment up and down slopes before seeding to create tread-track depressions for catching and holding seed.
2. For slopes steeper than 2:1 install erosion control blankets or turf mates according to manufacturers' recommendations.
3. Use seed mix #4 for slopes steeper than 4:1.

E. Reconditioning Existing Turf:
1. Recondition existing turf areas damaged by CONTRACTOR'S operations including storage of materials and equipment and movement of vehicles. Also recondition existing turf areas where minor regrading is required.
2. Provide fertilizer, seed or sod and soil amendments as specified for new turf and as required to provide a satisfactorily reconditioned turf. Provide new topsoil as required to fill low spots and meet new finish grades.
3. Cultivate bare and compacted areas thoroughly to provide a satisfactory planting bed.
4. Remove diseased and unsatisfactory turf areas; do not bury into soil. Remove topsoil containing foreign materials resulting from CONTRACTOR'S operations including oil drippings, stone, gravel and other loose building materials.
5. In areas approved by ENGINEER, where substantial turf remains (but is thin), mow, rake, aerate if compacted, fill low spots, remove humps and cultivate soil, fertilize, and seed. Remove weeds before seeding or if extensive, apply selective chemical weed killers as required. Apply a seedbed mulch, if required, to maintain moist condition.
6. Water newly planted areas and keep moist until new turf is established.

F. Be prepared to provide potable water and maintain temporary piping hoses and watering equipment as required to convey water from water source and to keep landscape Work moist as required for proper growth. CONTRACTOR shall supply required irrigation materials, equipment and potable water.

G. Any fences, signs, mailboxes, guardrails, shrubs, ornamental landscaping, or other miscellaneous items that need to be removed to facilitate sewer construction operations shall be replaced, in kind or with repairs satisfactory to the OWNER at the CONTRACTOR'S expense. Replacement of fences, signs, mailboxes, guardrails, shrubs, ornamental landscaping, or other miscellaneous items shall be considered a part of the sewer installation and shall be done immediately after the installation and backfilling of the sewer. The cost for the removal and replacement shall be included in the contract price bid for 12" diameter Ductile Iron pipe.

H. All drainage ditches, culverts, and storm pipes disturbed by the CONTRACTOR'S work shall be restored, reshaped, and graded to drain properly per the contract unit price bid for 12" diameter Ductile Iron pipe.

I. Pavement restoration shall be in accordance with the restoration sections on the Standard Detail sheets in the Contract Documents and the provisions of the Governing Agency responsible for the particular road.

3.5 PROTECTION AND MAINTENANCE

A. Begin maintenance immediately after planting.

B. Seeded areas shall be protected against traffic. All seeded areas shall be maintained by the CONTRACTOR until final acceptance of the project. Maintenance shall include watering, reseeding, repair of erosion damage, maintenance of mulch, cleanup and all other operations necessary for the satisfactory development of the grass.

C. Mulch shall be maintained until covered with growing grass seedlings. Material that has been removed from the site by wind or other causes shall be replaced and secured.

D. Original grades of grass areas shall be maintained after commencement of planting operations and until final acceptance. Any damage to the finished surface from construction operations shall be promptly repaired. In the event erosion occurs from either watering operations or rainfall, such damage shall be corrected, and areas reseeded where required. Ruts, ridges, tracks, and other surface irregularities shall be corrected, and areas reseeded where required.

E. Maintain lawns by watering, fertilizing, weeding, mowing, trimming and other operations such as rolling, regarding, and replanting as required to establish a smooth, acceptable lawn, free of eroded or bare areas.

1. Cutting Height: Mow lawns as soon as there is enough top growth to cut with mower set at the specified height for the principal species planted. Repeat mowing as required to maintain specified height. Do not remove more than 1/3 of grass height. Do not mow when grass is wet. Time initial and subsequent mowings as required to maintain the following grass height:
   a. Mow grass at 1-1/2-inch to 2-inch height. Do not mow lower than 1-1/2-inches.
2. Apply fertilizer after first mowing and when the grass is dry. Use fertilizer which will provide not less than 1.0 pound of actual nitrogen per 1,000 square foot of lawn area.
3. After grass has started, reseed repeatedly all areas greater than 8 inches square which fail to show a uniform stand of grass for any reason whatsoever until all areas are covered with a satisfactory stand of grass, as determined by OWNER.

F. Prior to final acceptance, seeded areas that show signs of substantial desiccation, as evident by a loss of color and a distinct yellowing or where no germination is evident, shall be considered as failed and shall be reseeded until an acceptable cover is obtained.

3.6 CLEANUP AND PROTECTION

A. During landscape Work, store materials and equipment where directed. Keep pavements clean and work area in an orderly condition.

B. Protect landscape Work and materials from damage due to landscape operations, operations by other contractors and trades and trespassers. Maintain protection during installation and maintenance periods. Treat, repair or replace damaged landscape Work as directed.

C. Remove all rubbish, equipment and rejected materials from the site.

D. Protection includes all temporary fences, barriers and signs and other Work incidental to proper maintenance.

3.7 INSPECTION AND ACCEPTANCE

A. When the landscape Work is completed, including maintenance, ENGINEER will make an inspection to determine acceptability.

B. Where inspected landscape Work does not comply with the requirements, replace rejected Work and continue specified maintenance until reinspected by ENGINEER and found to be acceptable. Remove rejected plants and materials promptly from the project site.

C. Seeded lawns will be acceptable provided all requirements, including maintenance, have been compiled with, and a healthy uniform, close stand of the specified grass is established, free of weeds, bare spots, and surface irregularities.

D. Restoration of disturbed areas in a timely manner is a priority. Payments to the CONTRACTOR may be withheld by the OWNER for the sewer installation if there is poor or untimely restoration.

3.8 GUARANTEE

A. The CONTRACTOR shall guarantee all work and materials for a period of one year after completion of seeding work. All seeded areas shall have a uniform stand of grass in a density acceptable to the OWNER. During the guarantee period, all turf which dies shall be replaced by and at the expense of the CONTRACTOR. Replacement made under the CONTRACTOR's guarantee shall be covered by a like guarantee for a period of one year after completion of the replacement.

3.9 SETTLEMENT

A. CONTRACTOR shall be responsible for all erosion and settlement of backfill, fills, and embankments which may occur within the correction period stipulated in the General Conditions.

B. CONTRACTOR shall make, or cause to be made, all repairs or replacements made necessary by settlement within 30 days after notice from ENGINEER or OWNER.

++ END OF SECTION ++

SECTION 03100

CONCRETE FORMWORK

PART 1 – GENERAL

1.1 THE REQUIREMENT

A. Provide materials, labor, and equipment required for the design and construction of all concrete formwork, bracing, shoring and supports in accordance with the provisions of the Contract Documents.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- Section 03200, Reinforcing Steel
- Section 03250, Concrete Accessories
- Section 03290, Joints in Concrete
- Section 03300, Cast-in-Place Concrete

1.3 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

A. Without limiting the generality of the other requirements of the specifications, all work herein shall conform to the applicable requirements of the following documents. All referenced specifications, codes, and standards refer to the most current issue available at the time of Bid.
   1. Kentucky Building Code
   2. ACI 318 - Building Code Requirements for Structural Concrete
   3. ACI 301 - Specifications for Structural Concrete for Buildings
   4. ACI 347 - Recommended Practice for Concrete Formwork
   5. U.S. Product Standard for Concrete Forms, Class I, PS 1
   6. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials

1.4 SUBMITTALS

A. Submit the following in accordance with Section 01340.
   1. Manufacturer's data on proposed form release agent
   2. Manufacturer's data on proposed formwork system including form ties

1.5 QUALITY ASSURANCE

A. Concrete formwork shall be in accordance with ACI 301, ACI 318, and ACI 347.

PART 2 – PRODUCTS

2.1 FORMS AND FALSEWORK

A. All forms shall be smooth surface forms unless otherwise specified.

B. Wood materials for concrete forms and falsework shall conform to the following requirements:
   1. Lumber for bracing, shoring, or supporting forms shall be Douglas Fir or Southern Pine, construction grade or better, in conformance with U.S. Product Standard PS20. All lumber used for forms, shoring or bracing shall be new material.
   2. Plywood for concrete formwork shall be new, waterproof, synthetic resin bonded, exterior type Douglas Fir or Southern Pine high density overlaid (HDO) plywood manufactured especially for concrete formwork and shall conform to the requirements of PS1 for Concrete Forms, Class I, and shall be edge sealed. Thickness shall be as required to support concrete at the rate it is placed, but not less than 5/8-inch thick.

C. Other form materials such as metal, fiberglass, or other acceptable material that will not adversely affect the concrete and will facilitate placement of concrete to the shape, form, line and grade indicated may be submitted to the Engineer for approval, but only materials that will produce a smooth form finish equal or better than the wood materials specified will be considered.

2.2 FORMWORK ACCESSORIES

A. Form ties shall be provided with a plastic cone or other suitable means for forming a conical hole to ensure that the form tie may be broken off back of the face of the concrete. The maximum diameter of removable cones for rod ties, or of other removable form-tie fasteners having a circular cross-section, shall not exceed 7/8-inch, and all such fasteners shall be such as to leave holes of regular shape for reaming.

B. Form ties for water-retaining structures shall have integral waterstops. Removable taper ties may be used when acceptable to the Engineer. A preformed mechanical EPDM rubber plug shall be used to seal the hole left after the removal of the taper tie. Plug shall be X-Plug by the Greenstreak Group, Inc., or approved equal. Friction fit plugs shall not be used.

C. Form release agent shall be a blend of natural and synthetic chemicals that employs a chemical reaction to provide quick, easy, and clean release of concrete from forms. It shall not stain the concrete and shall leave the concrete with a paintable surface. Formulation of the form release agent shall be such that it would minimize formation of "bug holes" in cast-in-place concrete.

PART 3 – EXECUTION

3.1 FORM DESIGN

A. Forms and falsework shall be designed for total dead load, plus all construction live load as outlined in ACI 347. Design and engineering of formwork and safety considerations during construction shall be the responsibility of the Contractor.

B. Forms shall be of sufficient strength and rigidity to maintain their position and shape under the loads and operations incident to placing and vibrating the concrete. The maximum deflection of facing materials reflected in concrete surfaces exposed to view shall be 1/240 of the span between structural members.

C. All forms shall be designed for predetermined placing rates per hour, considering expected air temperatures and setting rates.

3.2 CONSTRUCTION

A. The type, size, quality, and strength of all materials from which forms are made shall be subject to the approval of the Engineer. No falsework or forms shall be used which are not clean and suitable. Deformed, broken or defective falsework and forms shall be removed from the work.

B. Forms shall be smooth and free from surface irregularities. Suitable and effective means shall be provided on all forms for holding adjacent edges and ends of panels and sections tightly together and in accurate alignment so as to prevent the formation of ridges, fins, offsets, or similar surface defects in the finished concrete. Joints between the forms shall be sealed to eliminate any irregularities. The arrangement of the facing material shall be orderly and symmetrical, with the number of seams kept to a practical minimum.

C. Forms shall be true to line and grade, and shall be sufficiently rigid to prevent displacement and sagging between supports. Curved forms shall be used for curved and circular structures. Straight panels joined at angles will not be acceptable for forming curved structures. Forms shall be properly braced or tied together to maintain their position and shape under a load of freshly-placed concrete. Facing material shall be supported with studs or other backing which shall prevent both visible deflection marks in the concrete and deflections beyond the tolerances specified.

D. Forms shall be mortar tight so as to prevent the loss of water, cement and fines during placing and vibrating of the concrete. Specifically, the bottom of wall forms that rest on concrete footings or slabs shall be provided with a gasket to prevent loss of fines and paste during placement and vibration of concrete. Such gasket may be a 1 to 1-1/2-inch diameter polyethylene rod held in position to the underside of the wall form.

E. All vertical surfaces of concrete members shall be formed, and side forms shall be provided for all footings, slab edges and grade beams, except where placement of the concrete against the ground is called for on the Drawings. Not less than 1-inch of concrete shall be added to the thickness of the concrete member as shown where concrete is permitted to be placed against trimmed ground in lieu of forms. Such permission will be granted only for members of comparatively limited height and where the character of the ground is such that it can be trimmed to the required lines and will stand securely without caving or sloughing until the concrete has been placed.

F. All forms shall be constructed in such a manner that they can be removed without hammering or prying against the concrete. Wood forms shall be constructed for wall openings to facilitate loosening and to counteract swelling of the forms.

G. Adequate clean out holes shall be provided at the bottom of each lift of forms. Temporary openings shall be provided at the base of column forms and wall forms and at other points to facilitate cleaning and observation immediately before the concrete is deposited. The size, number and location of such clean outs shall be as acceptable to the Engineer.

H. Construction joints shall not be permitted at locations other than those shown or specified, except as may be acceptable to the Engineer. When a second lift is placed on hardened concrete, special precautions shall be taken in the way of the number, location and tightening of ties at the top of the old lift and bottom of the new to prevent any unsatisfactory effect whatsoever on the concrete. For flush surfaces at construction joints exposed to view, the contact surface of the form sheathing over the hardened concrete in the previous placement shall be lapped by not more than 1 inch. Forms shall be held against hardened concrete to prevent offset or loss of mortar at construction joints and to maintain a true surface.

I. The formwork shall be cambered to compensate for anticipated deflections in the formwork due to the weight and pressure of the fresh concrete and due to construction loads. Set forms and intermediate screed strips for slabs accurately to produce the designated elevations and contours of the finished surface. Ensure that edge forms and screed strips are sufficiently strong to support vibrating screeds or roller pipe screeds if the nature of the finish specified requires the use of such equipment. When formwork is cambered, set screeds to a like camber to maintain the proper concrete thickness.

J. Positive means of adjustment (wedges or jacks) for shores and struts shall be provided and all settlement shall be taken up during concrete placing operation. Shores and struts shall be securely braced against lateral deflections. Wedges shall be fastened firmly in place after final adjustment of forms prior to concrete placement. Formwork shall be anchored to shores or other supporting surfaces or members to prevent upward or lateral movement of any part of the formwork system during concrete placement. If adequate foundation for shores cannot be secured, trussed supports shall be provided.

K. Runways shall be provided for moving equipment with struts or legs. Runways shall be supported directly on the formwork or structural member without resting on the reinforcing steel.

3.3 TOLERANCES

A. Unless otherwise indicated in the Contract Documents, formwork shall be constructed so that the concrete surfaces will conform to the tolerance limits listed in ACI 117.

B. Structural framing of reinforced concrete around elevators and stairways shall be accurately plumbed and located within 1/4-in. tolerance from established dimensions.

C. The Contractor shall establish and maintain in an undisturbed condition and until final completion and acceptance of the project, sufficient control points and benchmarks to be used for reference purposes to check tolerances. Plumb and string lines shall be installed before concrete placement and shall be maintained during placement. Such lines shall be used by Contractor's personnel and by the Engineer and shall be in sufficient number and properly installed. During concrete placement, the Contractor shall continually monitor plumb and string line form positions and immediately correct deficiencies.

D. Regardless of the tolerances specified, no portion of the building shall extend beyond the legal boundary of the building.

3.4 FORM ACCESSORIES

A. Suitable moldings shall be placed to bevel or round all exposed corners and edges of beams, columns, walls, slabs, and equipment pads. Chamfers shall be 3/4-inch unless otherwise noted.

B. Form ties shall be so constructed that the ends, or end fasteners, can be removed without causing appreciable spalling at the faces of the concrete. After ends, or end fasteners of form ties have been removed, the embedded portion of the ties shall terminate not less than 2 inches from the formed face of the concrete that is exposed to water or enclosed surfaces above the water surface, and not less than 1 inch from the formed face of all other concrete. Holes left by the removal of form tie cones shall be reamed with suitable toothed reamers so as to leave the surface of the holes clean and rough before being filled with mortar as specified in Section 03350 Concrete Finishing. No form-tying device or part thereof, other than metal, shall be left embedded in the concrete. Ties shall not be removed in such manner as to leave a hole extending through the interior of the concrete member. The use of snap-ties which cause spalling of the concrete upon form stripping or tie removal will not be permitted. No snap ties shall be broken off until the concrete is at least three days old. If steel panel forms are used, rubber grommets shall be provided where the ties pass through the form in order to prevent loss of cement paste.

3.5 APPLICATION - FORM RELEASE AGENT

A. Forms for concrete surfaces that will not be subsequently waterproofed shall be coated with a form release agent. Form release agent shall be applied on formwork in accordance with manufacturer's recommendations.

3.6 INSERTS AND EMBEDDED ITEMS

A. Sleeves, pipe stubs, inserts, anchors, expansion joint material, waterstops, and other embedded items shall be positioned accurately and supported against displacement prior to concreting. Voids in sleeves, inserts, and anchor slots shall be filled

temporarily with readily removable material to prevent the entry of concrete into the voids.

3.7 FORM CLEANING AND REUSE

A. The inner faces of all forms shall be thoroughly cleaned prior to concreting. Forms may be reused only if in good condition and only if acceptable to the Engineer. Light sanding between uses will be required wherever necessary to obtain uniform surface texture. Unused tie rod holes in forms shall be covered with metal caps or shall be filled by other methods acceptable to the Engineer.

3.8 FORM REMOVAL AND SHORING

A. Forms shall not be disturbed until the concrete has attained sufficient strength. Sufficient strength shall be demonstrated by structural analysis considering proposed loads, strength of forming and shoring system, and concrete strength data. Shoring shall not be removed until the supported member has acquired sufficient strength to support its weight and the load upon it. Members subject to additional loads during construction shall be adequately shored to sustain all resulting stresses. Forms shall be removed in such manner as not to impair safety and serviceability of the structure. All concrete to be exposed by form removal shall have sufficient strength not to be damaged thereby.

B. Provided the strength requirements specified above have been met and subject to the Engineer's approval, forms may be removed at the following minimum times. The Contractor shall assume full responsibility for the strength of all such components from which forms are removed prior to the concrete attaining its full design compressive strength. Shoring may be required at the option of the Engineer beyond these periods.

Ambient Temperature (°F) During Concrete Placement

	Over 95°	**70°-95°**	**60°-70°**	**50°-60°**	**Below 50°**
Walls	5 days	2 days	2 days	3 days	Do not remove until directed by Engineer (7 days minimum)
Columns	7 days	2 days	3 days	4 days	
Beam Soffits	10 days	7 days	7 days	7 days	
Elevated Slabs	12 days	7 days	7 days	7 days	

C. When, in the opinion of the Engineer, conditions of the work or weather justify, forms may be required to remain in place for longer periods of time.

D. An accurate record shall be maintained by the Contractor of the dates of concrete placings and the exact location thereof and the dates of removal of forms. These records shall be available for inspection at all times at the site, and two copies shall be furnished the Engineer upon completion of the concrete work.

3.9 RESHORING

A. When reshoring is permitted or required the operations shall be planned in advance and subjected to approval by the Engineer.

B. Reshores shall be placed after stripping operations are complete but in no case later than the end of the working day on which stripping occurs.

C. Reshoring for the purpose of early form removal shall be performed so that at no time will large areas of new construction be required to support their own weight. While reshoring is under way, no construction or live loads shall be permitted on the new construction. Reshores shall be tightened to carry their required loads, but they shall not be overtightened so that the new construction is overstressed. Reshores shall remain in place until the concrete has reached its specified 28-day strength, unless otherwise specified.

D. For floors supporting shores under newly placed concrete, the original supporting shores shall remain in place or reshores shall be placed. The shoring or reshoring system shall have a capacity sufficient to resist the anticipated loads and, in all cases, shall have a capacity equal to at least one-half of the capacity of the shoring system above. Reshores shall be located directly under a reshore position above unless other locations are permitted.

E. In multi-story buildings, reshoring shall extend over a sufficient number of stories to distribute the weight of newly placed concrete, forms, and construction live loads so the design superimposed loads of the floors supporting shores are not exceeded.

++ END OF SECTION ++

SECTION 03200

REINFORCING STEEL

PART 1 – GENERAL

1.1 REQUIREMENTS

A. Provide all concrete reinforcing including all cutting, bending, fastening and any special work necessary to hold the reinforcing steel in place and protect it from injury and corrosion in accordance with the requirements of this section.

B. Provide deformed reinforcing bars to be grouted into reinforced concrete masonry walls.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- Section 03100, Concrete Formwork
- Section 03250, Concrete Accessories
- Section 03300, Cast-in-Place Concrete
- Section 03400, Precast Concrete

1.3 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Without limiting the generality of the other requirements of the specifications, all work herein shall conform to the applicable requirements of the following documents. All referenced specifications, codes, and standards refer to the most current issue available at the time of Bid.
   1. Kentucky Building Code
   2. CRSI – Concrete Reinforcing Institute Manual of Standard Practice
   3. ACI SP66 – ACI Detailing Manual
   4. ACI 315 – Details and Detailing of Concrete Reinforcing
   5. ACI 318 – Building Code Requirements for Structural Concrete
   6. ICC-ES AC193 – Acceptance Criteria for Expansion and Screw Anchors (Concrete)
   7. WRI – Manual of Standard Practice for Welded Wire Fabric
   8. ASTM A 615 – Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcing
   9. ASTM A 1064 – Standard Specification for Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete

1.4 SUBMITTALS

A. Submit the following in accordance with Section 01340, Shop Drawing Procedures.
   1. Detailed placing and shop fabricating drawings, prepared in accordance with ACI 315 and ACI Detailing Manual - (SP66), shall be furnished for all concrete reinforcing. These drawings shall be made to such a scale as to clearly show joint locations, openings, and the arrangement, spacing and splicing of the bars.

2. Mill test certificates - 3 copies of each.
3. Description of the reinforcing steel manufacturer's marking pattern.
4. Requests to relocate any bars that cause interferences or that cause placing tolerances to be violated.
5. Proposed supports for each type of reinforcing.
6. Request to use splices not shown on the Drawings.
7. Request and procedure to field bend or straighten partially embedded reinforcing.
8. International Code Council–Evaluation Services Report (ICC-ES ESR) for dowel adhesives.
9. Certification that all installers of dowel adhesive are certified as Adhesive Anchor Installers in accordance with the ACI-CRSI Anchor Installer Certification Program.

1.5 QUALITY ASSURANCE

A. If requested by the Engineer, the Contractor shall provide samples from each load of reinforcing steel delivered in a quantity adequate for testing. Costs of initial tests will be paid by the Owner. Costs of additional tests due to material failing initial tests shall be paid by the Contractor.

B. Provide a list of names of all installers who are trained by the Manufacturer’s Field Representative on this jobsite prior to installation of products. Record must include the installer name, date of training, products included in the training and trainer name and contact information.

C. Provide a copy of the current ACI/CRSI “Adhesive Anchor Installer” certification cards for all installers who will be installing adhesive anchors in the horizontal to vertically overhead orientation.

D. Inspections of the adhesive dowel system may be made by the Engineer or other representatives of the Owner in accordance with the requirements of the ESR published by the manufacturer. Provide adequate time and access for inspections of products and anchor holes prior to injection, installation, and proof testing.

PART 2 – PRODUCTS

2.1 REINFORCING STEEL

A. Bar reinforcing shall conform to the requirements of ASTM A 615 for Grade 60 Billet Steel reinforcing. All reinforcing steel shall be from domestic mills and shall have the manufacturer's mill marking rolled into the bar which shall indicate the producer, size, type and grade. All reinforcing bars shall be deformed bars. Smooth reinforcing bars shall not be used unless specifically called for on Drawings.

B. Welded wire fabric reinforcing shall conform to the requirements of ASTM A 1064 and the details shown on the Drawings.

C. A certified copy of the mill test on each load of reinforcing steel delivered showing physical and chemical analysis shall be provided, prior to shipment. The Engineer reserves the right to require the Contractor to obtain separate test results from an independent testing laboratory in the event of any questionable steel. When such tests are necessary because of failure to comply with this Specification, such as improper identification, the cost of such tests shall be borne by the Contractor.

D. Field welding of reinforcing steel will not be allowed.

E. Use of coiled reinforcing steel will not be allowed.

2.2 ACCESSORIES

A. Accessories shall include all necessary chairs, slab bolsters, concrete blocks, tie wires, dips, supports, spacers and other devices to position reinforcing during concrete placement. Wire bar supports shall be plastic protected (CRSI Class 1).

B. Concrete blocks (dobies), used to support and position bottom reinforcing steel, shall have the same or higher compressive strength as specified for the concrete in which it is located.

2.3 DOWEL ADHESIVE SYSTEM

A. Where shown on the Drawings, reinforcing bars anchored into hardened concrete with a dowel adhesive system shall use a two-component adhesive mix which shall be injected with a static mixing nozzle following manufacturer's instructions.

B. All holes shall be drilled in accordance with the manufacturer’s instructions except that core drilled holes shall not be permitted unless specifically allowed by the Engineer. Cored holes, if allowed by the manufacturer and approved by the Engineer, shall be roughened in accordance with manufacturer’s requirements.

C. Thoroughly clean drill holes of all debris, drill dust, and water in accordance with manufacturer’s instructions prior to installation of adhesive and reinforcing bar.

D. Degree of hole dampness shall be in strict accordance with manufacturer recommendations. Installation conditions shall be either dry or water-saturated. Water filled or submerged holes shall not be permitted unless specifically approved by the Engineer.

E. Injection of adhesive into the hole shall be performed in a manner to minimize the formation of air pockets in accordance with the manufacturer’s instructions.

F. Embedment Depth:
   1. The embedment depth of the bar shall be as shown on the Drawings
   2. Where the embedment depth is not shown on the Drawings, the embedment depth shall be determined to provide the minimum allowable bond strength equal to the tensile strength of the rebar according to the manufacturer’s ICC-ES ESR.

3. The embedment depth shall be determined using the actual concrete compressive strength, a cracked concrete state, maximum long-term temperature of 110 degrees Fahrenheit, and maximum short-term temperature of 140 degrees Fahrenheit. In no case shall the embedment depth be less than the minimum, or more than the maximum, embedment depths stated in the manufacturer's ICC-ES ESR.

G. Engineer's approval is required for use of this system in locations other than those shown on the Drawings.

H. The adhesive system shall be IBC compliant for use in both cracked and uncracked concrete in all Seismic Design Categories and shall be "Epcon C6+ Adhesive Anchoring System" as manufactured by ITW Redhead, " HIT-HY 200 Adhesive Anchoring System" as manufactured by Hilti, Inc. "SET-XP Epoxy Adhesive Anchors" as manufactured by Simpson Strong-Tie Co. or "Pure 110+ Epoxy Adhesive Anchor System" by DeWalt. Fast-set epoxy formulations shall not be acceptable. No or equal products will be considered, unless pre-qualified and approved.

I. All individuals installing dowel adhesive system shall be certified as an Adhesive Anchor Installer in accordance with the ACI-CRSI Anchor Installation Certification Program.

PART 3 – EXECUTION

3.1 TEMPERATURE REINFORCING

A. Unless otherwise shown on the Drawings or in the absence of the concrete reinforcing being shown, the minimum cross-sectional area of horizontal and vertical concrete reinforcing in walls shall be 0.0033 times the gross concrete area and the minimum cross-sectional area of reinforcing perpendicular to the principal reinforcing in slabs shall be 0.0020 times the gross concrete area. Temperature reinforcing shall not be spaced further apart than five times the slab or wall thickness, nor more than 18 inches.

3.2 FABRICATION

A. Reinforcing steel shall be accurately formed to the dimensions and shapes shown on the Drawings and the fabricating details shall be prepared in accordance with ACI 315 and ACI 318, except as modified by the Drawings.

B. The Contractor shall fabricate reinforcing bars for structures in accordance with the bending diagrams, placing lists and placing Drawings.

C. No fabrication shall commence until approval of Shop Drawings has been obtained. All reinforcing bars shall be shop fabricated unless approved to be bent in the field. Reinforcing bars shall not be straightened or rebent in a manner that will injure the material. Heating of bars will not be permitted.

D. Welded wire fabric with longitudinal wire of W9.5 size or smaller shall be either furnished in flat sheets or in rolls with a core diameter of not less than 10 inches. Welded wire fabric with longitudinal wires larger than W9.5 size shall be furnished in flat sheets only.

3.3 DELIVERY, STORAGE AND HANDLING

A. All reinforcing shall be neatly bundled and tagged for placement when delivered to the job site. Bundles shall be properly identified for coordination with mill test reports.

B. Reinforcing steel shall be stored above ground on platforms or other supports and shall be protected from the weather at all times by suitable covering. It shall be stored in an orderly manner and plainly marked to facilitate identification.

C. Reinforcing steel shall at all times be protected from conditions conducive to corrosion until concrete is placed around it.

D. The surfaces of all reinforcing steel and other metalwork to be in contact with concrete shall be thoroughly cleaned of all dirt, grease, loose scale and rust, grout, mortar and other foreign substances immediately before the concrete is placed. Where there is delay in depositing concrete, reinforcing shall be reinspected and if necessary recleaned.

3.4 PLACING

A. Reinforcing steel shall be accurately positioned as shown on the Drawings and shall be supported and wired together to prevent displacement, using annealed iron wire ties or suitable clips at intersections. All reinforcing steel shall be supported by concrete, plastic or plastic protected (CRSI Class 1) metal supports, spacers or metal hangers which are strong and rigid enough to prevent any displacement of the reinforcing steel. Where concrete is to be placed on the ground, supporting concrete blocks (or dobies) shall be used in sufficient numbers to support the reinforcing bars without settlement. In no case shall concrete block supports be continuous.

B. The portions of all accessories in contact with the formwork shall be made of plastic or steel coated with a 1/8-inch minimum thickness of plastic which extends at least 1/2-inch from the concrete surface. Plastic shall be gray in color.

C. Tie wires shall be bent away from the forms in order to provide the specified concrete coverage.

D. Reinforcing bars additional to those shown on the Drawings, which may be found necessary or desirable by the Contractor for the purpose of securing reinforcing in position, shall be provided by the Contractor at no additional cost to the Owner.

E. Reinforcing placing, spacing, and protection tolerances shall be within the limits specified in ACI 318 except where in conflict with the Building Code, unless otherwise specified.

F. Reinforcing bars may be moved within one bar diameter as necessary to avoid interference with other concrete reinforcing, conduits, or embedded items. If bars are moved more than one bar diameter, or enough to exceed placing tolerances, the resulting arrangement of bars shall be as acceptable to the Engineer.

G. Welded wire fabric shall be supported on slab bolsters spaced not less than 30 inches on centers, extending continuously across the entire width of the reinforcing mat and supporting the reinforcing mat in the plane shown on the Drawings.

H. Reinforcing shall not be straightened or rebent unless specifically shown on the drawings. Bars with kinks or bends not shown on the Drawings shall not be used. Coiled reinforcement shall not be used.

I. Dowel Adhesive System shall be installed in strict conformance with the manufacturer's recommendations and as required in 2.3. A representative of the manufacturer must be on site prior to adhesive dowel installation to provide instruction on proper installation procedures for all adhesive dowel installers. Testing of adhesive dowels shall be as indicated below. If the dowels have a hook at the end to be embedded in subsequent work, an approved mechanical coupler shall be provided at a convenient distance from the face of existing concrete to facilitate adhesive dowel testing while maintaining required hook embedment in subsequent work.

J. All adhesive dowel installations in the horizontal or overhead orientation shall be conducted by a certified Adhesive Anchor Installer as certified by ACI/CSRI per ACI 318-11 9.2.2. Current AAI Certificated must be submitted to the Engineer of Record for approval prior to commencement of any adhesive anchor installations.

3.5 SPLICING

A. Reinforcing bar splices shall only be used at locations shown on the Drawings. When it is necessary to splice reinforcing at points other than where shown, the splice shall be as acceptable to the Engineer.

B. The length of lap for reinforcing bars, unless otherwise shown on the Drawings shall be in accordance with ACI 318 for a class B splice.

C. Laps of welded wire fabric shall be in accordance with ACI 318. Adjoining sheets shall be securely tied together with No. 14 tie wire, one tie for each 2 running feet. Wires shall be staggered and tied in such a manner that they cannot slip.

D. Mechanical splices shall be used only where shown on the drawings or when approved by the Engineer.

E. Couplers which are located at a joint face shall be a type which can be set either flush or recessed from the face as shown on the Drawings. The couplers shall be sealed during concrete placement to completely eliminate concrete or cement paste from entering. After the concrete is placed, couplers intended for future connections shall be plugged and sealed to prevent any contact with water or other corrosive materials. Threaded couplers shall be plugged with plastic plugs which have an O-ring seal.

3.6 INSPECTION

A. The Contractor shall advise the Engineer of his intentions to place concrete and shall allow him adequate time to inspect all reinforcing steel before concrete is placed.

B. The Contractor shall advise the Engineer of his intentions to place grout in masonry walls and shall allow him adequate time to inspect all reinforcing steel before grout is placed.

3.7 CUTTING OF EMBEDDED REBAR

A. The Contractor shall not cut embedded rebar cast into structural concrete without prior approval.

++ END OF SECTION ++

SECTION 03370

CONCRETE CURING

PART 1 – GENERAL

1.1 THE REQUIREMENT

A. Protect all freshly deposited concrete from premature drying and from the weather elements. The concrete shall be maintained with minimal moisture loss at a relatively constant temperature for a period of time necessary for the hydration of the cement and proper hardening of the concrete in accordance with the requirements specified herein.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- Section 03100, Concrete Formwork
- Section 03300, Cast-In-Place Concrete
- Section 03350, Concrete Finishes

1.3 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

A. Without limiting the generality of the other requirements of the specifications, all work herein shall conform to the applicable requirements of the following documents. All referenced specifications, codes, and standards refer to the most current issue available at the time of Bid.
   1. ACI 301 – Specifications for Structural Concrete for Buildings
   2. ACI 304 – Guide for Measuring, Mixing, Transporting, and Placing Concrete
   3. ACI 305 – Hot Weather Concreting
   4. ACI 306 – Cold Weather Concreting
   5. ACI 308 – Standard Practice for Curing Concrete
   6. ASTM C171 – Standard Specifications for Sheet Materials for Curing Concrete
   7. ASTM C309 – Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
   8. ASTM C1315 – Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete

1.4 SUBMITTALS

A. Submit the following in accordance with Section 01340.
   1. Proposed procedures for protection of concrete under wet weather placement conditions.
   2. Proposed normal procedures for protection and curing of concrete.
   3. Proposed special procedures for protection and curing of concrete under hot and cold weather conditions.
   4. Proposed method of measuring concrete surface temperature changes.

5. Manufacturer's literature and material certification for proposed curing compounds.

PART 2 – PRODUCTS

2.1 LIQUID MEMBRANE-FORMING CURING COMPOUND

A. Clear curing and sealing compound shall be a clear styrene acrylate type complying with ASTM C 1315, Type 1, Class A with a minimum solids content of 30%. Moisture loss shall not be greater than 0.40 kg/m2 when applied at 300 sq.ft./gal. Manufacturer's certification is required. Acceptable products are Super Diamond Clear VOX by the Euclid Chemical Company, MasteKure CC 300 SB by BASF Master Builder Solutions, and Cure & Seal 30 Plus by Symons Corporation.

B. Where specifically approved by Engineer, on slabs to receive subsequent applied finishes, compound shall conform to ASTM C 309. Acceptable products are "Kurez DR VOX" or "Kurez W VOX" by the Euclid Chemical Company. Install in strict accordance with manufacturer's requirements.

2.2 EVAPORATION REDUCER

A. Evaporation reducer shall be BASF, "MasterKure ER 50", or Euclid Chemical "Euco-Bar".

PART 3 – EXECUTION

3.1 PROTECTION AND CURING

A. All freshly placed concrete shall be protected from the elements, flowing water and from defacement of any nature during construction operations.

B. As soon as the concrete has been placed and horizontal top surfaces have received their required finish, provision shall be made for maintaining the concrete in a moist condition for at least a 5-day period thereafter except for high early strength concrete, for which the period shall be at least the first three days after placement. Horizontal surfaces shall be kept covered, and intermittent, localized drying will not be permitted.

C. Walls that will be exposed on one side with either fluid or earth backfill on the opposite side shall be continuously wet cured for a minimum of five days. Use of a curing compound will not be acceptable for applications of this type.

D. The Contractor shall use one of the following methods to ensure that the concrete remains in a moist condition for the minimum period stated above.
   1. Ponding or continuous fogging or sprinkling.
   2. Application of mats or fabric kept continuously wet.
   3. Continuous application of steam (under 150°F).
   4. Application of sheet materials conforming to ASTM C171.

5. If approved by the Engineer, application of a curing compound in accordance with 3.4 Use of Curing Compound.

E. The Contractor shall keep absorbent wood forms wet until they are removed. After form removal, the concrete shall be cured by one of the methods in 3.1D.

F. Any of the curing procedures used in 3.1D may be replaced by one of the other curing procedures listed in 3.1D after the concrete is one-day old. However, the concrete surface shall not be permitted to become dry at any time.

3.2 CURING CONCRETE UNDER COLD WEATHER CONDITIONS

A. Suitable means shall be provided for a minimum of 72 hours after placing concrete to maintain it at or above the minimum as placed temperatures specified in Section 03300, Cast-In-Place Concrete, for concrete work in cold weather. During the 72-hour period, the concrete surface shall not be exposed to air more than 20°F above the minimum as placed temperatures.

B. Stripping time for forms and supports shall be increased as necessary to allow for retardation in concrete strength caused by colder temperatures. This retardation is magnified when using concrete made with blended cements or containing fly ash or ground granulated blast furnace slag. Therefore, curing times and stripping times shall be further increased as necessary when using these types of concrete.

C. The methods of protecting the concrete shall be approved by the Engineer and shall be such as will prevent local drying. Equipment and materials approved for this purpose shall be on the site in sufficient quantity before the work begins. The Contractor shall assist the Engineer by providing holes in the forms and the concrete in which thermometers can be placed to determine the adequacy of heating and protection. All such thermometers shall be furnished by the Contractor in quantity and type which the Engineer directs.

D. Curing procedures during cold weather conditions shall conform to the requirements of ACI 306.

3.3 CURING CONCRETE UNDER HOT WEATHER CONDITIONS

A. When air temperatures exceed 85°F, the Contractor shall take extra care in placing and finishing techniques to avoid formation of cold joints and plastic shrinkage cracking. If ordered by the Engineer, temporary sun shades and/or windbreakers shall be erected to guard against such developments, including generous use of wet burlap coverings and fog sprays to prevent drying out of the exposed concrete surfaces.

B. Immediately after screeding, horizontal surfaces shall receive an application of evaporation reducer. Apply in accordance with manufacturer's instructions. Final finish work shall begin as soon as the mix has stiffened sufficiently to support the workmen.

C. Curing and protection of the concrete shall begin immediately after completion of the finishing operation. Continuous moist-curing consisting of method 1 or 2 listed in 3.1D is mandatory for at least the first 24 hours. Method 2 may be used only if the finished surface is not marred or blemished during contact with the coverings.

D. At the end of the initial 24-hour period, curing and protection of the concrete shall continue for at least six (6) additional days using one of the methods listed in 3.1D.

E. Curing procedures during hot weather conditions shall conform to the requirements of ACI 305.

3.4 USE OF CURING COMPOUND

A. Curing compound shall be used only where specifically approved by the Engineer. Curing compound shall never be used for curing exposed walls with fluid or earth backfill on the opposite side. A continuous wet cure for a minimum of five days is required for these applications. Curing compound shall not be used on surfaces exposed to water in potable water storage tanks and treatment plants unless curing compound is certified in accordance with ANSI/NSF Standard 61.

B. When permitted, the curing compound shall maintain the concrete in a moist condition for the required time period, and the subsequent appearance of the concrete surface shall not be affected.

C. The compound shall be applied in accordance with the manufacturer's recommendations after water sheen has disappeared from the concrete surface and after finishing operations. Maximum coverage for the curing and sealing compound shall be 300 square feet per gallon for trowel finishes and 200 square feet per gallon for floated or broom surfaces. Maximum coverage for compounds placed where subsequent finishes will be applied shall be 200 square feet per gallon. For rough surfaces, apply in two directions at right angles to each other.

3.5 EARLY TERMINATION OF CURING

A. Moisture retention measures may be terminated earlier than the specified times only when at least one of the following conditions is met:
   1. The strength of the concrete reaches 85% of the specified 28-day compressive strength in laboratory-cured cylinders representative of the concrete in place, and the temperature of the in-place concrete has been constantly maintained at 50 degrees Fahrenheit or higher.
   2. The strength of concrete reaches the specified 28-day compressive strength as determined by accepted nondestructive methods or laboratory-cured cylinder test results.

++ END OF SECTION ++

SECTION 03600

GROUT

PART 1 – GENERAL

1.1 THE REQUIREMENT

A. Furnish all materials, labor, and equipment required to provide all grout used in concrete work and as bearing surfaces for base plates, in accordance with the Contract Documents.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A. Requirements of related work are included in Division 1 and Division 2 of these Specifications.

1.3 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

A. Without limiting the generality of the other requirements of the specifications, all work herein shall conform to the applicable requirements of the following documents. All referenced specifications, codes, and standards refer to the most current issue available at the time of Bid.
   1. CRD-C 621 – Corps of Engineers Specification for Non-shrink Grout
   2. ASTM C 109 – Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2 inch or 50 mm cube Specimens)
   3. ASTM C 531 – Standard Test Method for Linear Shrinkage and Coefficient of Thermal Expansion of Chemical-Resistant Mortars, Grouts and Monolithic Surfacing
   4. ASTM C 579 – Test Method for Compressive Strength of Chemical-Resistant Mortars and Monolithic Surfacings
   5. ASTM C 827 – Standard Test Method for Early Volume Change of Cementitious Mixtures
   6. ASTM C 144 – Standard Specification for Aggregate for Masonry Mortar
   7. ASTM C 1107 – Standard Specification for Packaged Dry, Hydraulic Cement Grout (Nonshrink)

1.4 SUBMITTALS

A. Submit the following in accordance with Section 01340.
   1. Certified test results verifying the compressive strength and shrinkage and expansion requirements specified herein.
   2. Manufacturer's literature containing instructions and recommendations on the mixing, handling, placement and appropriate uses for each type of grout used in the work.

1.5 QUALITY ASSURANCE

A. Field Tests
   1. Compression test specimens will be taken during construction from the first placement of each type of grout and at intervals thereafter as selected by the Engineer to ensure continued compliance with these Specifications. The specimens will be made by the Engineer or its representative.
      a. Compression tests and fabrication of specimens for cement grout and non-shrink grout will be performed as specified in ASTM C 109 at intervals during construction as selected by the Engineer. A set of three specimens will be made for testing at seven days, 28 days and any additional time period as appropriate.
      b. Compression tests and fabrication of specimens for epoxy grout will be performed as specified in ASTM C 579, Method B, at intervals during construction as selected by the Engineer. A set of three specimens will be made for testing at seven days and any other time period as appropriate.
   2. The cost of all laboratory tests on grout will be borne by the Owner, but the Contractor shall assist the Engineer in obtaining specimens for testing. The Contractor shall be charged for the cost of any additional tests and investigation on work performed which does not meet the specifications. The Contractor shall supply all materials necessary for fabricating the test specimens, at no additional cost to the Owner.
   3. All grout, already placed, which fails to meet the requirements of these Specifications, is subject to removal and replacement at no additional cost to the Owner.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Cement Grout
   1. Cement grout shall be composed of Portland Cement and sand in the proportion specified in the Contract Documents and the minimum amount of water necessary to obtain the desired consistency. If no proportion is indicated, cement grout shall consist of one part Portland Cement to three parts sand. Water amount shall be as required to achieve desired consistency without compromising strength requirements. White Portland Cement shall be mixed with the Portland Cement as required to match color of adjacent concrete.
      Cement grout and placed on top of hollow core planks shall include structural macro fibers. Structural macro fibers shall meet requirements of ASTM C1116 with a minimum length of 2 inches, an aspect ratio between 50 and 90, and a minimum toughness rating R10, 50=60 (approximate) in accordance with ASTM C1609. Acceptable structural macro fibers are Tuf Strand SF by the Euclid Chemical Company, Strux 90/40 by W.R. Grace, or equal. Structural macro fibers shall be added to the grout mix at a rate of 1-1/2 lbs/cy. Structural macro fibers shall be added to the grout mix per the manufacturer's recommendations.
   2. The minimum compressive strength at 28 days shall be 4,000 psi.

3. For beds thicker than 1-1/2 inch and/or where free passage of grout will not be obstructed by coarse aggregate, 1-1/2 parts of coarse aggregate having a top size of 3/8 inch should be added. This stipulation does not apply for grout being swept in by a mechanism. These applications shall use a plain cement grout without coarse aggregate regardless of bed thickness.
4. Sand shall conform to the requirements of ASTM C144.

B. Non-Shrink Grout
1. Non-shrink grout shall conform to CRD-C 621 and ASTM C 1107, Grade B or C when tested at a max. fluid consistency of 30 seconds per CDC 611/ASTM C939 at temperature extremes of 45°F and 90°F and an extended working time of 15 minutes. Grout shall have a min. 28-day strength of 7,000 psi. Non-shrink grout shall be, "Euco N-S" by the Euclid Chemical Company, "Sikagrout 212" by Sika Corporation, “Conspec 100 Non-Shrink Non-Metallic Grout” by Conspec, “Masterflow 555 Grout” by BASF Master Builder Solutions.

C. Epoxy Grout
1. Epoxy grout shall be "Sikadur 32 Hi-Mod" by Sika Corporation, "Duralcrete LV" by Tamms Industries, or "Euco #452 Series" by Euclid Chemical, “MasterEmaco ADH 1090 RS” by BASF Master Builder Solutions.
2. Epoxy grout shall be modified as required for each particular application with aggregate per manufacturer's instructions.

D. Epoxy Base Plate Grout
1. Epoxy base plate grout shall be “Sikadur 42, Grout-Pak” by Sika Corporation, or “Masterflow 648” by BASF Master Builder Solutions.

2.2 CURING MATERIALS

A. Curing materials shall be as specified in Section 03370 Concrete Curing for cement grout and as recommended by the manufacturer for prepackaged grouts.

PART 3 – EXECUTION

3.1 GENERAL

A. The different types of grout shall be used for the applications stated below unless noted otherwise in the Contract Documents. Where grout is called for in the Contract Documents which does not fall under any of the applications stated below, non-shrink grout shall be used unless another type is specifically referenced.
1. Cement grout shall be used for grout toppings and for patching of fresh concrete.
2. Non-shrink grout shall be used for grouting beneath base plates of structural metal framing.
3. Epoxy grout shall be used for bonding new concrete to hardened concrete.
4. Epoxy base plate grout shall be used for precision seating of base plates including base plates for all equipment such as engines, mixers, pumps, vibratory and heavy impact machinery, etc.

B. New concrete surfaces to receive cement grout shall be as specified in Section 03350, Concrete Finishes, and shall be cleaned of all dirt, grease and oil-like films. Existing concrete surfaces shall likewise be cleaned of all similar contamination and debris, including chipping or roughening the surface if a laitance or poor concrete is evident. The finish of the grout surface shall match that of the adjacent concrete. Curing and protection of cement grout shall be as specified in Section 03370 Concrete Curing.

C. All mixing, surface preparation, handling, placing, consolidation, and other means of execution for prepackaged grouts shall be done according to the instructions and recommendations of the manufacturer.

D. The Contractor, through the manufacturer of a non-shrink grout and epoxy grout, shall provide on-site technical assistance upon request, at no additional cost to the Owner.

3.2 CONSISTENCY

A. The consistency of grouts shall be that necessary to completely fill the space to be grouted for the particular application. Dry pack consistency is such that the grout is plastic and moldable but will not flow.

3.3 MEASUREMENT OF INGREDIENTS

A. Measurements for cement grout shall be made accurately by volume using containers. Shovel measurement shall not be allowed.

B. Prepackaged grouts shall have ingredients measured by means recommended by the manufacturer.

3.4 GROUT INSTALLATION

A. Grout shall be placed quickly and continuously, shall completely fill the space to be grouted and be thoroughly compacted and free of air pockets. The grout may be poured in place, pressure grouted by gravity, or pumped. The use of pneumatic pressure or dry-packed grouting requires approval of the Engineer. For grouting beneath base plates, grout shall be poured from one side only and thence flow across to the open side to avoid air-entrapment.

++ END OF SECTION ++

SECTION 05536

FLOOR ACCESS HATCH COVERS

PART 1 – GENERAL

1.1 DESCRIPTION

A. Scope:
   1. CONTRACTOR shall provide all labor, materials, equipment and incidentals as shown, specified and required to furnish hinged floor access hatch covers.
   2. The types of floor access hatch covers include the following:
      a. Aluminum covers with frames for drainage.

B. Related Sections:
   1. Section 02606, Sanitary & Storm Structures
   2. Section 03300, Cast-In-Place Concrete
   3. Section 05501, Miscellaneous Metal Fabrications
   4. Section 09900, Painting

1.2 QUALITY ASSURANCE

A. Manufacturer: All access hatch covers for the project shall be the product of a single manufacturer. Access hatch covers from more than one manufacturer will not be permitted.

B. Reference Standards: Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.
   1. ASTM A 123, Standard Specification for Zinc (Hot-Galvanized) Coatings on Iron and Steel Products.

1.3 SUBMITTALS

A. Shop Drawings: Submit for approval the following:
   1. Dimensional plans of all access hatch covers, quantity schedule, details of fabrication and erection, and anchorage.

1.4 GUARANTEE

A. CONTRACTOR shall furnish a written guarantee obtained from the manufacturer. Guarantee shall state the following:
   1. Access hatch covers are to operate properly and be free of defects in material and workmanship for a period of five years from date of purchase.
   2. Should any part fail to function, or break in normal use during this period, manufacturer shall furnish a new part at no charge to OWNER.

PART 2 – PRODUCTS

2.1 MATERIALS AND FABRICATION

A. General:
1. Provide manufacturer's standard fabricated units, modified, if necessary, to comply with the requirements. Where standard units are not available for the sizes and types required, custom fabricate units to match manufacturer's similar units.
2. Fabricate each unit in the shop, complete with anchors, gaskets, hardware and accessory items as required.

B. Covers with Frames for Drainage:
1. Provide mill finished aluminum covers of checkered or diamond plate or other approved non-slip surface, with channel frames for drainage, designed to withstand an AASHTO H-20 wheel loading.
2. Both frames and door leaves shall be 1/4 inch thick, minimum.
3. Furnish stainless steel hardware for aluminum doors.
4. Provide channel frame with 1-1/2” diameter drainage coupling connection and PVC piping.
5. Provide single or double leaf covers as specified in the Floor Access Hatch Cover Schedule.
6. Frames shall have anchorage devices.
7. When open, door shall pivot so that the cover does not protrude into the channel frame.
8. Door covers shall have torsion bars, springs, or other approved means, for counterbalanced operations.
9. Covers shall be designed to receive a padlock and shall have a recessed hasp covered by a hinged lid flush with surface.
10. Covers shall have hold-open devices.
11. Where specified in the Floor Access Hatch Cover Schedule, provide stainless steel safety chains or cables across both open ends of the floor access hatch cover.
12. Product and Manufacturer:
    a. Double leaf door covers fabricated of aluminum.
        1) H2C, as manufactured by Halliday Products.
        2) Type JDH-20, as manufactured by The Bilco Company.
        3) Or equal.
    b. Single leaf door covers fabricated of aluminum.
        1) Type H1C, as manufactured by Halliday Products.
        2) Type JH-20, as manufactured by The Bilco Company.
        3) Or equal.

C. Safety Post: Each floor access hatch cover in which a fixed access ladder or manhole steps are shown on the Drawings below the hatch shall be provided with a safety post.
1. Safety post shall be a telescoping tubular section that locks automatically when fully extended.
2. Materials of Construction: Type 304 stainless steel.

3. Acceptable manufacturers:
   a. The Bilco Company (Ladder Up).
   b. Halliday Products, Series LIE Safety Extension.
   c. Or equal.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Install doors in accordance with approved Shop Drawings.

B. Set doors and covers plumb, level and true to line or grade, without warp or rack, for anchoring under other Sections of these Specifications.

C. Install PVC piping between coupling connection and sump as shown on the drawings.

D. Protection of Aluminum from Dissimilar Materials: Paint in accordance with Section 09900.

Floor Access Hatch Cover Schedule

Location	Size	Leaf	Comments
Air Release Manholes	3 ft x 3 ft	Single	

++ END OF SECTION ++

SECTION 05536b

ACCESS HATCHES

PART 1 – GENERAL

1.1 SCOPE OF WORK

A. Provide all labor, materials, equipment, and service required for the complete installation of the access hatches as specified herein and shown on the Drawings.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- Section 03300, Cast-in-Place Concrete
- Section 03400, Precast Concrete

1.3 SUBMITTALS

A. Submit manufacturer’s data and shop drawings for the materials specified herein. Comply with all requirements of Section 01340.

B. Descriptive literature, catalog cuts, and dimensional prints clearly indicating all dimensions and materials of construction, shall be submitted on all items specified herein to the Engineer for review before ordering.

C. At the time of submission, the Contractor shall, in writing, call the Engineer's attention to any deviations that the submittals may have from the requirements of the Engineer's Contract Drawings and Specifications.

1.4 ACCEPTABLE MANUFACTURERS

A. Access hatches shall be as manufactured by the Halliday Products, Inc., Orlando, FL or approved equal.

PART 2 – PRODUCTS

2.1 ACCESS HATCH FOR WET WELL (PUMPS)

A. Access hatch shall be single leaf, as indicated on the Contract Drawings or by the Engineer, aluminum, gutter type, watertight, exterior, flush floor hatch design. Door leaves shall have a ¼-in. thick mill finish, aluminum frame designed for surface mounting. Door panel shall be ¼-in. aluminum diamond plate, reinforced to withstand a 10-foot column of stationary water, or approximately 300 lb/ft² live load. Door(s) shall incorporate a 90 degree return flange around the perimeter.

B. Stainless steel pressure locks shall be provided to work in conjunction with a ¼-in. thick Neoprene compression gasket, mounted to the underside of the door, to insure minimal water intrusion. Door shall open to 90 degrees and automatically lock with a T-316 stainless steel hold-open arm with an aluminum release handle. Hinges and all fastening hardware shall be T-316 stainless steel. Unit shall lock with padlock lugs.

C. The protective grating panel shall be 1 inch (25 kg.) aluminum "I" bar grating with Safety Orange powder-coated finish. Grating shall be hinged with tamper proof stainless steel bolts, and shall be supplied with a positive latch to maintain unit in an upright position. Grating shall have a 6-in. (152mm) viewing area on each lateral unhinged side for visual observation and limited maintenance. Grating angle support ledges on 300 lb/ft² (1462 kg/m²) live load access covers shall incorporate nut rail with a minimum of four (4) stainless steel spring nuts.

D. A padlock hasp for owner-supplied padlock shall be provided.

E. Hatch shall have a minimum clear opening of 44-3/4" x 68-3/4", as shown on the contract drawings.

F. Hatch shall be Series F1R Access Cover with Grating Panel as manufactured by Halliday Products, Inc. or approved equal.

PART 3 – EXECUTION

3.1 GENERAL

A. Installation shall be in accordance with manufacturer's instructions.

B. Manufacturer shall guarantee against defects in material of workmanship for a period of five years.

++ END OF SECTION ++

SECTION 05540

CASTINGS

PART 1 – GENERAL

1.1 DESCRIPTION

A. Scope:
   1. CONTRACTOR shall provide all labor, materials, equipment and incidentals as shown, specified and required to furnish castings.
   2. Castings include metal items that are not a part of the miscellaneous metal fabrications or metal systems in other Sections of these Specifications.

B. Castings shall be for the following types of construction:
   1. Manholes.
   2. Catch basins.
   3. Valve Boxes.

C. Related Sections:
   1. Section 02606, Sanitary & Storm Structures
   2. Section 05501, Miscellaneous Metal Fabrications

1.2 QUALITY ASSURANCE

A. Reference Standards: Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.
   1. ASTM A 48, Standard Specification for Gray Iron Castings.

B. Shop Assembly:
   1. Preassemble items in the shop to the greatest extent possible, so as to minimize field splicing and assembly of units at the site. Disassemble units only to the extent necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

1.3 SUBMITTALS

A. Shop Drawings: Submit for approval the following:
   1. Fabrication and erection of all casting assemblies. Include plans, elevations, and details of sections and connections. Show anchorage and accessory items.
      a. Include setting drawings for location and installation of castings and anchorage devices.
   2. Copies of manufacturer's specifications, load tables, dimension diagrams, anchor details and installation instructions.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Gray Iron Castings: ASTM A 48, Class 30A.

B. Manhole Frames with Water-tight Covers:
   1. Neenah Foundry Co., Model R-1916-F or approved equal
   2. Bolt frame to manhole cone section with 5/8-inch stainless steel expansion anchors.
   3. Other Manhole Frames and Covers will be considered on a case-by-case basis.

C. Manhole Frames with Solid Covers:
   1. Neenah Foundry Co., Model R-1642, East Jordan, Model 1045, or approved equal.
   2. Bolt frame to manhole cone section with 5/8-inch stainless steel expansion anchors.
   3. Other Manhole Frames and Covers will be considered on a case-by-case basis.

D. Standard Inlets and Yard Drains:
   1. Grating:
      a. Neenah Foundry Co., Model R-4859-C or approved equal.
      b. East Jordan No. 5110 Type M2 or approved equal.

E. Standard Curb Inlets
   1. Grate and Casting:
      a. East Jordan 7350 for Single Inlets
      b. East Jordan 7355 for Double Inlets
   2. Driveway and Mountable Grate and Castings:
      a. East Jordan 7390 for Single Inlets
      b. East Jordan 7391 for Double Inlets

F. Area Inlet Catch Basin Frames and Gratings:
   1. Frames:
      a. Neenah Foundry Co., Model R-4899 or approved equal.
   2. Grating:
      a. Neenah Foundry Co., Model R-4884-A or approved equal.

G. Lamp hole Frames with Covers (for cleanouts):
   1. Non-Roadway: Neenah Foundry Co., Model R-1976.
   2. Sidewalks and paved areas: Sewer cleanout lid assembly, vestal lid rmc-18-1, SN# 32-032, 32 lbs.
   3. Or equal.

2.2 DESIGN AND FABRICATION

A. Design round frames and covers to prevent rocking and rattling under traffic.

B. Fabricate castings true to pattern so that component parts fit together.

C. Identification Markings:
   1. Provide markings on all manhole lids.
   2. All manhole lids shall be provided with the words “SANITARY SEWER” across the center of the lid for sanitary manholes and “STORM SEWER” for storm sewer manholes.

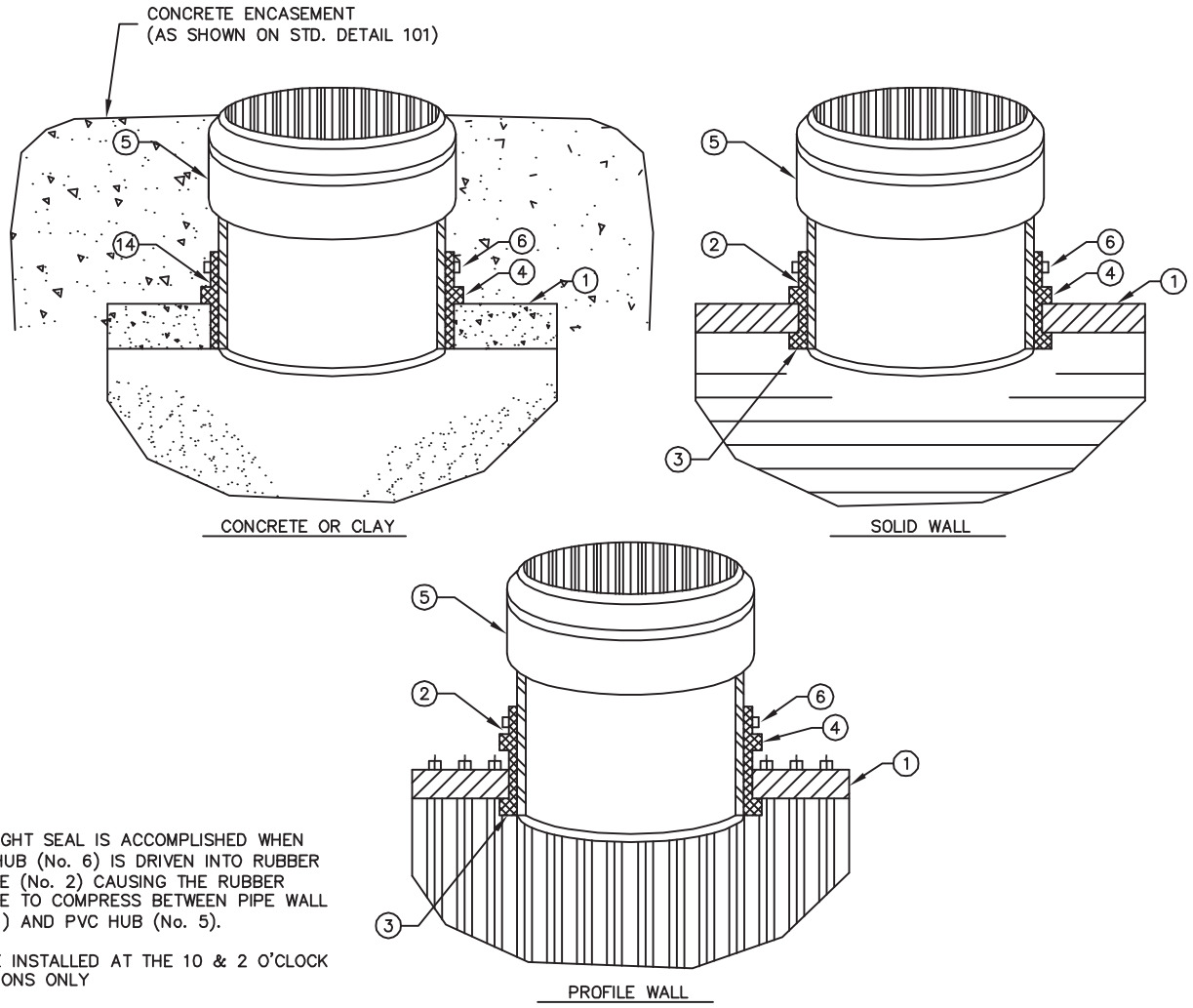
PART 3 – EXECUTION

3.1 INSTALLATION

A. Follow manufacturer's printed instructions and approved Shop Drawings.

B. Set castings accurately to required location, alignment and elevation, plumb, level, true and free of rack, measured from established lines and levels. Brace temporarily or anchor temporarily in formwork.

++ END OF SECTION ++



NOTE:

AIR TIGHT SEAL IS ACCOMPLISHED WHEN PVC HUB (No. 6) IS DRIVEN INTO RUBBER SLEEVE (No. 2) CAUSING THE RUBBER SLEEVE TO COMPRESS BETWEEN PIPE WALL (No. 1) AND PVC HUB (No. 5).

TO BE INSTALLED AT THE 10 & 2 O'CLOCK POSITIONS ONLY

FIGURE 1 MAINLINE PIPE WALL WHERE BRANCH LINE IS CONNECTED.

FIGURE 2 COMPLETE RUBBER SLEEVE CONSISTING OF ASTM C-448 SPECIFICATIONS.

FIGURE 3 RUBBER SEGMENT WHICH IS MOLDED INTO THE RUBBER SLEEVE. THIS PREVENTS SNAP OUT ON THE INSIDE OF THE DRILLED HOLE (PLASTIC PIPE ONLY) AND HELPS HOLD THE FITTING IN PLACE, NOT CREATING THE SEAL.

FIGURE 4 RUBBER SEGMENT WHICH IS MOLDED INTO THE RUBBER SLEEVE. THIS PREVENTS THE RUBBER SLEEVE FROM GOING THROUGH THE DRILLED HOLE WHEN PVC HUB IS BEING DRIVEN INTO THE RUBBER SLEEVE.

FIGURE 5 SDR-26 PVC HUB (ASTM D-3034) WHICH IS DRIVEN INTO THE CENTER OF THE RUBBER SLEEVE AFTER THE RUBBER SLEEVE IS IN THE HOLE.

FIGURE 6 STAINLESS STEEL BANDS, PUT ON ABOVE FIGURE 4 IS AN ADDED PRECAUTION.

NOTE: PIPE PENETRATIONS SHALL BE CORE DRILLED.

INSERTA TEE CONNECTION DETAILS

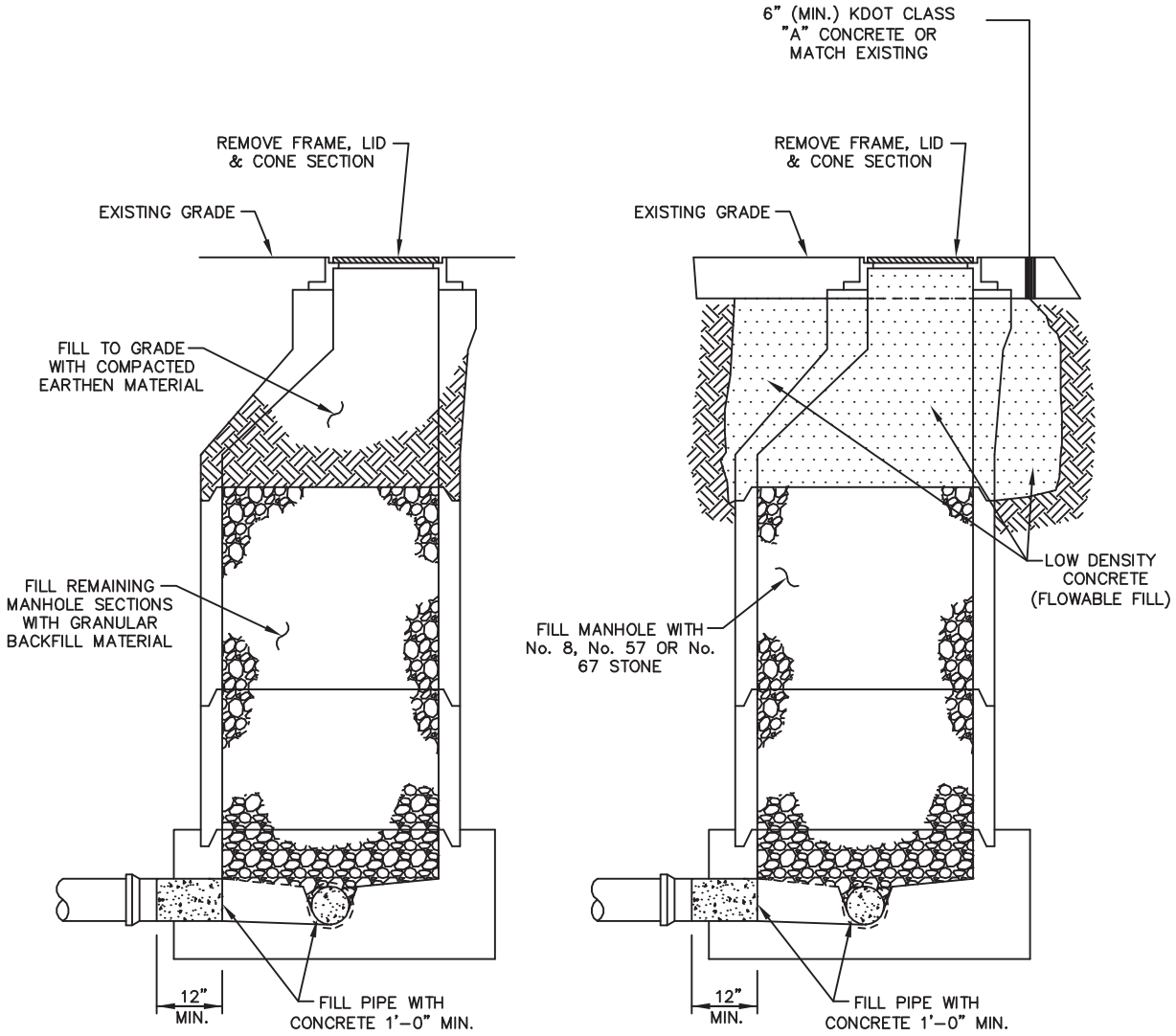
N.T.S.

REVISION	BY	DATE

SANITATION DISTRICT NO. 1
1045 Eaton Drive
FT. Wright, Kentucky 41017
Ph: (859) 578-7460
Fax: (859) 331-2436

DATE: MARCH 2010

STANDARD DRAWING NO: 102



UNPAVED AREAS

PAVED AREAS

ABANDONED MANHOLE & PIPE

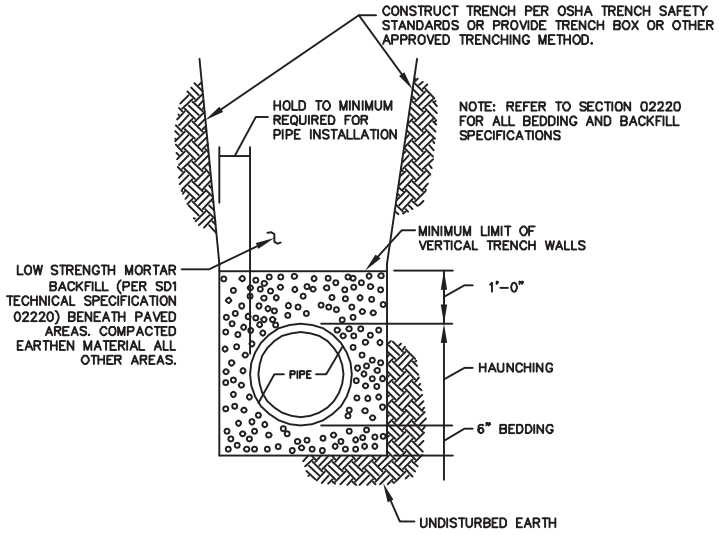
N.T.S.

REVISION	BY	DATE

SANITATION DISTRICT NO. 1
1045 Eaton Drive
FT. Wright, Kentucky 41017
Ph: (859) 578-7460
Fax: (859) 331-2436

DATE: MARCH 2010

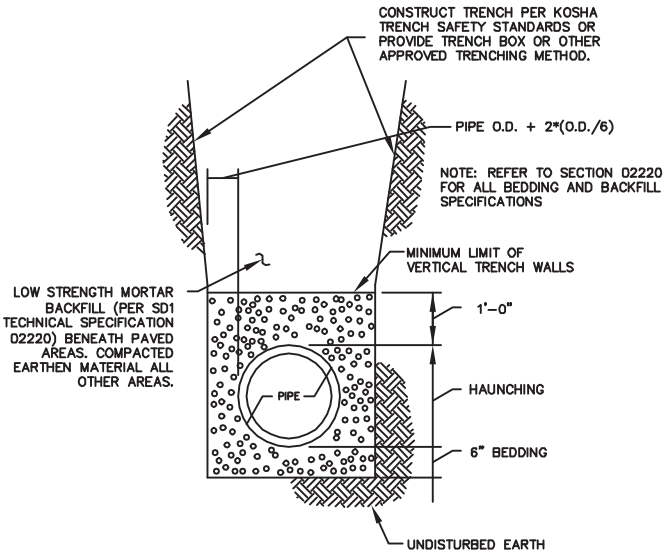
STANDARD DRAWING NO: 107



FLEXIBLE PIPE	MIN TRENCH WIDTH
PIPE LESS OR EQUAL TO 36" DIA	PIPE O.D. + 24"
PIPE GREATER THAN 36" DIA	PIPE O.D. + 48"

PIPE BEDDING – FLEXIBLE PIPE

N.T.S.



RIGID PIPE	MIN TRENCH WIDTH
PIPE LESS OR EQUAL TO 36" DIA	PIPE O.D. + 24"
PIPE GREATER THAN 36" DIA	PIPE O.D. + 2*(O.D./6)

PIPE BEDDING – RIGID PIPE

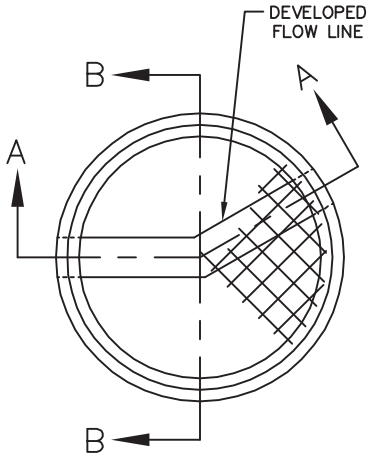
N.T.S.

REVISION	BY	DATE

SANITATION DISTRICT NO. 1
1045 Eaton Drive
FT. Wright, Kentucky 41017
Ph: (859) 578-7460
Fax: (859) 331-2436

DATE: MARCH 2010

STANDARD DRAWING NO: 110



PLAN
MANHOLE BASE

NOTES:

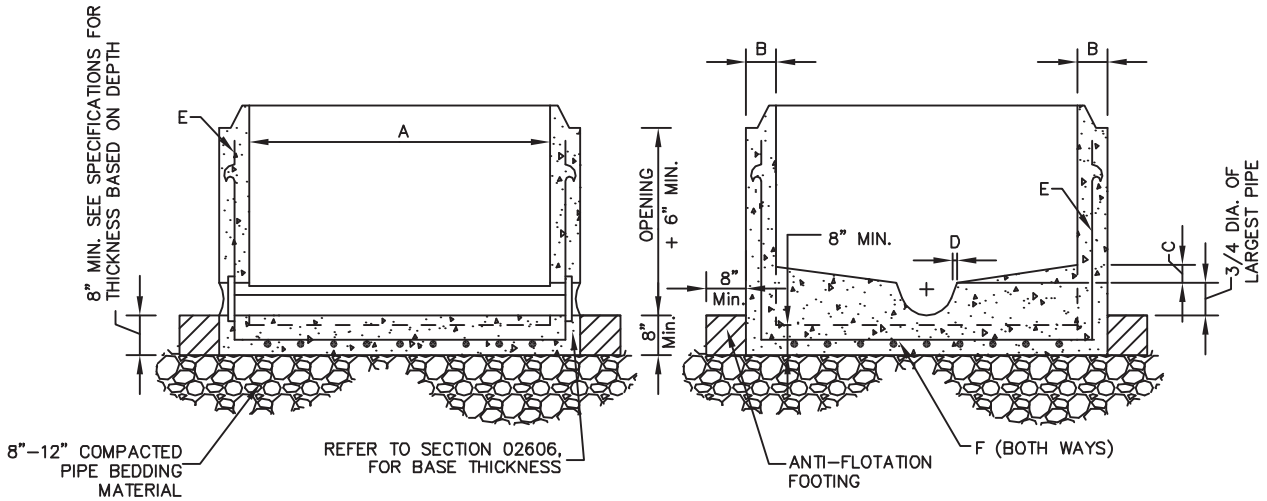
1. THE PRECAST BASE SHALL HAVE THE FLOOR AND SIDE WALL CAST AS ONE UNIT; IF THE FLOW LINE (CHANNEL) AND BENCHES ARE NOT CAST AS A PART OF FLOOR AND SIDE WALL, THEY SHALL BE CAST IN PLACE.
2. ALL NOTES ON STANDARD DRAWING 113 SHALL APPLY

PIPE DIAMETER	DIMENSION			
		B	C	D
8" THRU 18"	48"	5"	2"–3"	UP TO 1 1/2"
21" & 24"	48"	5"*	2"–3"	"
	60"	6"*	2"–3"	"
27" – 36"	60"	6"	2"–3"	UP TO 1 1/2"

* MOVABLE PANEL CONSTRUCTION MAY BE USED PROVIDING 5" MIN. THICKNESS PROVIDED.

REINFORCEMENT STEEL PER A.S.T.M. C478

DIAMETER	REINFORCING ITEM	
	E	F
48"	A^S = 0.12 Sq. In./Ft. (CIRCUMFERENTIAL)	A^S = 0.12 Sq. In./Ft. (BOTH WAYS)
60"	A^S = 0.15 Sq. In./Ft. (CIRCUMFERENTIAL)	A^S = 0.12 Sq. In./Ft. (BOTH WAYS)



STANDARD PRECAST CONCRETE MANHOLE BASE

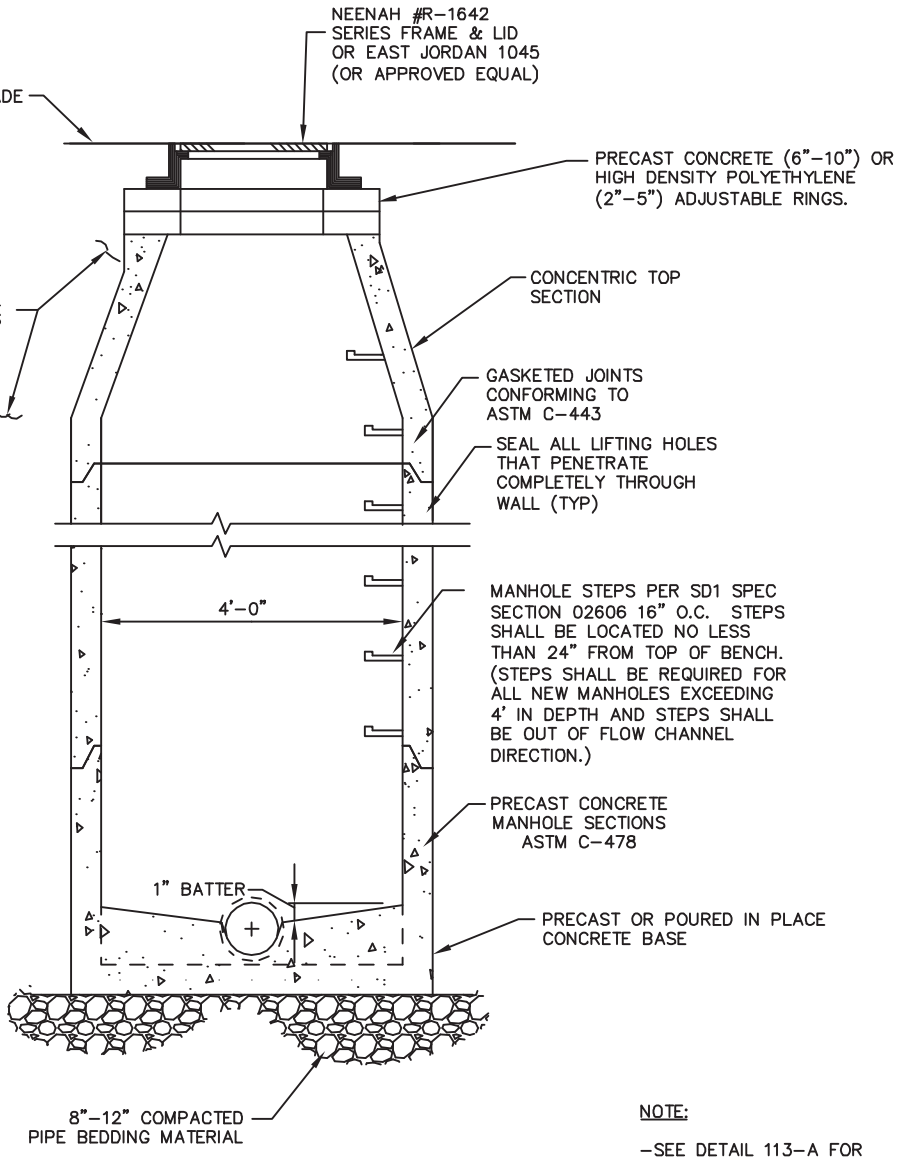
N.T.S.

REVISION	BY	DATE

SANITATION DISTRICT NO. 1
1045 Eaton Drive
FT. Wright, Kentucky 41017
Ph: (859) 578–7460
Fax: (859) 331–2436

DATE:
APRIL 2010

STANDARD DRAWING NO:
113–A



NOTES:

1. IF THE SLOPE OF THE INCOMING SEWER EXCEEDS 26% FROM THE HORIZONTAL, A FITTING SHALL BE USED OUTSIDE THE MANHOLE WALL TO FACILITATE A MORE PERPENDICULAR CONNECTION TO THE MANHOLE WALL. THE USE OF THIS FITTING IS TO BE EVALUATED ON A CASE BY CASE BASIS BY SD1 ENGINEERS.

2. PRECAST MANHOLES SHALL BE INSTALLED PER SECTION 02606.

3. BENCHING SHALL BE SHAPED TO MAINTAIN A SMOOTH TRANSITION OF FLOW FOR PIPE ANGLES BETWEEN 90 AND 180 DEGREES, AS REFERENCED TO THE DOWNSTREAM FLOWLINE. NO ANGLES LESS THAN 90 DEGREES WILL BE ALLOWED BETWEEN INCOMING AND OUTGOING PIPES IN MHS.

NOTE:

-SEE DETAIL 113-A FOR PRECAST BASE DETAIL

-ANTI-FLOTATION FLANGES MAY BE REQUIRED IN AREAS WHERE THE MANHOLE IS SUBJECT TO GROUND WATER PER SD1 SPEC 02606.

STANDARD MANHOLE

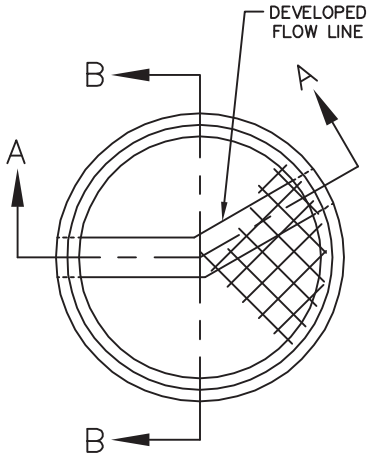
N.T.S.

REVISION	BY	DATE

SANITATION DISTRICT NO. 1
1045 Eaton Drive
FT. Wright, Kentucky 41017
Ph: (859) 578-7460
Fax: (859) 331-2436

DATE: APRIL 2010

STANDARD DRAWING NO: 113



PLAN
MANHOLE BASE

NOTES:

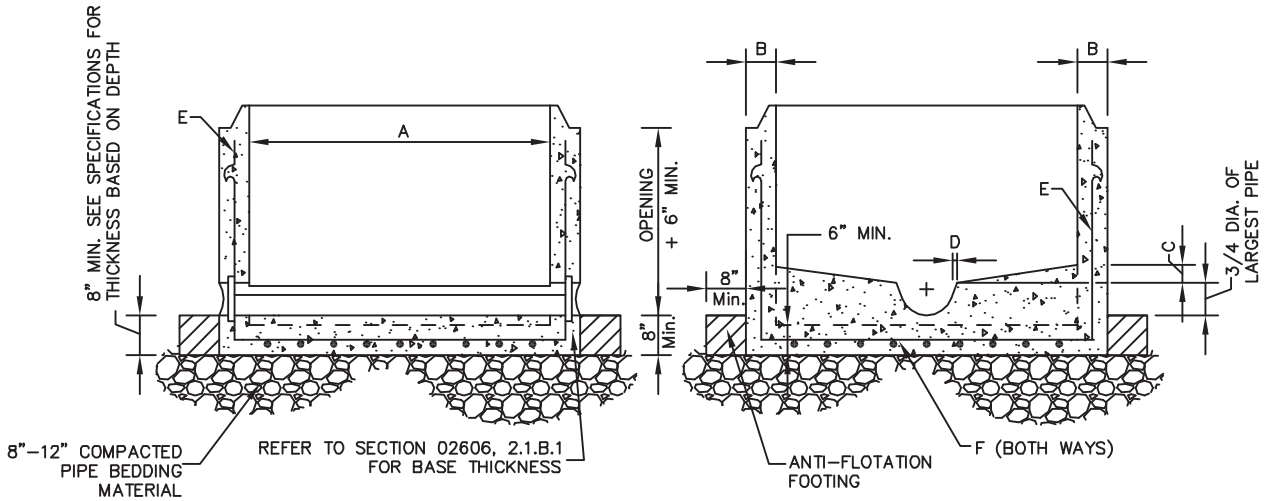
1. THE PRECAST BASE SHALL HAVE THE FLOOR AND SIDE WALL CAST AS ONE UNIT; IF THE FLOW LINE (CHANNEL) AND BENCHES ARE NOT CAST AS A PART OF FLOOR AND SIDE WALL, THEY SHALL BE CAST IN PLACE.
2. ALL NOTES ON STANDARD DRAWING 113 SHALL APPLY

PIPE DIAMETER	DIMENSION			
		B	C	D
8" THRU 18"	48"	5"	2"–3"	UP TO 1 1/2"
21" & 24"	48"	5"*	2"–3"	"
	60"	6"*	2"–3"	"
27" – 36"	60"	6"	2"–3"	UP TO 1 1/2"

* MOVABLE PANEL CONSTRUCTION MAY BE USED PROVIDING 5" MIN. THICKNESS PROVIDED.

REINFORCEMENT STEEL PER A.S.T.M. C478

DIAMETER	REINFORCING ITEM	
	E	F
48"	A^S = 0.12 Sq. In./Ft. (CIRCUMFERENTIAL)	A^S = 0.12 Sq. In./Ft. (BOTH WAYS)
60"	A^S = 0.15 Sq. In./Ft. (CIRCUMFERENTIAL)	A^S = 0.12 Sq. In./Ft. (BOTH WAYS)



STANDARD PRECAST CONCRETE MANHOLE BASE

N.T.S.

REVISION	BY	DATE

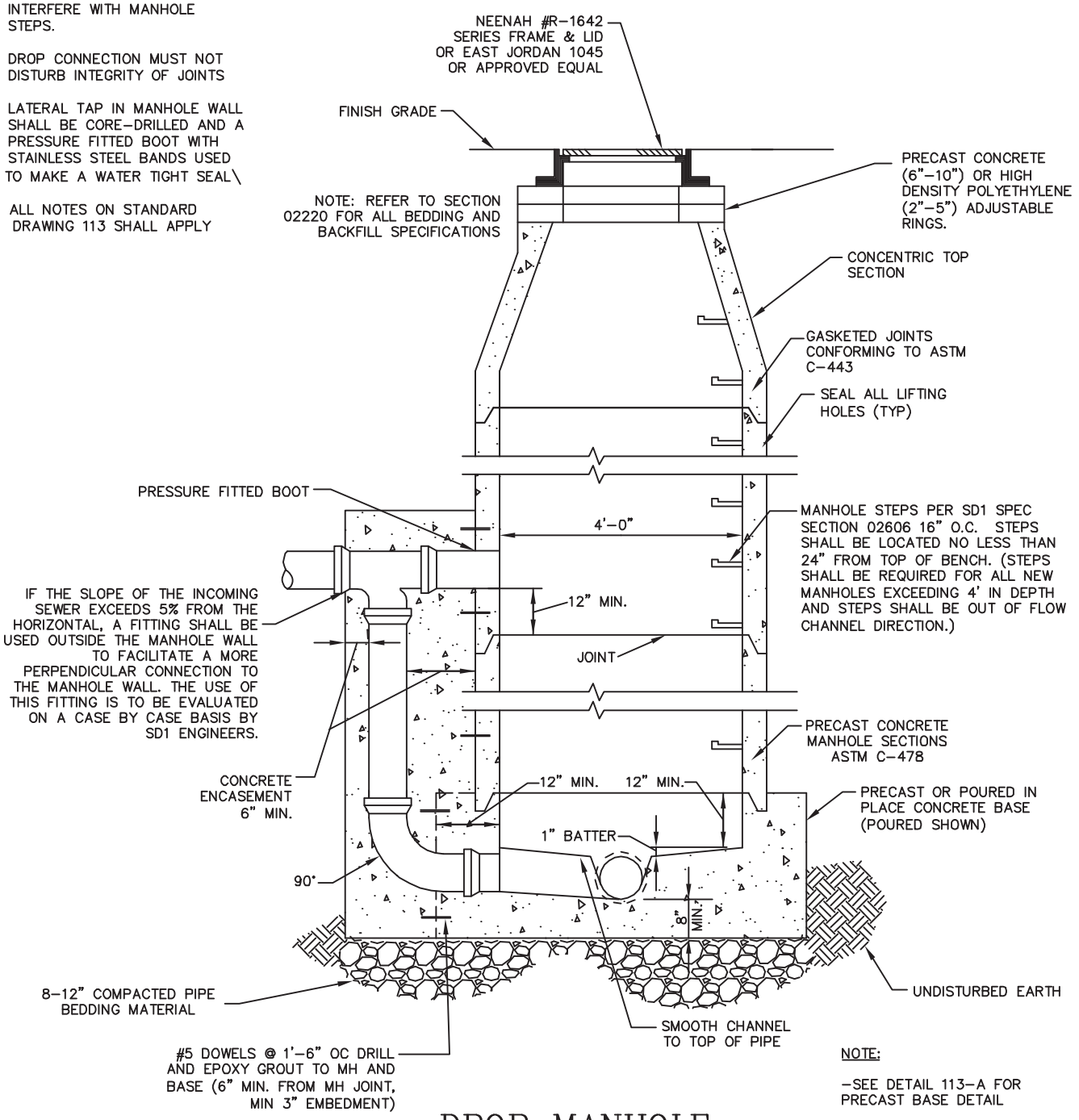
SANITATION DISTRICT NO. 1
1045 Eaton Drive
FT. Wright, Kentucky 41017
Ph: (859) 578–7460
Fax: (859) 331–2436

DATE:
APRIL 2010

STANDARD DRAWING NO:
113–A

NOTES

1. PERMIT FEE AND INSPECTION REQUIRED
2. DROP CONNECTION TO BE MADE BELOW CONE SECTION.
3. DROP CONNECTION SHALL NOT INTERFERE WITH MANHOLE STEPS.
4. DROP CONNECTION MUST NOT DISTURB INTEGRITY OF JOINTS
5. LATERAL TAP IN MANHOLE WALL SHALL BE CORE-DRILLED AND A PRESSURE FITTED BOOT WITH STAINLESS STEEL BANDS USED TO MAKE A WATER TIGHT SEAL\
6. ALL NOTES ON STANDARD DRAWING 113 SHALL APPLY



DROP MANHOLE

N.T.S.

NOTE:

-SEE DETAIL 113-A FOR PRECAST BASE DETAIL

-ANTI-FLOTATION FLANGES MAY BE REQUIRED IN AREAS WHERE THE MANHOLE IS SUBJECT TO GROUND WATER PER SD1 SPECIFICATION 02606

REVISION	BY	DATE

SANITATION DISTRICT NO. 1
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FT. Wright, Kentucky 41017
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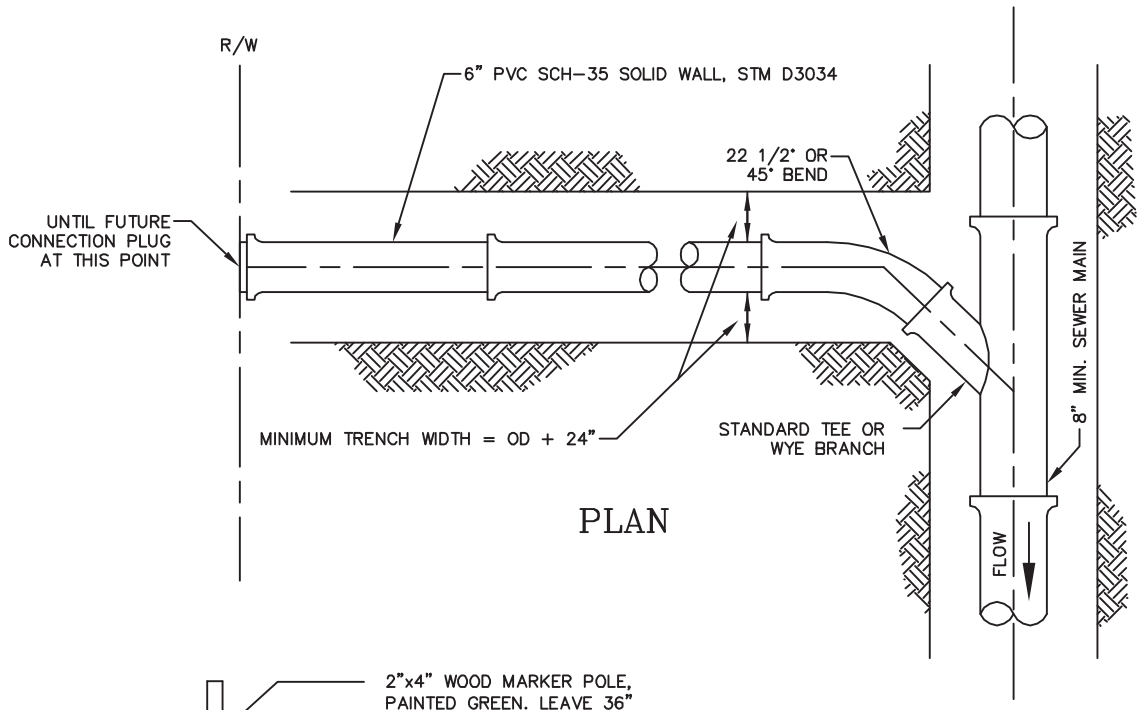
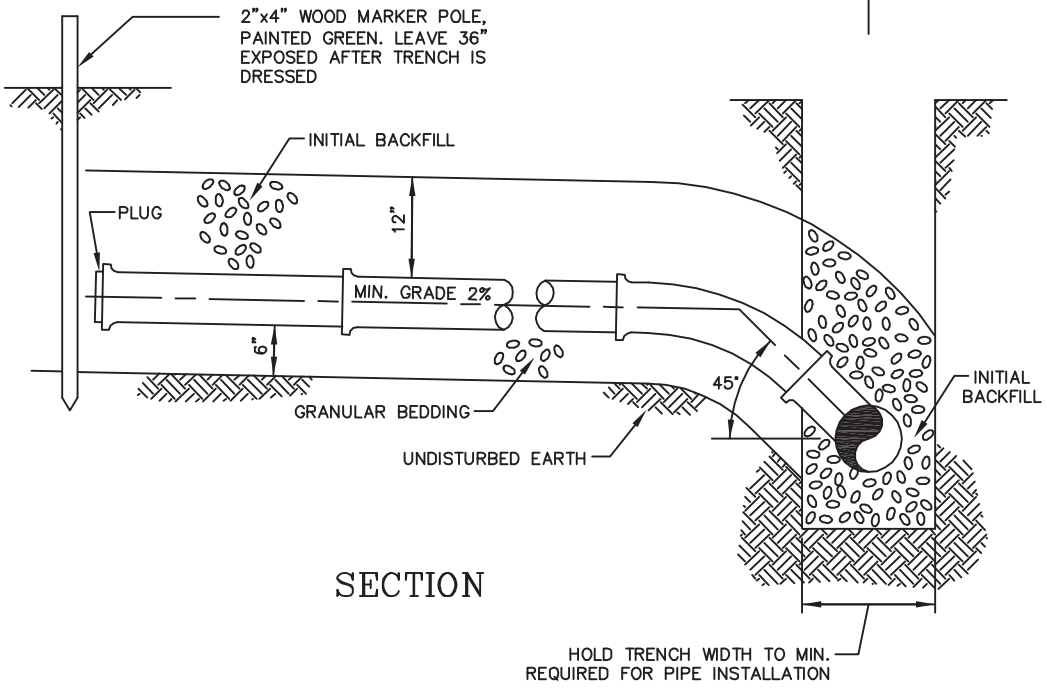
Fax: (859) 331-2436

DATE: APRIL 2010

STANDARD DRAWING NO: 114



PLAN



SECTION

NOTE:

1. SEWER SERVICE CONNECTION TO SEWER LATERAL SHALL BE BY MEANS OF FLEXIBLE PIPE CONNECTORS (COUPLING OR DONUT TYPE) WHEN JOINING PIPES OF DIFFERENT MATERIAL. DETAIL ALSO APPLIES FOR ALL 4" SEWER SERVICE LATERALS IF SHOWN ON DRAWINGS.
2. ALL LATERAL CONNECTIONS SHALL BE MADE BETWEEN THE 10 AND 11 O'CLOCK AND THE 1 AND 2 O'CLOCK POSITIONS TO THE SEWER MAIN.
3. FOR ALL SEWER LATERAL CONSTRUCTION BEYOND PUBLIC R/W, REFER TO STD. DWG. 113.
4. LATERAL INSTALLATIONS SHALL FOLLOW ALL BEDDING AND BACKFILL REQUIREMENTS IN SD1 STANDARD SPECIFICATIONS, SECTION 02220.

SEWER LATERAL INSTALLATION

N.T.S.

REVISION	BY	DATE

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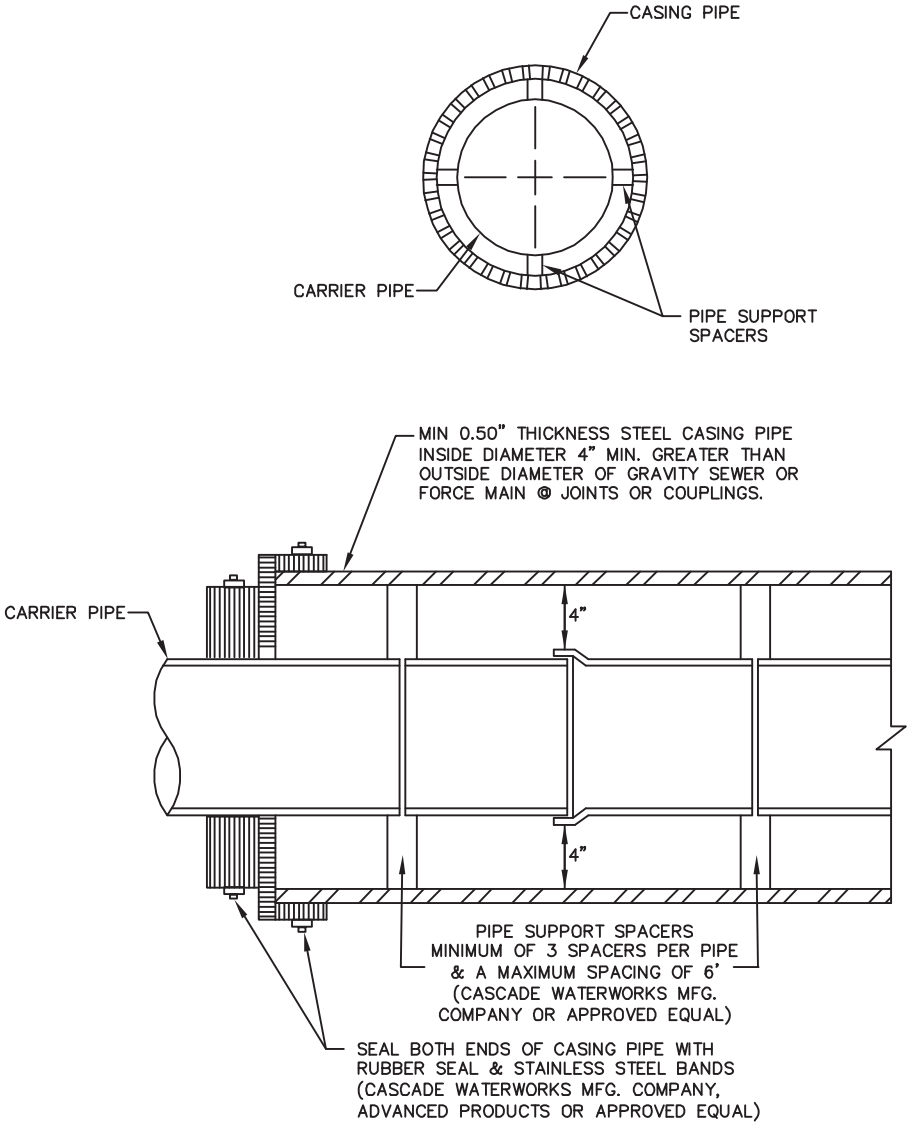
FT. Wright, Kentucky 41017
Ph: (859) 578-7460
Fax: (859) 331-2436

DATE:
APRIL 2010

STANDARD
DRAWING NO:
120



STEEL CASING PIPE

N.T.S.

REVISION	BY	DATE

SANITATION DISTRICT NO. 1
1045 Eaton Drive
FT. Wright, Kentucky 41017
Ph: (859) 578-7460
Fax: (859) 331-2436

DATE:
APRIL 2010

STANDARD DRAWING NO:
121

NOTE:

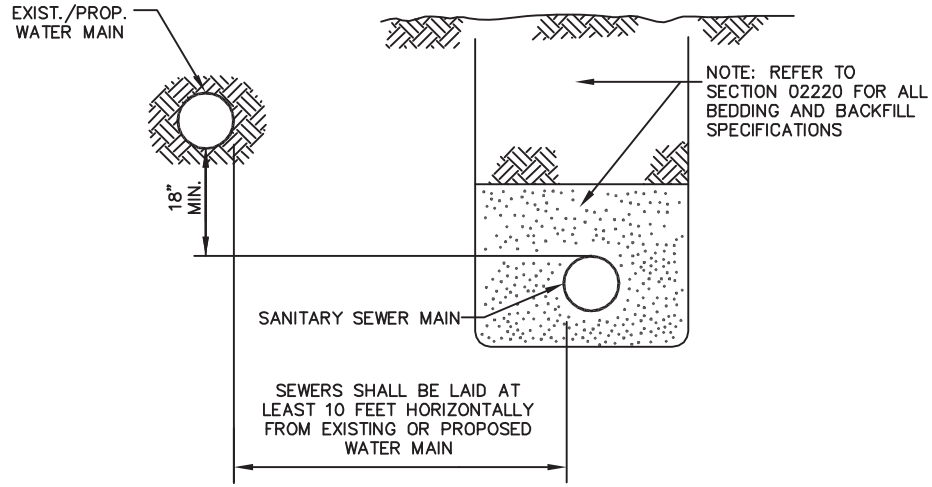
1. THE WATER MAIN SHALL MAINTAIN A CLEAR SEPARATION OF AT LEAST 10'.

2. WHERE 10' OF HORIZONTAL SEPARATION IS NOT PRACTICAL, THE SEPARATION MAY BE LESS PROVIDED:

   A. THE WATER MAIN IS CONSTRUCTED IN A SEPARATE TRENCH

   B. THE ELEVATION OF THE BOTTOM OF THE WATER MAIN IS AT LEAST 18" ABOVE THE TOP OF THE SEWER.

3. WHEN EITHER OF THE FIRST TWO CONDITIONS CANNOT BE MET, CONSULT THE NORTHERN KY WATER DISTRICT FOR RELOCATION REQUIREMENTS.



SEWER MAIN PARALLELING WATER MAIN
N.T.S.

NOTE:

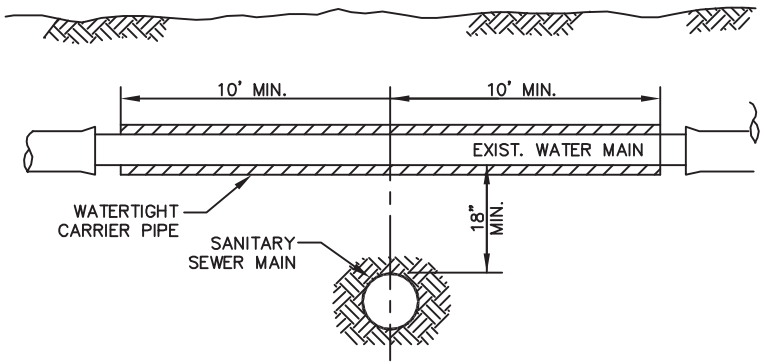
WHEN IT IS IMPOSSIBLE TO OBTAIN A PROPER VERTICAL SEPARATION OF AT LEAST 18" BETWEEN THE WATER MAIN AND GRAVITY SEWER, ONE OF THE FOLLOWING METHODS OF CONSTRUCTION MUST BE ACHIEVED:

1. A. THE WATER MUST BE CONSTRUCTED TO COMPLY WITH THE PUBLIC WATER SUPPLY DESIGN STANDARDS OF THE GOVERNING AGENCY

   B. GRAVITY SEWER MUST BE CONSTRUCTED OF EPOXY LINED DUCTILE IRON SLIP-ON OR MECHANICAL JOINT PIPE COMPLYING WITH SD1'S REQUIREMENTS.

   C. THE WATER MAIN AND GRAVITY SEWER ARE PRESSURE TESTED TO 150 PSI TO ASSURE WATERTIGHTNESS.

2. EITHER THE WATER MAIN OR SEWER LINE IS ENCASED IN A WATERTIGHT CARRIER PIPE WHICH EXTENDS 10 FEET ON BOTH SIDES OF THE CROSSING, MEASURED PERPENDICULAR TO THE WATER MAIN, THE CARRIER PIPE SHALL BE CONSTRUCTED OF APPROVED SD1 MATERIALS.



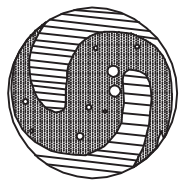
(WHERE A WATER MAIN CROSSES UNDER A SEWER, ADEQUATE STRUCTURAL SUPPORT SHALL BE PROVIDED FOR THE SEWER TO MAINTAIN LINE AND GRADE.)

SEWER CROSSING WATER MAIN
N.T.S.

DATE: APRIL 2010

STANDARD DRAWING NO: 126

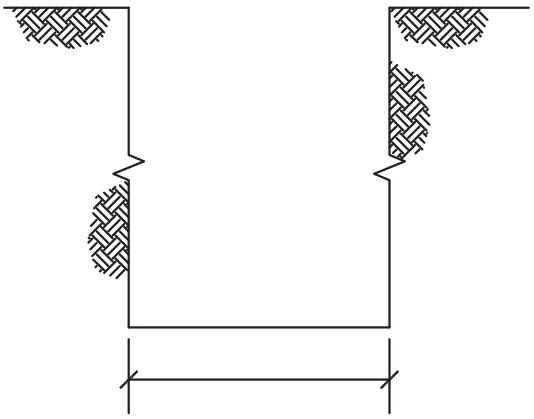
SANITATION DISTRICT NO. 1
1045 Eaton Drive
FT. Wright, Kentucky 41017
Ph: (859) 578-7460
Fax: (859) 331-2436



REVISION	BY	DATE

NKSD1 Requirements for Sewer Trench Compaction

STEP 1



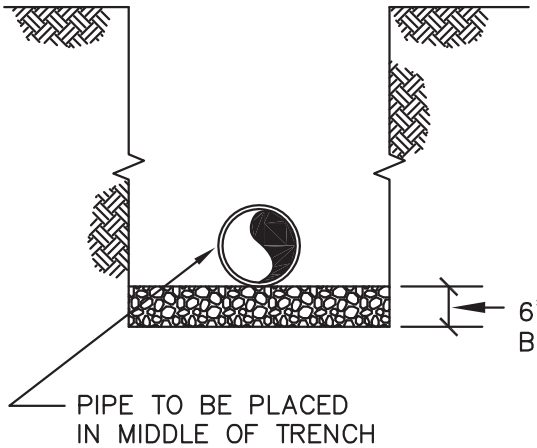
MINIMUM TRENCH WIDTH
SEE NOTES BELOW

- EXCAVATED TRENCH
- PIPE NOT INSTALLED YET
- EXAMINE TRENCH BOTTOM:
  - → IF FIRM & SOLID, PROCEED TO NEXT STEP
  - → IF UNSUITABLE SUBGRADE IS ENCOUNTERED, CONTRACTOR SHALL OVER EXCAVATE BOTTOM TO REMOVE UNSUITABLE MATERIAL & REPLACE WITH SUITABLE BACKFILL

FLEXIBLE PIPE	MIN TRENCH WIDTH
PIPE LESS OR EQUAL TO 36" DIA	PIPE O.D. + 24"
PIPE GREATER THAN 36" DIA	PIPE O.D. + 48"

RIGID PIPE	MIN TRENCH WIDTH
PIPE LESS OR EQUAL TO 36" DIA	PIPE O.D. + 24"
PIPE GREATER THAN 36" DIA	PIPE O.D. + 2*(O.D./6)

STEP 2



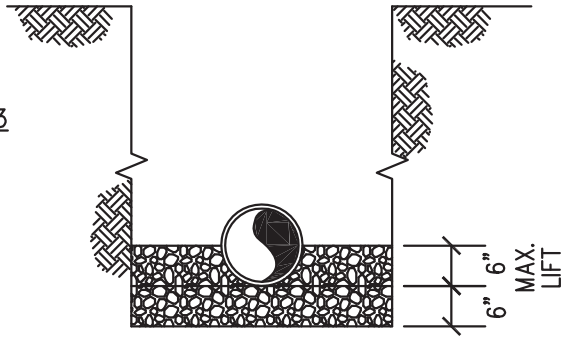
- PLACE 6" EMBEDMENT MAT'L IN TRENCH
- COMPACT GRANULAR & SAND

  DENSITY (ASTM D 4253 AND D 4254).
- PLACE PIPE ON TOP OF COMPACTED MATERIALS TO AT LEAST 75% RELATIVE MATERIAL.

NOTES

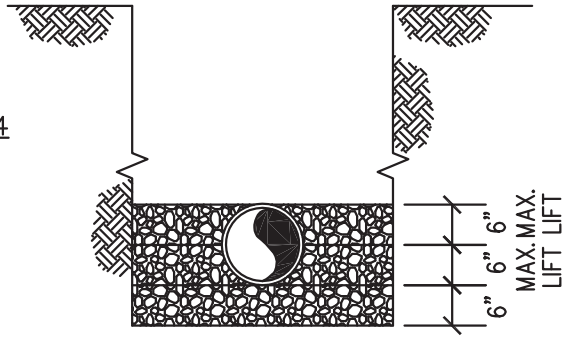
* APPLIES TO ALL AREAS, EXCEPT BENEATH STRUCTURES, FOUNDATIONS, AND ROADWAYS WHERE COMPACTION TO AT LEAST 85% RELATIVE DENSITY IS REQUIRED.

STEP 3



- PLACE EMBEDMENT MATERIAL IN A 6" LIFT MAXIMUM ALONG SIDES OF PIPE.
- HAVE CONTRACTOR SLICE MAT'L UNDER HAUNCHES OF PIPE WITH SHOVEL OR OTHER DEVICE TO FILL IN ALL VOID AREAS.
- COMPACT GRANULAR AND SAND MATERIALS TO AT LEAST 75% RELATIVE DENSITY. SEE STEP 2.

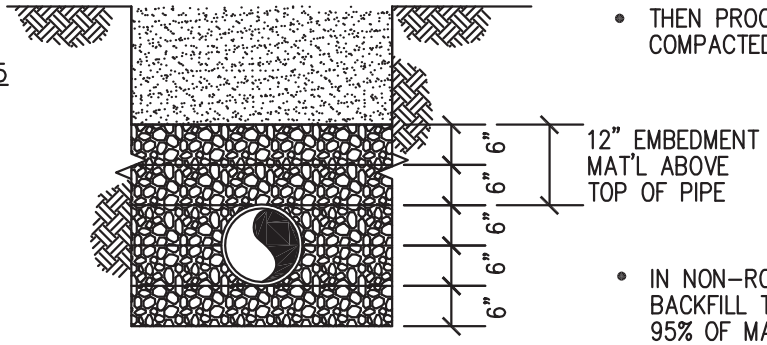
STEP 4



- PLACE NEXT 6" MAXIMUM LIFT OF EMBEDMENT MATERIAL ABOVE PREVIOUS LIFT.
- COMPACT EMBEDMENT MAT'L TO AT LEAST 75% RELATIVE DENSITY IN ACCORDANCE WITH STEP 2.
- CONTINUE PLACING EMBEDMENT MAT'L IN 6" LIFTS AND COMPACTING UNTIL REACH TOP OF PIPE.

- CONTINUE PLACING EMBEDMENT MATERIAL IN 6" MAXIMUM LIFTS AND COMPACT SAME AS ABOVE, UNTIL THERE IS 12" EMBEDMENT MATERIAL ABOVE THE TOP OF THE PIPE.
- THEN PROCEED WITH SOIL BACKFILL IN 8" COMPACTED LIFTS ABOVE EMBEDMENT MATERIAL.

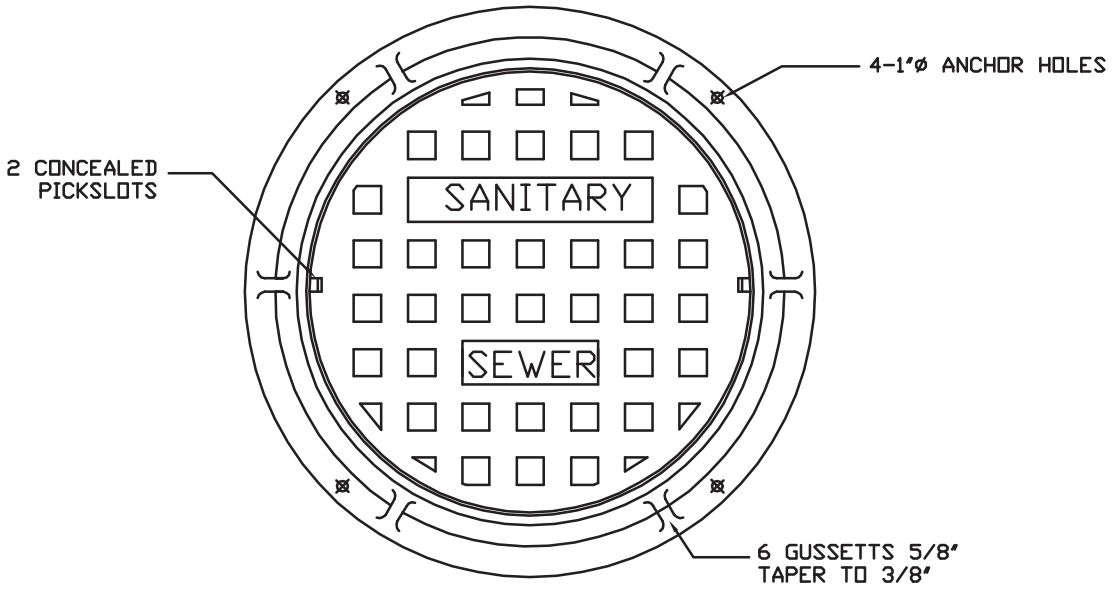
STEP 5

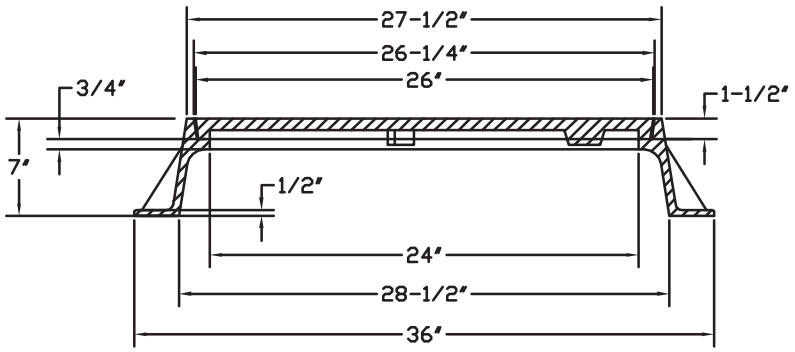


- IN NON-ROADWAY AREAS, SUITABLE BACKFILL TO BE COMPACTED TO 95% OF MAXIMUM STANDARD PROCTOR DRY UNIT WEIGHT AS DETERMINED BY ASTM D 698. FOR COMPACTION OF BACKFILL IN OTHER AREAS, SEE SECTION 02220.

STANDARD MANHOLE FRAME AND COVER

N.T.S.





CLASS 35B GRAY IRON
MACHINED BEARING SURFACES
HEAVY DUTY, H20 LOAD
RATED

REVISION	BY	DATE

SANITATION DISTRICT NO. 1
1045 Eaton Drive
FT. Wright, Kentucky 41017
Ph: (859) 578-7460
Fax: (859) 331-2436

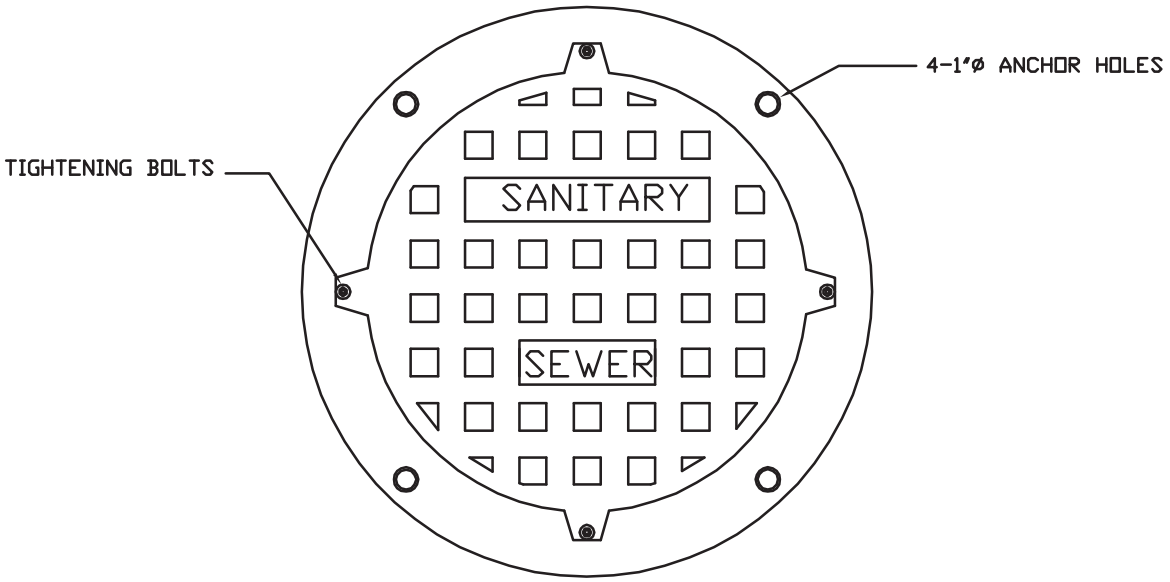
DATE: February 2011

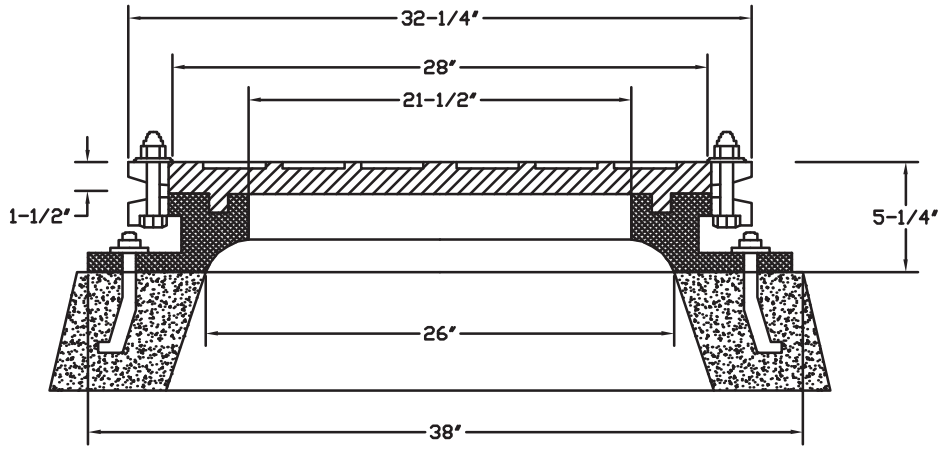
STANDARD DRAWING NO: 130

WATERTIGHT MANHOLE FRAME AND COVER

(FOR USE IN NON-ROADWAY AREAS & WHERE CASTING IS ABOVE GRADE)

N.T.S.





REVISION	BY	DATE

SANITATION DISTRICT NO. 1
1045 Eaton Drive
FT. Wright, Kentucky 41017
Ph: (859) 578-7460
Fax: (859) 331-2436

DATE: February 2011

STANDARD DRAWING NO: 131

Standard Electric and Communications Bid Item Descriptions

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 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.

EC 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 conduit under streets, creeks, etc. Payment under this item shall include the specified encasement pipe, conduit(s), void filler material (including grout, aggregate, bentonite, or other material as specified), casing spacers (as specified), labor, and equipment. No separate payment will be made for encasement pipe and/or conduits used within the limits of the directional bore. Payment under this item shall not be size specific and no separate bid items will be established for size or number of conduit variations to be installed. The encasement pipe, conduit sizes, and conduit numbers 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 bore size, encasement size, conduit size, or number of conduits. Some bores may not require the use of an encasement; but, may only require pulling the conduit directly into the bore. 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).

EC DUCT These items shall include all labor, equipment, and material to excavate, install, and backfill the specified bank of duct at locations shown in the plans in accordance with the specifications and standard drawings complete and ready for use. These bid items shall include all necessary appurtenances, connections, fittings, plugs, tees, bends, collars, racks or spacers, pull string, granular or concrete encasement, compacted earth or flowable fill backfill, and etc. Flowable fill, where specified on the plans and specifications, shall be considered incidental to the duct items. No separate payment will be made for flowable fill, unless directed to be used contrary to plans and specifications. All excavation shall be unclassified. No additional payment will be made for rock excavation. Duct shall be measured as the horizontal distance from outside face of structure to outside face of structure; or, to the point of duct termination at dead ends or poles. No additional payment will be made for vertical conduit. No separate bid items will be provided due to varying duct sizes. Any and all duct sizes and configurations shall be paid under these items. The only variations in bid items shall be in the number of duct in a bank and if the duct is or is not to be concrete encased. 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).

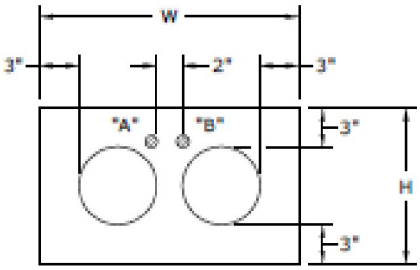
EC ELECTRIC MANHOLE, ELECTRIC PIT, ELECTRIC PULL BOX, COMMUNICATIONS MANHOLE, COMMUNICATIONS PULL BOX These items shall include all labor, equipment, excavation, materials, and backfill to install the specified manhole, pit, or pull box at the locations as shown on the plans in accordance with the specifications and standard drawings complete and ready for use. No separate bid items will be provided for varying sizes of structures. All structures shall be paid under the appropriate bid item regardless of size. Where structures are specified to be backfilled with flowable fill, the cost of the flowable fill shall be considered incidental to the 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.

EC LINE MARKER This item is for payment for furnishing and installing an electric or communications 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.

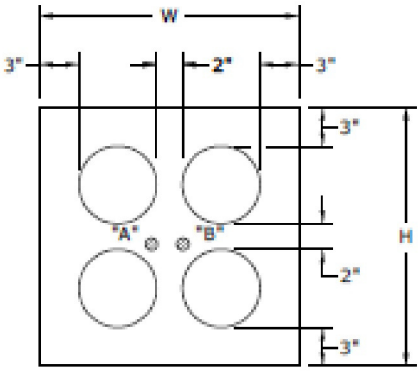
EC POLE REMOVE AND STOCKPILE This item shall include all labor and equipment required in the removal of a wood, steel, or other type utility pole regardless of material or size. No separate pole removal bid items will be provided for pole material type or size variations. This item also includes removal of any associated attachments to the pole including, but not limited to, cross-arms, hangers, brackets, insulators, downguys, etc. All removed materials shall be stockpiled on site at a location or locations previously agreed to between the utility owner and contractor for pickup and disposal by the utility owner. Stockpile locations shall be accessible to the utility owner's road vehicles. Any pole removed that still has cross-arms, protruding insulators and/or protruding brackets attached shall have such items removed by the contractor so poles can be stacked neatly for pickup. Removed cross-arms, insulators and brackets shall be stacked separately for pickup. This item shall be paid EACH (EA) when the poles and attachments are stockpiled and ready for pickup.

CONDUIT SPECIFICATIONS

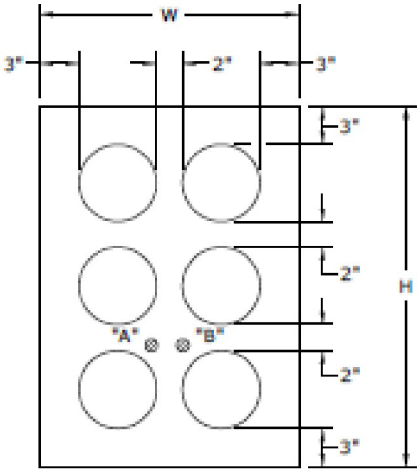
- Owner: Duke Energy/ Eagle Realty Group
- Description: Underground Electric and Telecom Conduit and Facilities
- Location: Boone County/Kenton County
  KY 236
  Donaldson Road Reconstruction
  Item No. 06-444.00
- Date: November, 2022



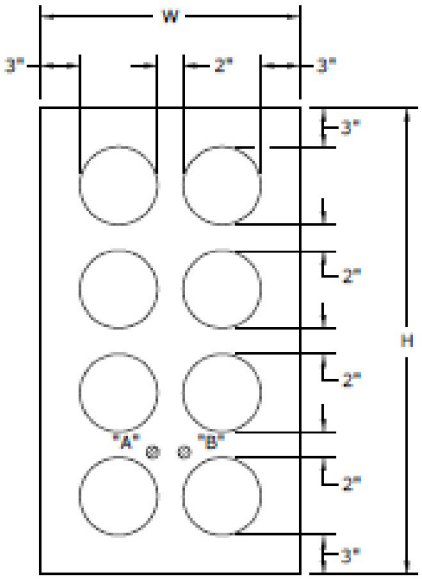
2W X 1H



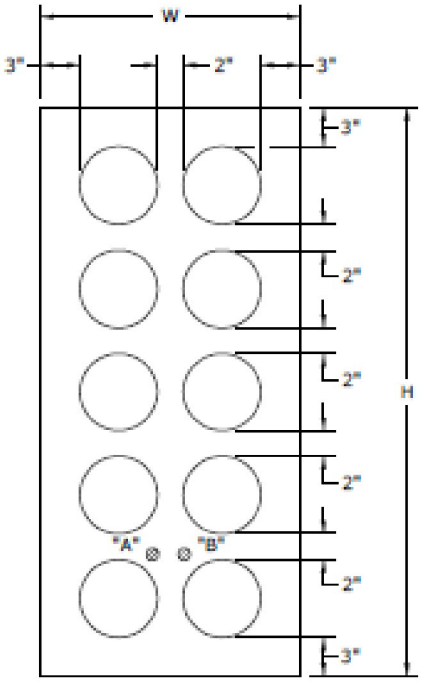
2W X 2H



2W X 3H



2W X 4H



2W X 5H

TWO COLUMN DUCT BANK OUTSIDE DIMENSIONS						
CONDUIT SIZE	DUCT WIDTH (W)	DUCT HEIGHT (H)				
		1 ROW	2 ROWS	3 ROWS	4 ROWS	5 ROWS
4"	17-1/4"	10-1/2"	17-1/4"	23-7/8"	30-1/2"	37-1/8"
5"	19-3/8"	11-1/2"	19-5/16"	27"	34-11/16"	42-3/8"
6"	21-1/2"	12-3/4"	21-3/8"	30"	38-5/8"	47-1/4"

CUBIC YARDS OF CONCRETE REQUIRED PER FOOT OF TWO COLUMN DUCT BANKS					
CONDUIT SIZE	DUCT HEIGHT (H)				
	1 ROW	2 ROWS	3 ROWS	4 ROWS	5 ROWS
4"	0.03841	0.06018	0.08140	0.10261	0.12383
5"	0.04487	0.07136	0.09723	0.12310	0.14898
6"	0.05278	0.08275	0.11273	0.14270	0.17267

2

NOTES:

1. SEE DWG. 22.06-112A FOR GROUNDING REQUIREMENTS.
2. "⊗" INDICATES THE END VIEW OF THE #2 BARE COPPER WIRE.
3. ALTERNATE THE POSITION OF THE #2 BARE COPPER WIRE FROM "A" TO "B" IN THE CONDUIT SPACERS.

DUKE ENERGY.

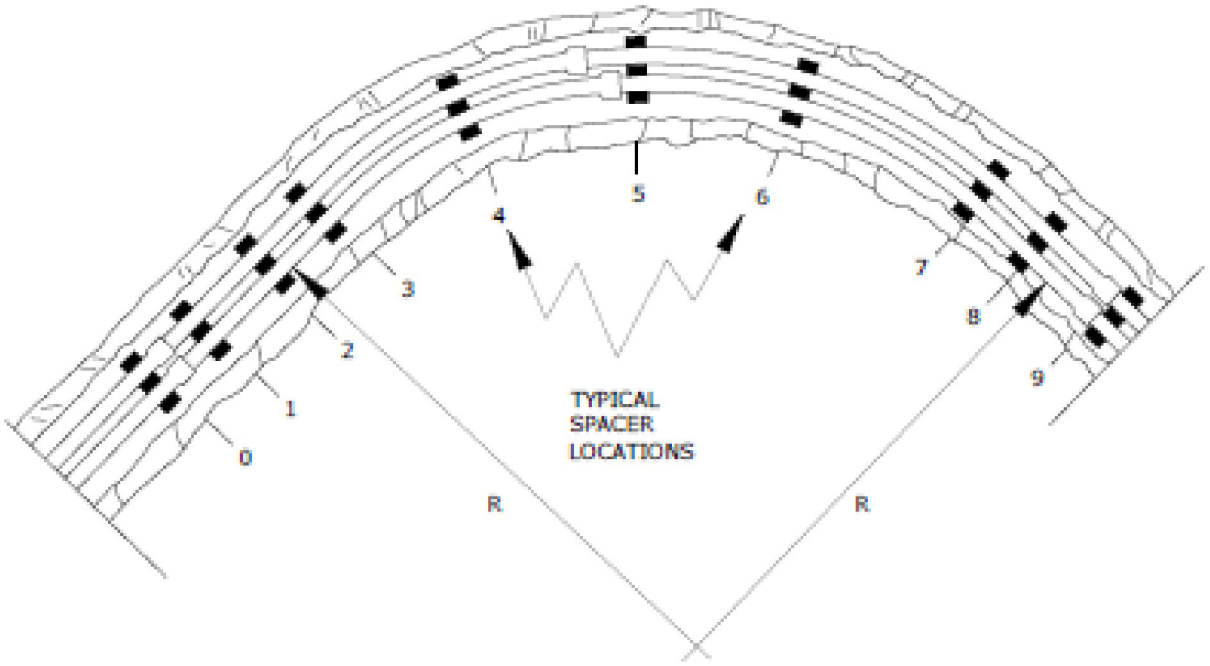
REVISED	BY	CK'D	APPR.
3				
2				
1				
0	12/31/15	FLETCHER	BANKS	ADCOCK

DUCT BANK CONFIGURATIONS

TWO WIDE

DEC	DEM	DEP	DEF
X	X	X	X

22.06-102



R=RADIUS OF BEND
(35' - 150')

NOTES:

1. SEE DWG. 22.06-102 OR 22.06-104 FOR CONFIGURATION DETAILS.
2. BENDS OF LESS THAN 35' RADIUS CAN BE ACCOMPLISHED USING FACTORY BENDS. BENDS GREATER THAN 150' GENERALLY REQUIRE NO SPECIAL TECHNIQUE.
3. JOINTS WHICH FALL WITHIN THE RADIUS OF THE CURVE ARE SUBJECTED TO THE SAME BENDING FORCES AS THE CONDUIT ITSELF. TO PREVENT THE TENSION SIDE (OUTSIDE OF CURVE) OF THE JOINT FROM FAILING, CAUTION MUST BE TAKEN TO ALLOW SUFFICIENT CURING TIME FOR ALL JOINTS IN THE RADIUS IN THE BEND. TWO HOURS CURING TIME IS REQUIRED AT 70°F. SHORTER TIMES MAY BE ADEQUATE IN HOTTER WEATHER AND LONGER TIMES MAY BE REQUIRED IN COLD WEATHER. SEE DWG. 22.05-100 FOR DETAILS ON JOINING PVC CONDUIT.
4. FOR BENDS WHERE THE RUNNING LENGTH OF DUCT REQUIRED IS 150' OR LESS, THE BENDING OPERATION IS SIMPLIFIED IF THE ENTIRE LENGTH IS PREASSEMBLED AND ALLOWED TO CURE PRIOR TO BENDING, PARTICULARLY IN INSTALLATIONS WHERE THE RADIUS OF CURVATURE IS LESS THAN 80'.
5. DRIVE REBAR INTO THE GROUND AT EACH SPACER LOCATION TO HOLD THE ASSEMBLY IN THE PROPER RADIUS.

3

DUKE ENERGY.

3					
2					
1					
0	12/31/18	PURCHER	BAKER	ADCOCK	
REVISED BY		CK'D		APPR.	

DUKE ENERGY.

DEC	DEM	DEP	DEF	
X	X	X	X	

DUCT BANK FIELD BENDS

22.06-118

A #2 AWG BARE COPPER GROUND WIRE SHALL BE INSTALLED IN THE CONCRETE OF THE DUCT BANK INSTILLATION FOLLOWING THE INSTRUCTIONS BELOW. A TEN FOOT TAIL OF THE #2 COPPER SHOULD BE LEFT EXPOSED INSIDE EACH VAULT/MANHOLE WITH THE ENTRY LOCATION GROUTED AND SEALED. A THREE FOOT TAIL SHOULD BE LEFT AT HAND HOLES.

1. INSTALL THE BOTTOM SPACERS AND THE BOTTOM ROW OF PVC CONDUITS IN THE TRENCH.
2. INSTALL THE #2 COPPER GROUND WIRE ALTERNATING THE WIRE FROM POSITION "A" TO POSITION "B" IN THE CONDUIT SPACERS. THE #2 COPPER GROUND WIRE SHOULD BE SAGGED WITH A MINIMUM TWO INCH CLEARANCE FROM THE BOTTOM OF THE TRENCH. REFER TO FIGURE 1 BELOW FOR DETAILS.
3. IF THE COPPER GROUND WIRE HAS TO BE SPLICED IN THE DUCT BANK BETWEEN MANHOLES, A COMPRESSION TYPE COPPER CONNECTOR OR EXOTHERMIC WELD SHALL BE USED.
4. INSTALL THE REMAINING SPACERS AND PVC CONDUIT AS SHOWN BELOW.

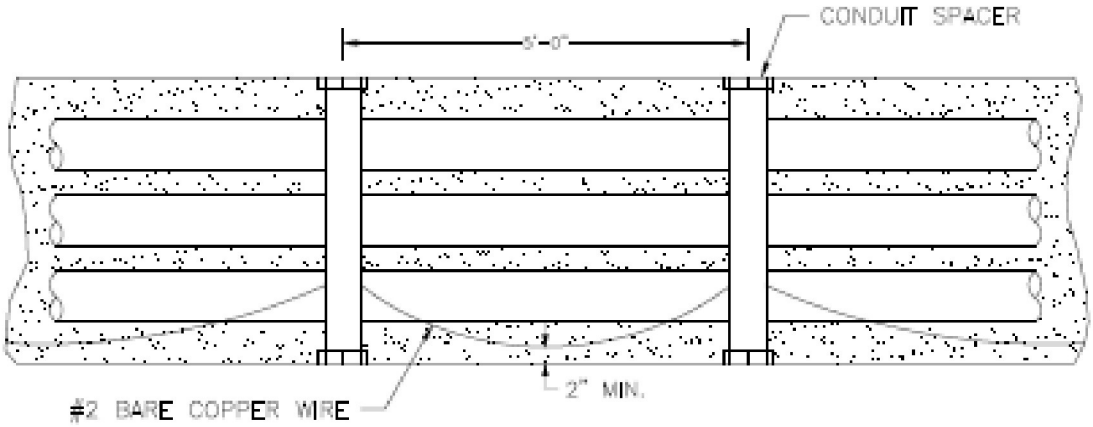
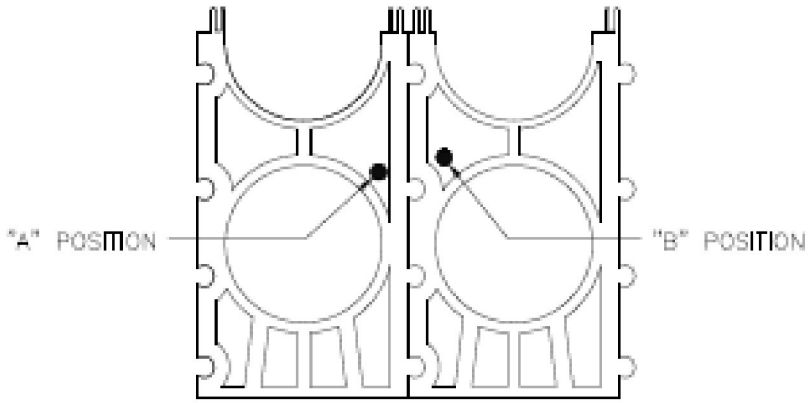


FIGURE 1



GROUND WIRE DUCT BANK

4

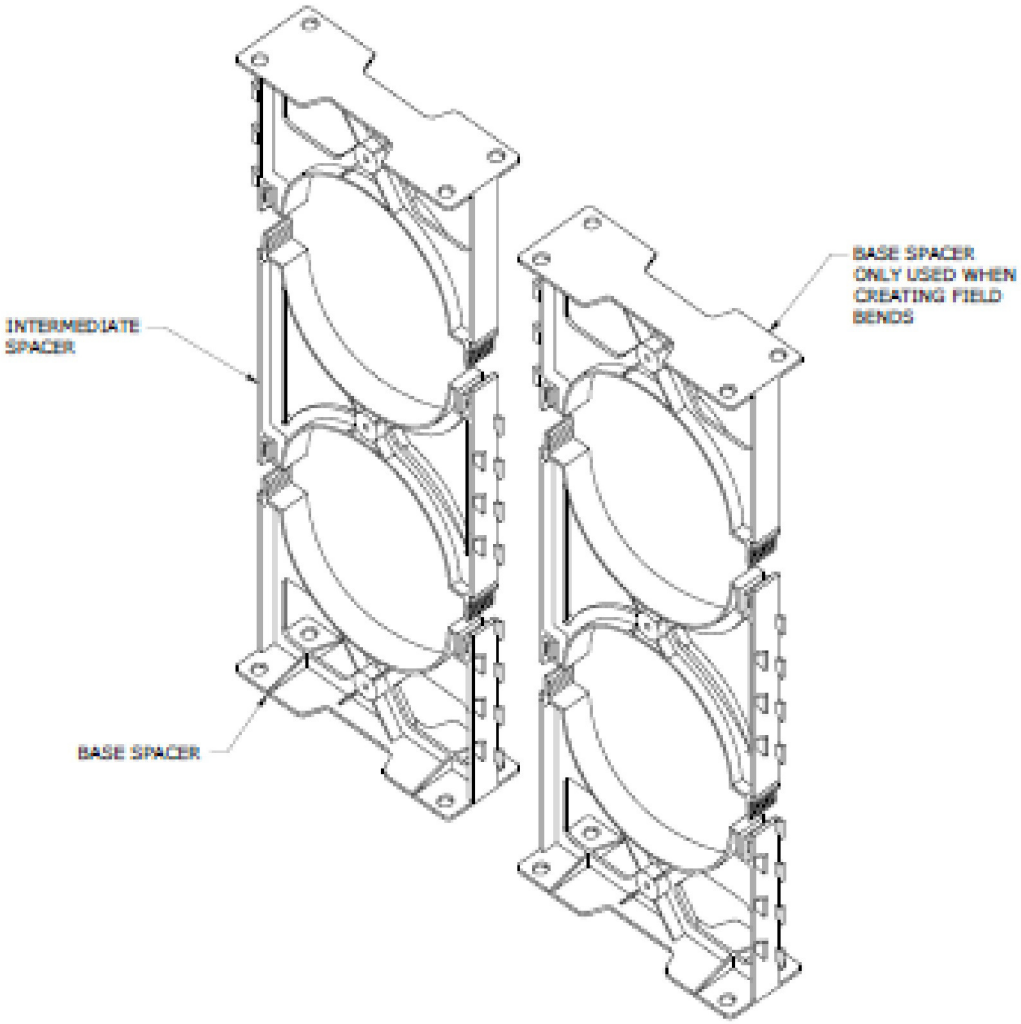
3				
2				
1				
0	12/31/19	PLOT CHECK	DwDs	ABCDEF
REVISED		BY	CK'D	APPR.

DUCT BANK GROUNDING

DUKE ENERGY.

DEC	DEM	DEP	DEF
X	X	X	X

22.06–112A



DUCT SIZE	REGION	ITEM NUMBER	
		BASE SPACER	INTERMEDIATE SPACER
2"	DEC	196423	1476143
3"	DEC	1476144	1476145
4"	DEC	1477614	1455529
	DEM	900272	900276
5"	DEC	196420	196419
	DEM	900271	900273
6"	DEC	196421	196422
	DEM	50110984	50117543
	DEP	50110984	50117543

NOTES:

1. SPACERS ARE ASSEMBLED BY PUSHING THEM TOGETHER.
2. BASE SPACERS AND INTERMEDIATE SPACERS INTERLOCK BOTH VERTICALLY AND HORIZONTALLY.
3. SPACERS SHOULD BE INSTALLED APPROXIMATELY EVERY FIVE FEET.
4. USE A BASE SPACER TURNED UPSIDE DOWN FOR TOP WHEN INSTALLING FIELD BENDS.
5. SEE DWGS. 22.06-102 AND 22.06-104 FOR PREFERRED CONFIGURATIONS OF DUCT BANK SPACERS AND FOR SPECIFIC INSTALLATION INSTRUCTIONS.

5

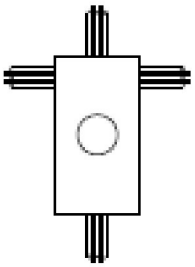
3				
2				
1				
0	8/7/17	PURCHASE BASED ACCESS		
REVISED BY		CHK'D	APPR.	

DUCT BANK SPACERS

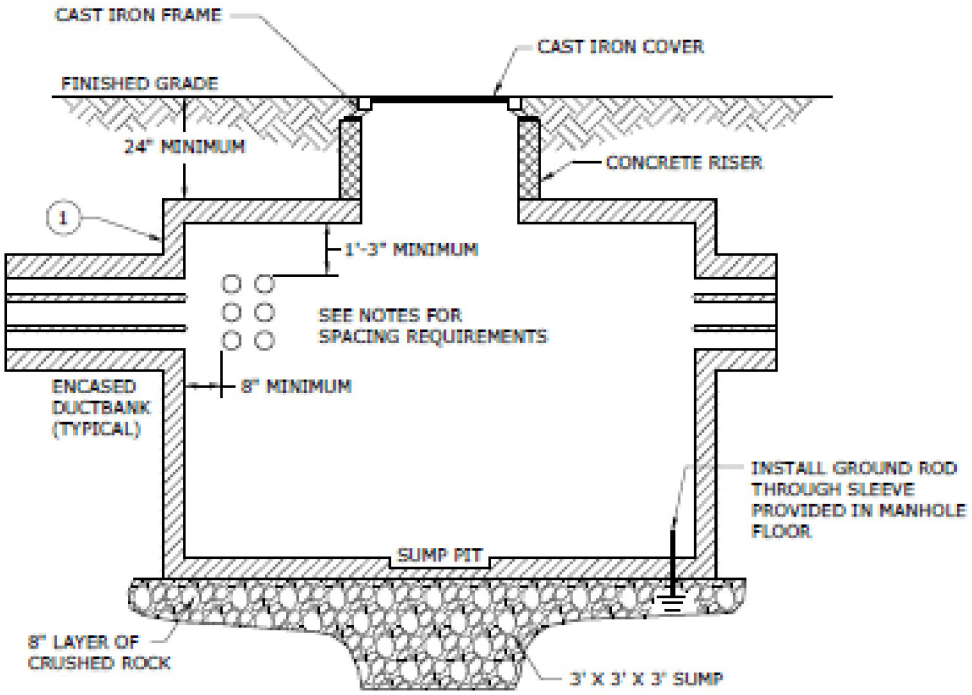
DUKE ENERGY.

DEC	DEM	DEP	DEF
X	X	X	X

22.06-110



AVAILABLE
CONDUIT ENTRY
POSITIONS
(J-TYPE MANHOLE)



		BILL OF MATERIALS				
MACRO UNIT	BUBBLE NUMBER	COMPATIBLE UNIT	CU QTY	ITEM NUMBER	ITEM QTY/ CU	DESCRIPTION
	1	71050 12L X 6W X 7D PAVE	1	50125640	1	12'L X 6'W X 7'D, FOR 15KV AND 35KV SPLICING
	1	71050 12L X 6W X 7D SOD			1	12'L X 6'W X 7'D, FOR 15KV AND 35KV SPLICING
	1	71050 10L X 5W X 7D PAVE	1	50119916	1	10'L X 5'W X 7'D, FOR 15KV SINGLE CIRCUIT SPLICING
	1	71050 10L X 5W X 7D SOD			1	10'L X 5'W X 7'D, FOR 15KV SINGLE CIRCUIT SPLICING
	1	71050 8L X 4W X 7D PAVE	1	50119918	1	8'L X 4'W X 7'D, FOR URD CABLE SPLICING
	1	71050 8L X 4W X 7D SOD			1	8'L X 4'W X 7'D, FOR URD CABLE SPLICING
	1	MANHOLE SEALANT	8	1520164	1 ROLL	COMPOUND, SEALING, PREMIUM GRADE, BUTYL RUBBER, BLACK, 1" DIA. X 14.5' ROLL

NOTES:

1. PRECAST MANHOLES MUST BE ORDERED FOR SPECIFIC REQUIREMENTS. DELIVERY TO THE JOBSITE AND PLACEMENT IN THE EXCAVATION AREA ARE INCLUDED IN THE PURCHASE PRICE. THE CONSTRUCTION SUPERVISOR MUST COORDINATE DELIVERY OF THE MANHOLE BASED ON THE JOB SCHEDULE.
2. THE BOTTOM OF THE EXCAVATION FOR THE PRECAST MANHOLE SHOULD BE FILLED WITH AN 8" THICK LAYER OF CRUSHED ROCK. IT SHOULD BE LEVEL. A SUMP OR "FRENCH DRAIN", 3 FT. SQUARE AND 3 FT. DEEP AND FILLED WITH GRAVEL SHOULD BE PLACED UNDER THE SUMP HOLE KNOCKOUT IN THE MANHOLE. THE SUMP HOLE SHOULD BE OPENED AFTER THE MANHOLE IS SET.
3. ALL PRECAST MANHOLES ARE CONFIGURED AS CORNER MANHOLES (TYPE "J"). IN ADDITION TO DUCT TERMINATORS FOR (6) SIX-6" DUCTS IN EACH END, THERE ARE (6) SIX-6" DUCT TERMINATORS IN BOTH SIDES OF ONE END OF THE MANHOLE.
4. MANHOLES COME WITH GALVANIZED STEEL CABLE RACKS AND ARMS THAT MOUNT TO INSERTS PRE-INSTALLED IN THE WALLS. SEE THE CABLE RACKING SECTION OF THE CHAPTER FOR MORE DETAILS AND OTHER RACKING OPTIONS SUCH AS CAST IRON AND NON-METALLIC PRODUCTS.
5. MANHOLE COVERS IN OHIO AND KENTUCKY MUST IDENTIFY THE OWNER OF THE MANHOLE. INDIANA INSTALLATIONS MAY USE A LID MARKED "ELECTRIC". SEE THE MANHOLE FRAME AND COVER SECTION OF THIS CHAPTER FOR MORE DETAILS.
6. MANHOLE CHIMNEYS, GRADE RING RISERS, AND INFRA-RISERS, ALONG WITH THE MANHOLE COVER FRAME, MAY BE USED TO FILL THE GAP BETWEEN THE TOP OF THE MANHOLE AND FINISHED GRADE. SEE THOSE SECTIONS OF THIS CHAPTER FOR DETAILS.
7. INSTALL 4/0CUBS7 GROUND BUS AROUND MANHOLE APPROXIMATELY 12" ABOVE THE FLOOR AND CONNECT TO THE GROUND ROD USING A SUITABLE CLAMP.
8. EIGHT (8) ROLLS OF MANHOLE SEALANT (14.5 FT. IN LENGTH) ARE PROVIDED WITH EACH PRE-CAST MANHOLE INSTALLATION. THE SEALANT IS TO BE PLACED AT JOINTS BETWEEN CONCRETE SECTIONS AND CONCRETE RISERS.

6

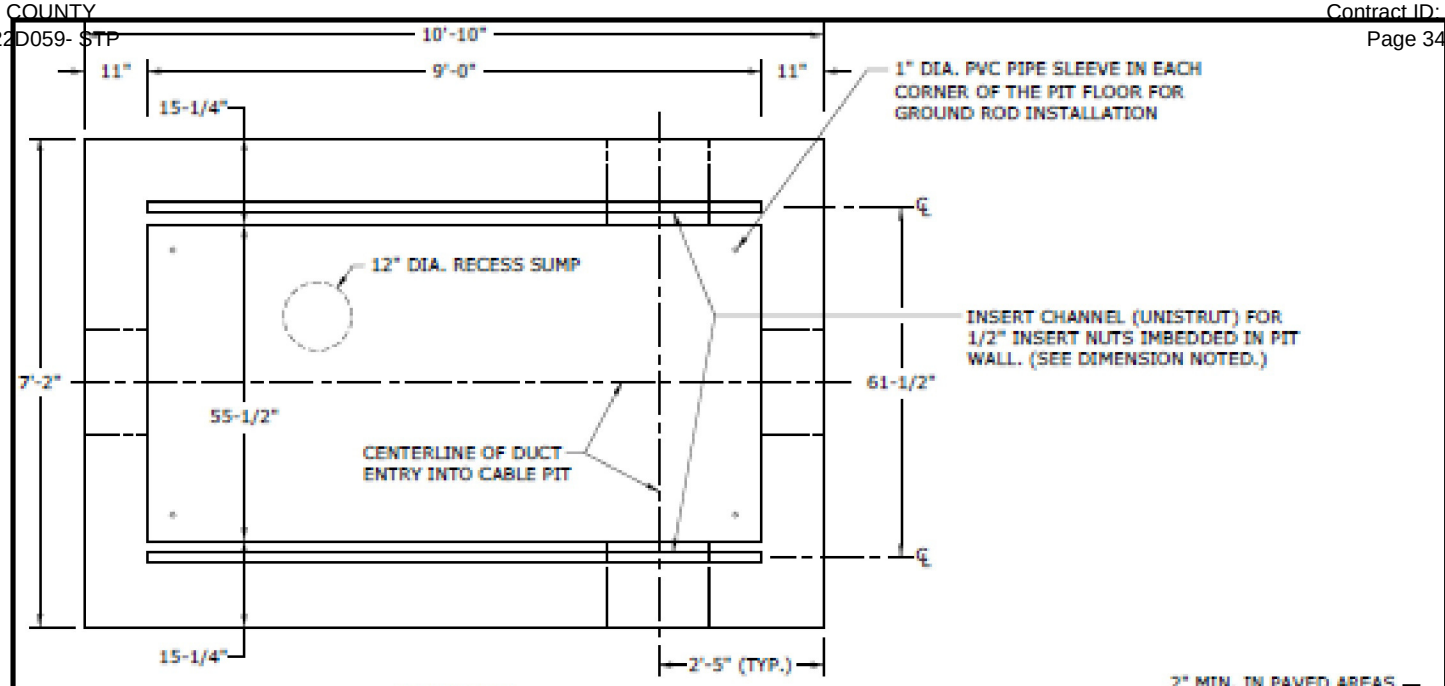
DUKE ENERGY.

REVISED	BY	CK'D	APPR.
3			
2			
1			
0	3/31/17	RANBI	FLETCHER

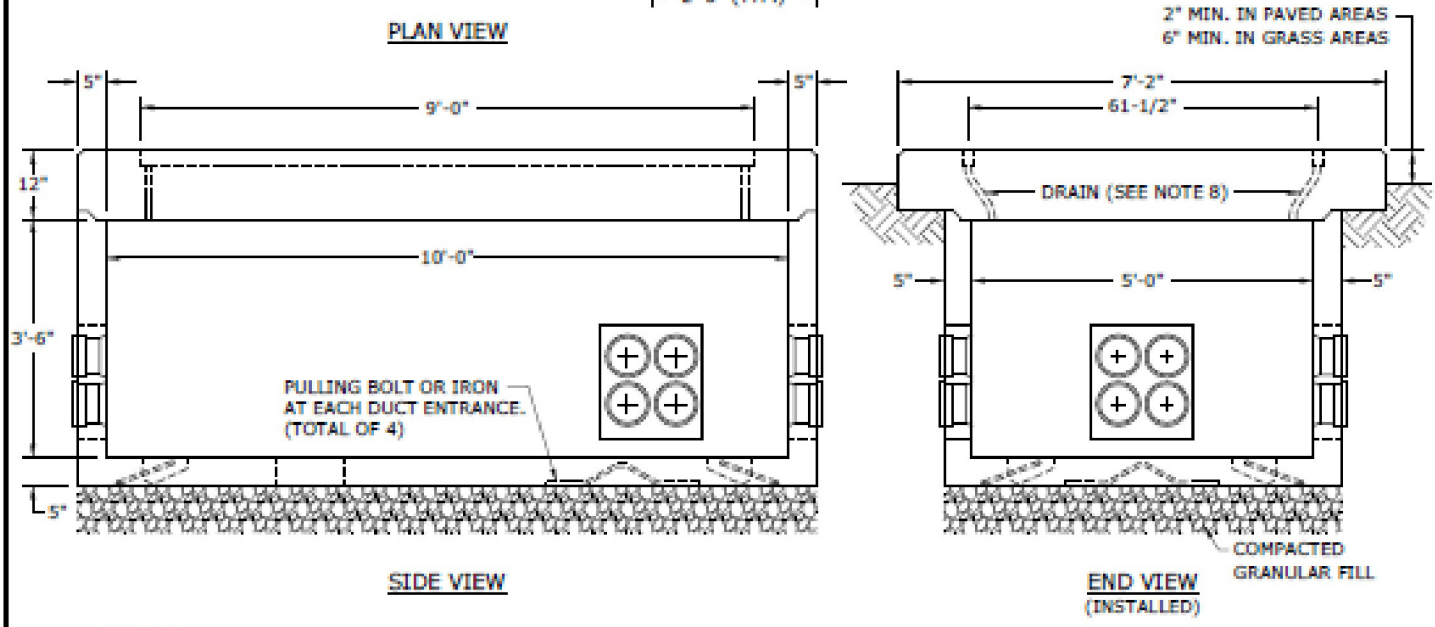
MANHOLES - PRECAST

DEC	DEM	DEP	DEF
	X		

29.14-102



PLAN VIEW



SIDE VIEW

END VIEW
(INSTALLED)

NOTES:

1. THE INSIDE DIMENSIONS FOR THE PRE-CAST CABLE PIT ARE 5 FT. WIDE X 10 FT. LONG X 4'-6" DEEP. THE CLEAR OPENING AT THE TOP WHERE THE EQUIPMENT IS POSITIONED MUST BE 9 FT. LONG TO ENSURE PROPER FIT FOR THE COVER PLATES.
2. EACH LONG WALL HAS A 9 FT. SECTION OF IMBEDDED UNISTRUT ALONG THE LENGTH OF THE OPENING. THESE UNISTRUT CHANNELS MUST BE LOCATED 61-1/2" APART CENTER TO CENTER.
3. THE BOTTOM OF THE EXCAVATION FOR THE PRECAST CABLE PIT MUST BE LEVEL WITH A MINIMUM OF 8" OF COMPACTED GRANULAR FILL. A SUMP OR FRENCH DRAIN 3 FT. SQUARE AND 3 FT. DEEP WITH GRAVEL FILL IS TO BE PROVIDED UNDER THE SUMP HOLE KNOCKOUT IN THE FLOOR OF THE CABLE PIT.
4. WALLS AND FLOORS MUST BE OF A THICKNESS SUCH THAT THE CABLE PIT IS STRUCTURALLY SOUND AND CAPABLE OF CARRYING THE WEIGHT OF THE SWITCHGEAR (2000 LBS. MAXIMUM).
5. THERE ARE (4) 1" I.D. PVC PIPE SLEEVES THROUGH THE FLOOR LOCATED APPROXIMATELY 1 FT. FROM EACH CORNER FOR INSTALLING GROUND RODS.
6. THERE ARE (4) DUCT ENTRY POINTS, ONE AT EACH SIDE AS SHOWN. MANUFACTURER IS TO PROVIDE KNOCKOUTS, SLEEVES, OR INSERTS TO ACCOMMODATE (4) 6" I.D. SCH. 40 PVC DUCTS AT EACH ENTRY LOCATION.
7. INDIVIDUAL CONDUITS ARE TO BE SEPARATED BY 4" (OUTSIDE TO OUTSIDE) WHERE THEY ENTER THE PIT. END OF CONDUIT TO BE TERMINATED IN A BELL END FITTING THAT IS FINISHED FLUSH WITH THE INSIDE WALL OF THE CABLE PIT.
8. 3/4" PVC DRAIN IS PROVIDED AT EACH CORNER TO ALLOW WATER TO DRAIN FROM UNISTRUT INTO CABLE PIT.

7

3				
2				
1				
0	12/31/20	GORLEY	FLETCHER	GRAHAM
REVISED		BY	CHK'D	APPR.

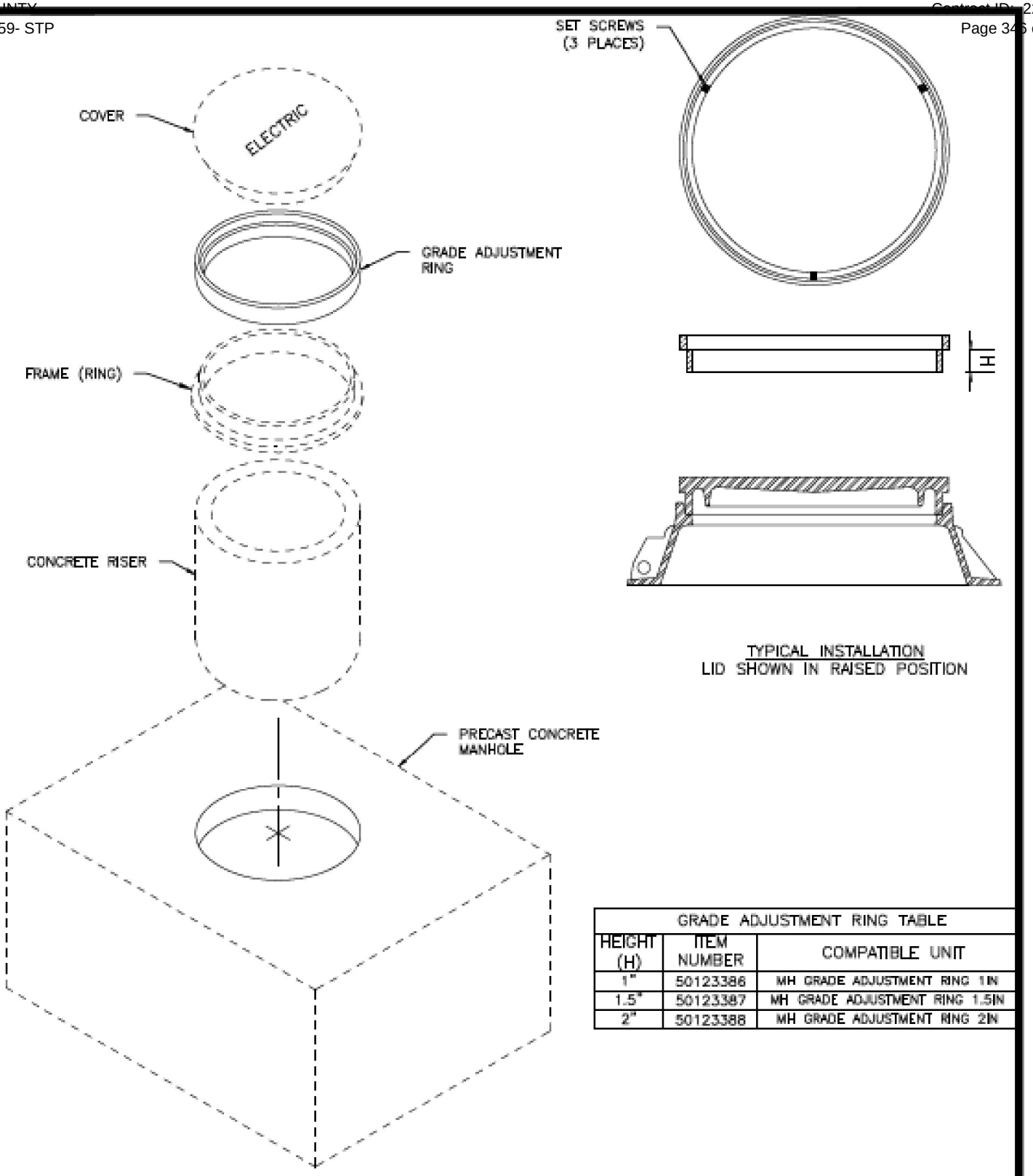
PRECAST CABLE PIT

FOR PAD-MOUNTED EQUIPMENT

DUKE ENERGY.

DEC	DEM	DEP	DEF
	X		

24.02-100



TYPICAL INSTALLATION
LID SHOWN IN RAISED POSITION

GRADE ADJUSTMENT RING TABLE		
HEIGHT (H)	ITEM NUMBER	COMPATIBLE UNIT
1"	50123386	MH GRADE ADJUSTMENT RING 1IN
1.5"	50123387	MH GRADE ADJUSTMENT RING 1.5IN
2"	50123388	MH GRADE ADJUSTMENT RING 2IN

8

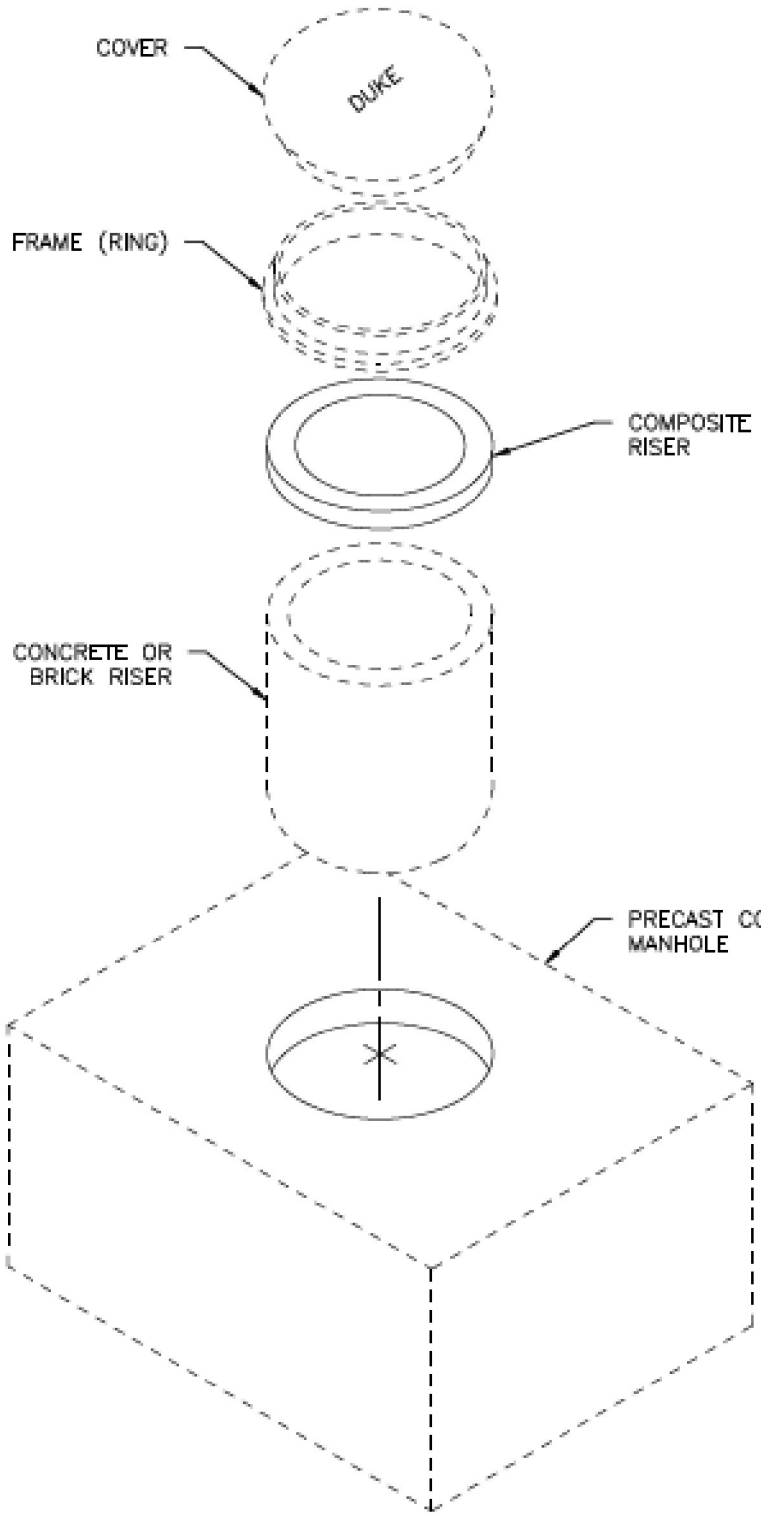
DUKE ENERGY.

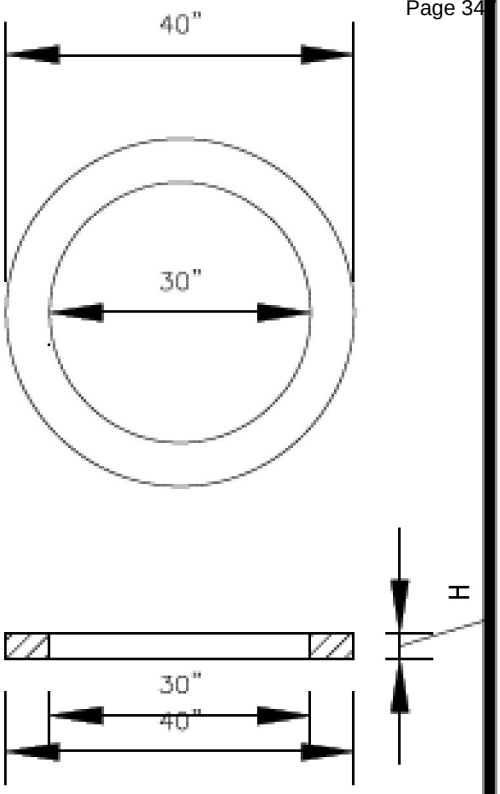
3				
2				
1				
0	12/31/17	GAINES	FLETCHER	ADCOCK
REVISED		BY	CK'D	APPR.

GRADE ADJUSTMENT RINGS - METALLIC

DEC	DEM	DEP	DE
X	X	X	X

29.14–112





GRADE ADJUSTMENT RING TABLE		
HEIGHT (H)	ITEM NUMBER	COMPATIBLE UNIT
0.5"	1536908	STRUCT-MH-RISER-COMP-LG-1/2IN-M
1"	1536909	STRUCT-MH-RISER-COMP-LG-1IN-M
2"	1536910	STRUCT-MH-RISER-COMP-LG-2IN-M
3"	1536911	STRUCT-MH-RISER-COMP-LG-3IN-M

NOTES:
1. DO NOT STACK COMPOSITE RISERS. ONLY ONE ALLOWED PER INSTALLATION.

9

DUKE ENERGY.

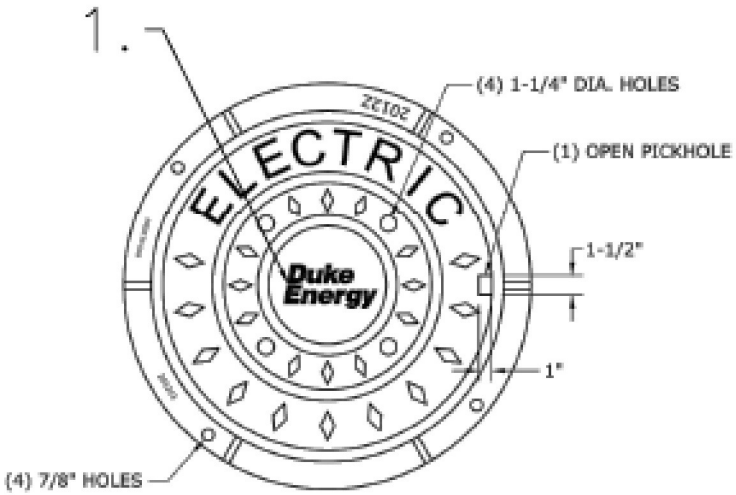
3				
2				
1				
0	12/31/17	EAMES	FLETCHER	ADCOCK
REVISED		BY	CK'D	APPR.

COMPOSITE RISER

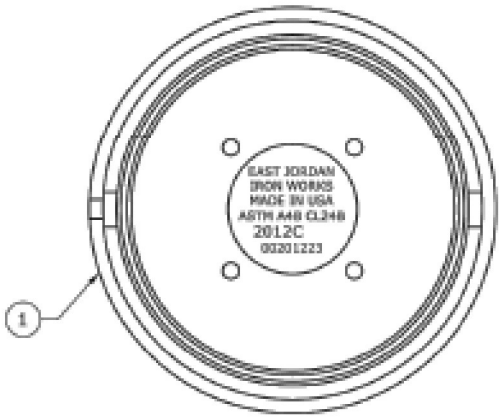
DEC	DEM	DEP	DEF
X	X	X	X

29.14-105

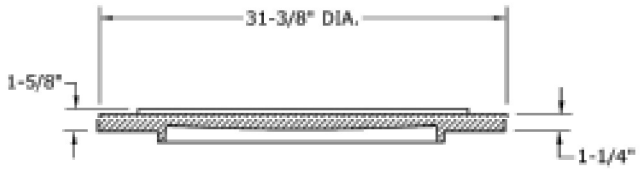
HEAVY DUTY LOAD RATING



COVER TOP VIEW



COVER BACK VIEW



COVER SIDE VIEW

BILL OF MATERIALS						
MACRO UNIT	BUBBLE NUMBER	COMPATIBLE UNIT	CU QTY	ITEM NUMBER	ITEM QTY/ CU	DESCRIPTION
-	1	LID 30IN MANHOLE CGE	1	50128979	1	COVER, MANHOLE, 31-3/8" DIA. MARKED WITH DUKE ENERGY
	1	LID 30IN MANHOLE ULHP	1	50128979	1	COVER, MANHOLE, 31-3/8" DIA. MARKED WITH DUKE ENERGY

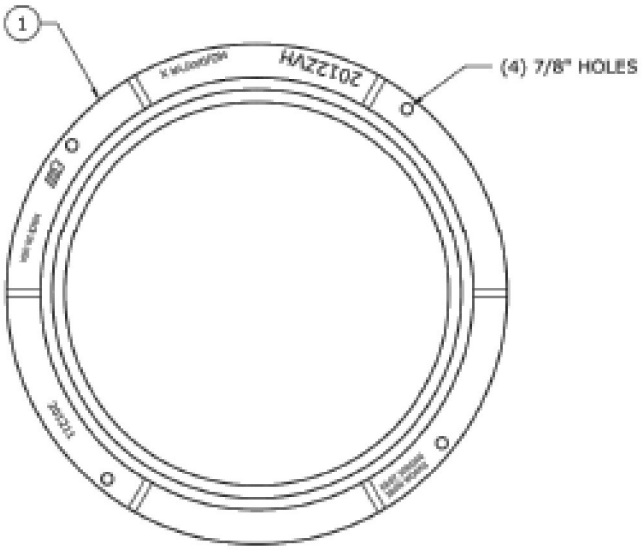
NOTE:

1. INSTALL NOMENCLATURE ON LID PER RESPECTIVE UTILITY NAME (OWEN OR DUKE)

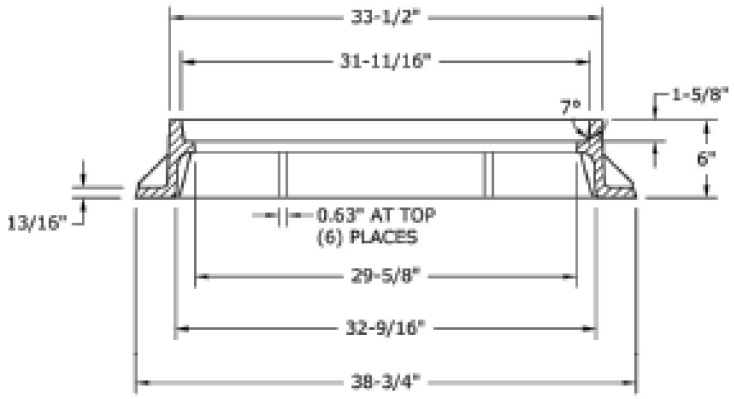
10

DUKE ENERGY.

3					MANHOLE COVER FOR NON-NETWORK INSTALLATIONS	DEC	DEM	DEP	DEF
2									
1							X		
0	3/21/17	EMMS	FLETCHER	ADCOCK		29.14-107			
REVISED		BY	CK'D	APPR.					



FRAME TOP VIEW



FRAME SECTION VIEW

BILL OF MATERIALS

MACRO UNIT	BUBBLE NUMBER	COMPATIBLE UNIT	CU QTY	ITEM NUMBER	ITEM QTY/ CU	DESCRIPTION
-	1	FRAME 32IN DIA 6IN DEEP NO LID	1	1480534	1	FRAME, MANHOLE, 31-11/16" ID X 38-3/4" OD X 6" DP

11

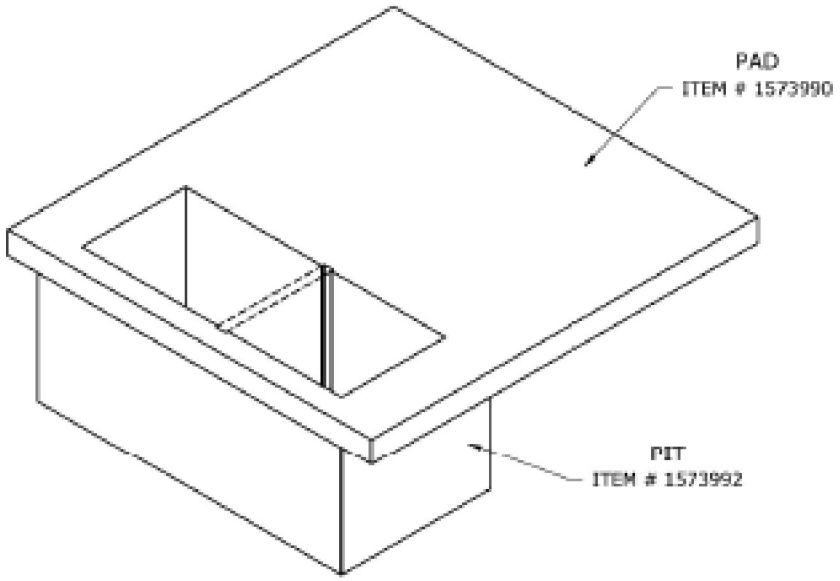
DUKE ENERGY.

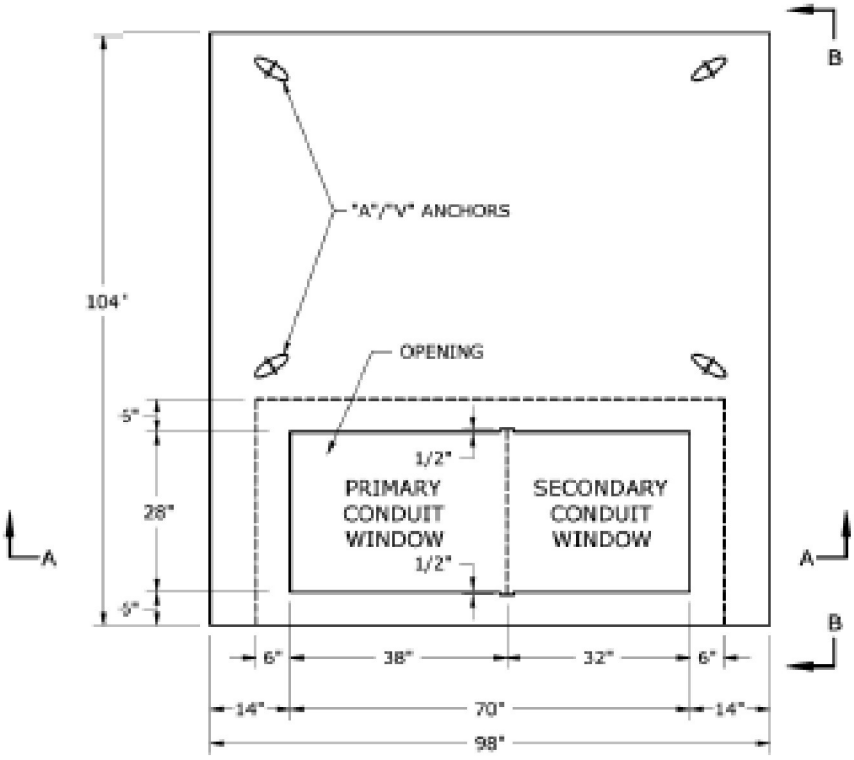
3					
2					
1					
0	3/31/17	EANES	FLETCHER	ADCOCK	
REVISED		BY	CK'D	APPR.	

FRAME - MANHOLE - 32"

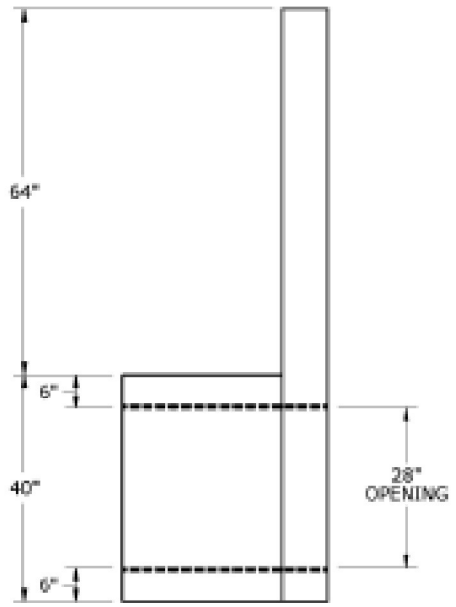
DEC	DEM	DEP	DEF
	X		

29.14-106

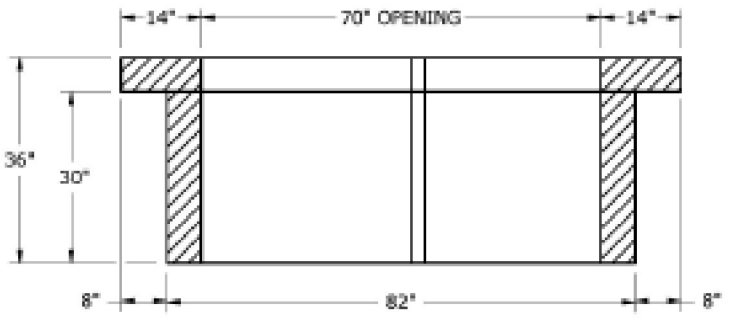




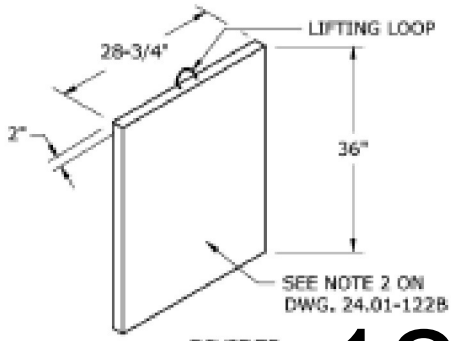
PLAN VIEW



SECTION B-B



SECTION A-A



DIVIDER
ITEM # 1573996

12

NOTES:

1. SEE DWG. 24.01-122B FOR NOTES.

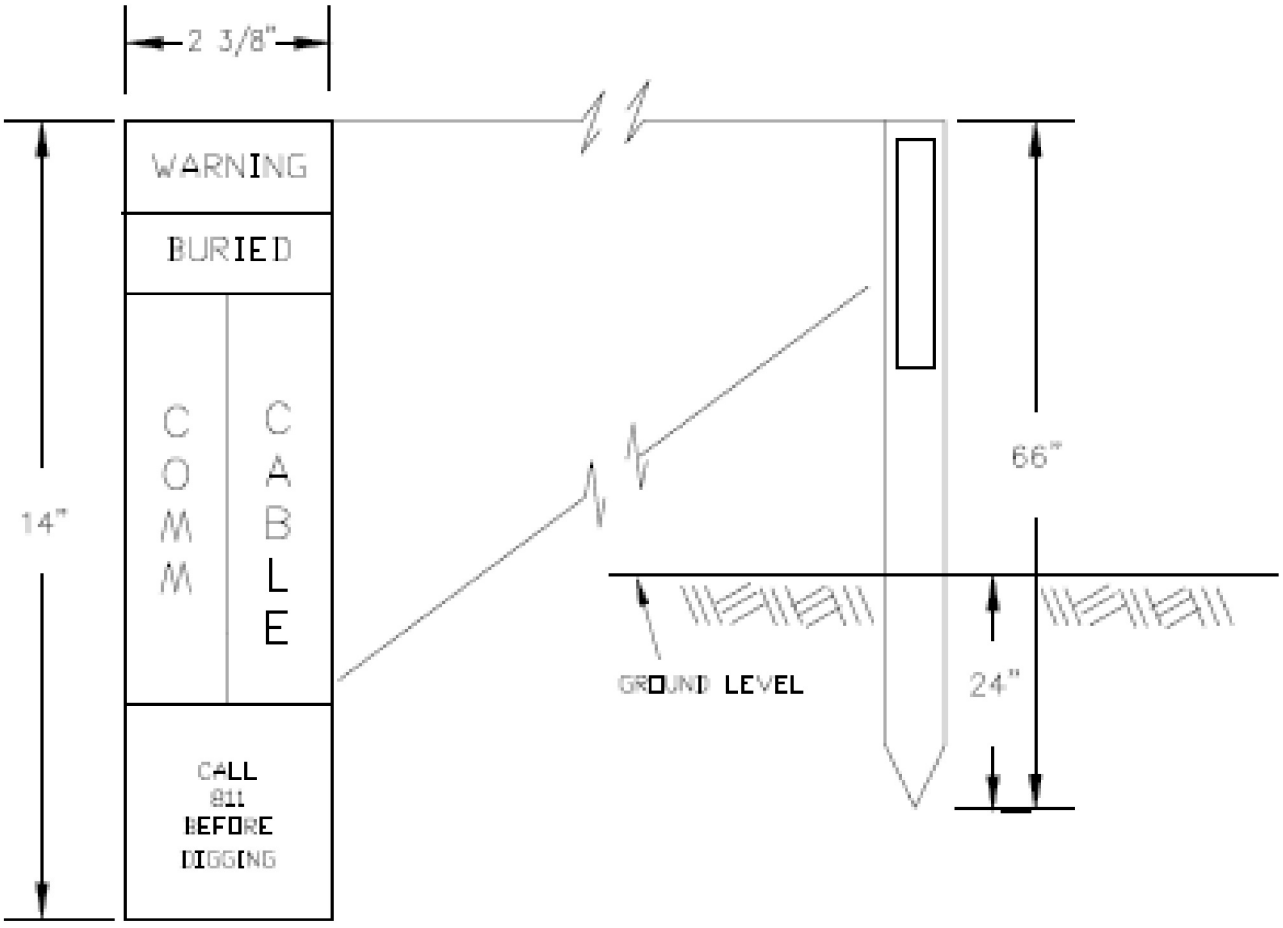
3				
2				
1				
0	1/31/13	GORLEY	BANES	ADCOCK
	REVISED		BY	CHK'D	APPR.

PIT PAD FOR THREE-PHASE 500 - 5000 KVA
PAD-MOUNTED TRANSFORMERS

DUKE ENERGY.

DEC	DEM	DEP	DEF
X	X	X	

24.01-122A



NOTES:

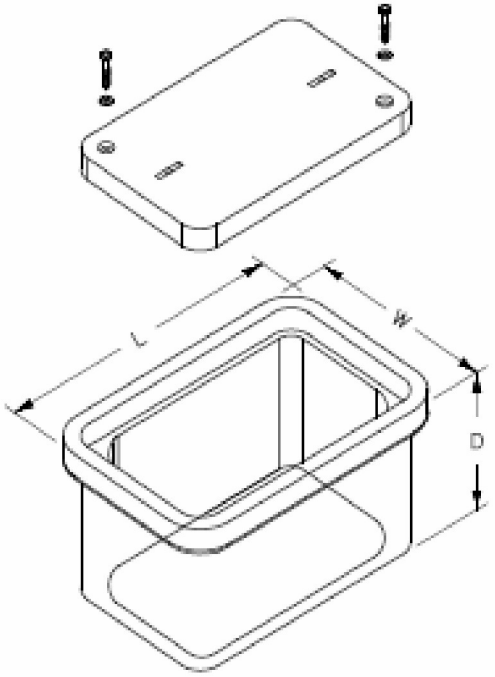
1. MARKING POST SHALL BE A COMPOSITE FLEXIBLE MATERIAL RESISTING RUST, ROT, COLD, AND U.V. EXPOSURE.
2. POST SHALL BE RED.
3. DECAL SHALL HAVE BLACK PAINT ON A WHITE BACKROUND.
4. MARKER SHALL MAINTAIN FLEXIBILITY UNDER ALL WEATHER CONDITIONS.
5. CARSONITE CBM-250 IS PREFFERED.

13

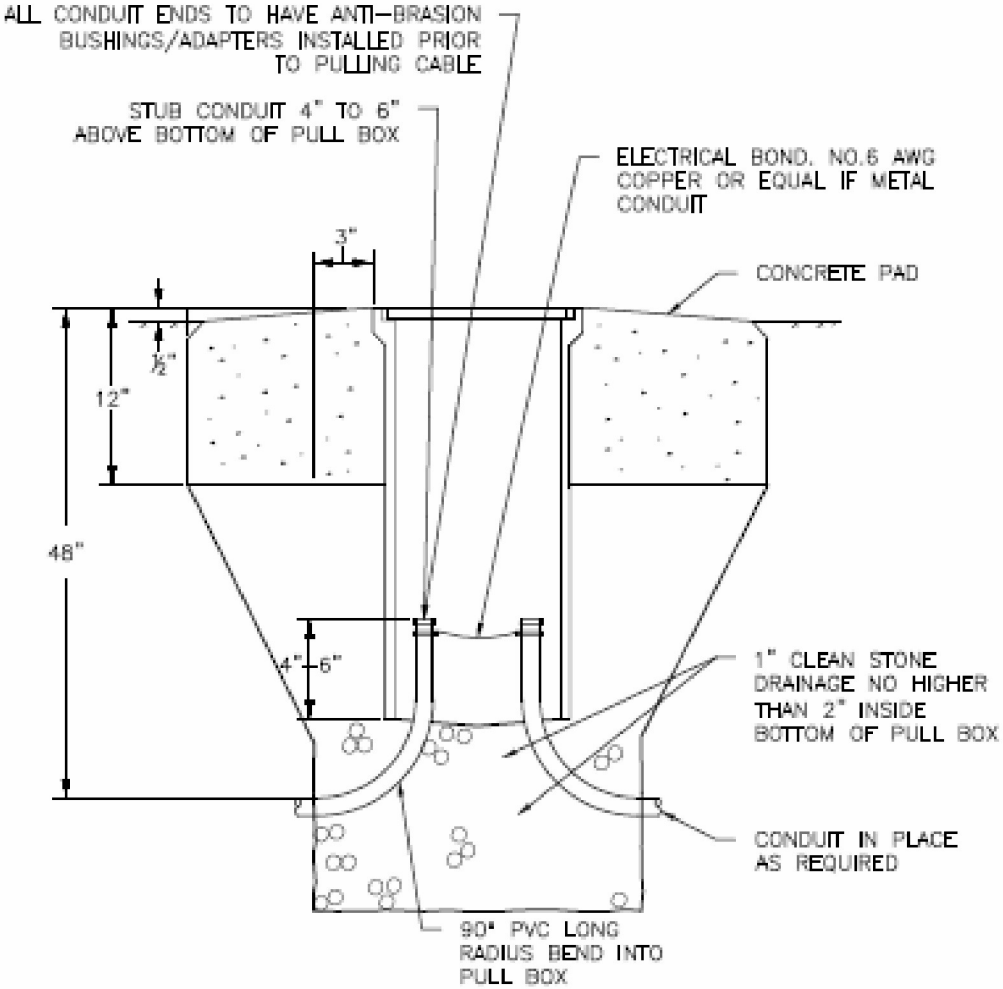
ISSUE DATE:	10/15/99
DRAWN BY:	CSK
APP BY:	
REVISED DATE:	8/18/12

WARNING SIGN CABLE ROUTE

UM12



PULL BOX – COMPOSITE		
TYPE 1		
L	=	30"
W	=	48"
D	=	36"
IDL	=	17"
IDW	=	10"
CL	=	18"
CW	=	11"



PULL BOX INSTALLED IN EARTH

SPECTRUM & WINDSTREAM

N.T.S.

14

Kentucky Transportation Cabinet

Highway District 6

And

_____(2), Construction

Kentucky Pollutant Discharge Elimination System Permit KYR10 Best Management Practices (BMP) plan

Groundwater protection plan

For Highway Construction Activities

For

KY 236 (Donaldson Highway) from KY 3076 (Mineola Pike) to Houston Road

Project: PCN ## - #### Item 06-444.00

KyTC BMP Plan for Project PCN ## -

Project information

Note – (1) = Design (2) = Construction (3) = Contractor

1. Owner – Kentucky Transportation Cabinet, District 6

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) 1648 Donaldson Highway

6. Latitude/Longitude (project mid-point) dd/mm/ss, dd/mm/ss 39^02’10” north, 84^37’48” west

7. County (project mid-point) Boone County

8. Project start date (date work will begin): (2)

9. Projected completion date: (2)

KyTC BMP Plan for Project PCN ## - ####

A. Site description:

1. Nature of Construction Activity (from letting project description) Highway Reconstruction

2. Order of major soil disturbing activities (2) and (3)

3. Projected volume of material to be moved 181,591 Cubic Yards

4. Estimate of total project area (acres) 11.5 Acres

5. Estimate of area to be disturbed (acres) 11.5 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. 0.5

7. Data describing existing soil condition (2)

8. Data describing existing discharge water quality (if any) (2)

9. Receiving water name, Longbranch Creek

10. TMDLs and Pollutants of Concern in Receiving Waters: (1 DEA)

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 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. <u>All DDA’s will have adequate BMP’s in place before being disturbed.</u>

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.

KyTC BMP Plan for Project PCN ## - ####

- 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.
  - 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 : N/A

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 Resident 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
- 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 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 contract 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.

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.

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.

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 received KyTC Grade Level II training or other qualification as prescribed by the cabinet that includes instruction concerning sediment and erosion control.
- 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 70 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 form 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.

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.

KyTC BMP Plan for Project PCN ## - ####

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;
(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.)

KyTC BMP Plan for Project PCN ## -

Contractor and Resident Engineer Plan certification

The contractor that is responsible for implementing this BMP plan is identified in the Project Information section of this plan.

The following certification applies to all parties that are signatory to this BMP plan:

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 gathered and evaluated 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, 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. Further, this plan complies with the requirements of 401 KAR 5:037. By this certification, the undersigned state that the individuals signing the plan have reviewed the terms of the plan and will implement its provisions as they pertain to ground water protection.

Resident Engineer and Contractor Certification:

(2) Resident Engineer signature

Signed _____title_____, _____
Typed or printed name[2] signature

(3) Signed _____title_____, _____
Typed or printed name[1] signature

1. Contractors Note: to be signed by a person who is the owner, a responsible corporate officer, a general partner or the proprietor or a person designated to have the authority to sign reports by such a person in accordance with 401 KAR 5:060 Section 9. This delegation shall be in writing to: Manager, KPDES Branch, Division of Water, 14 Reilly Road, Frankfort Kentucky 40601. Reference the Project Control Number (PCN) and KPDES number when one has been issued.

2. KyTC note: to be signed by the Chief District Engineer or a person designated to have the authority to sign reports by such a person (usually the resident engineer) in accordance with 401 KAR 5:060 Section 9. This delegation shall be in writing to: Manager, KPDES Branch, Division of Water, 14 Reilly Road, Frankfort Kentucky 40601 Reference the Project Control Number (PCN) and KPDES number when one has been issued.

Sub-Contractor Certification

The following sub-contractor shall be made aware of the BMP plan and responsible for implementation of BMPs identified in this plan as follows:

Subcontractor

Name:
Address:
Address:

Phone:

The part of BMP plan this subcontractor is responsible to implement is:

I certify under penalty of law that I understand the terms and conditions of the general Kentucky Pollutant Discharge Elimination System permit that authorizes the storm water discharges, the BMP plan that has been developed to manage the quality of water to be discharged as a result of storm events associated with the construction site activity and management of non-storm water pollutant sources identified as part of this certification.

Signed _____title_____, _____
Typed or printed name[1] signature

1. Sub Contractor Note: to be signed by a person who is the owner, a responsible corporate officer, a general partner or the proprietor or a person designated to have the authority to sign reports by such a person in accordance with 401 KAR 5:060 Section 9. This delegation shall be in writing to: Manager, KPDES Branch, Division of Water, 14 Reilly Road, Frankfort Kentucky 40601. Reference the Project Control Number (PCN) and KPDES number when one has been issued.

SPECIAL NOTE

Filing of eNOI for KPDES Construction Stormwater Permit

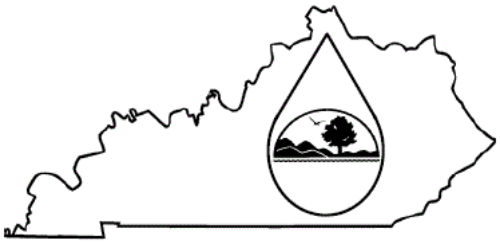
County: Boone
Item No.: 6-444.00

Route: KY 3076
KDOW Submittal ID:
64272b39-db7c-41be-b132-123db9a90322

Project Description: KY 236 (Donaldson Highway) from KY 3076 (Mineola Pike) from to Houston Road

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 Danny Peake, Director, Division of Environmental Analysis, TCOB, 200 Mero Street, Frankfort, KY 40622, Phone: (502) 564-7250.



KENTUCKY POLLUTION DISCHARGE ELIMINATION SYSTEM (KPDES)

Notice of Intent (NOI) for coverage of Storm Water Discharge Associated with Construction Activities Under the KPDES Storm Water General Permit KYR100000

Click here for Instructions
(Controls/KPDES_FormKYR10_Instructions.htm)

Click here to obtain information and a copy of the KPDES General Permit.
(http://dep.ky.gov/formslibrary/Documents/KYR10PermitPage.pdf)

(*) indicates a required field; (✓) indicates a field may be required based on user input or is an optionally required field

Reason for Submittal:(*)	Agency Interest ID:	Permit Number:(✓)
Application for New Permit Coverage	Agency Interest ID	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:(✓)	First Name:(✓)	M.I.:	Last Name:(✓)
Kentucky Transportation Cabinet	Robert	A	Yeager

Mailing Address:(*)	City:(*)	State:(*)	Zip:(*)
421 Buttermilk Pike	Covington	Kentucky	41017

eMail Address:(*)	Business Phone:(*)	Alternate Phone:
Cory.Wilson@ky.gov	8593412700	Phone

SECTION II -- GENERAL SITE LOCATION INFORMATION

Project Name:(*)	Status of Owner/Operator(*)	SIC Code(*)
Donaldson Road	State Government	1611 Highway and Street Const

Company Name:(✓)	First Name:(✓)	M.I.:	Last Name:(✓)
Kentucky Transportation Cabinet	Robert	A	Yeager

Site Physical Address:(*)
1648 Donaldson Road

City:(*)	State:(*)	Zip:(*)
Burlington	Kentucky	41005

County:(*)	Latitude(decimal degrees)(*)DMS to DD Converter (https://www.fcc.gov/media/radio/dms-decimal)	Longitude(decimal degrees)(*)
Boone	39.036111	-84.63000

SECTION III -- SPECIFIC SITE ACTIVITY INFORMATION

Project Description:(*)
Donaldson Road reconstruction from Mineola Pike to Houston Road

a. For single projects provide the following information

Total Number of Acres in Project:(✓)	Total Number of Acres Disturbed:(✓)
11.5	11.5
Anticipated Start Date:(✓)	**Anticipated Completion Date:(✓)**
12/5/2022	9/30/2025

b. For common plans of development provide the following information

Total Number of Acres in Project:(✓)	Total Number of Acres Disturbed:(✓)
# Acre(s)	# Acre(s)
Number of individual lots in development, if applicable:(✓)	**Number of lots in development:(✓)**
# lot(s)	# lot(s)
Total acreage of lots intended to be developed:(✓)	**Number of acres intended to be disturbed at any one time:(✓)**
Project Acres	Disturbed Acres
Anticipated Start Date:(✓)	**Anticipated Completion Date:(✓)**

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	Yes	39.031186	-84.620336		Delete
2	Yes	39.032361	-84.622194		Delete
3	Yes	39.033600	-84.623911		Delete
4	Yes	39.035142	-84.628539		Delete
5	Yes	39.035233	-84.631231		Delete
6	Yes	39.036925	-84.631236		Delete
7	Yes	39.037522	-84.632928		Delete
8	Yes	39.037786	-84.633344		Delete
9	Yes	39.039883	-84.636806		Delete
10	Yes	39.045625	-84.640069		Delete

SECTION V -- IF THE PERMITTED SITE DISCHARGES TO A MS4 THE FOLLOWING INFORMATION IS REQUIRED

Name of MS4:

Date of application/notification to the MS4 for construction site permit coverage:	Discharge Point(s):(*)
Date	

	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?: (*)	No
If Yes, describe scope of activity: (✓)	describe scope of activity
Is a Clean Water Act 404 permit required?:(*)	No

Is a Clean Water Act 401 Water Quality Certification required?:(*)	No

SECTION VII -- NOI PREPARER INFORMATION

First Name:(*)	M.I.:	Last Name:(*)	Company Name:(*)
Gerald	M	Bezold	Kentucky Transportation Cabinet

Mailing Address:(*)	City:(*)	State:(*)	Zip:(*)
421 Buttermilk Pike	Covington	Kentucky	41017

eMail Address:(*)	Business Phone:(*)	Alternate Phone:
Cory.Wilson@ky.gov	8593412700	Phone

SECTION VIII -- ATTACHMENTS

Facility Location Map:(*)	Upload file
Supplemental Information:	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:(*)	Title:(*)
Signature	Title

First Name:(*)	M.I.:	Last Name:(*)
Robert	A	Yeager

eMail Address:(*)	Business Phone:(*)	Alternate Phone:	Signature Date:(*)
eMail Address	Phone	Phone	Date

Click to Save Values for Future Retrieval | Click to Submit to EEC

Latitude			Longitude			Latitude	Longitude
D	M	S	D	M	S		
39	2	10.00	84	37	48.00	39.036111	84.630000
39	2	46.80	84	38	25.96	39.046333	84.640544
39	2	44.25	84	38	24.25	39.045625	84.640069
39	2	23.58	84	38	12.50	39.039883	84.636806
39	2	16.03	84	38	0.04	39.037786	84.633344
39	2	15.08	84	37	58.54	39.037522	84.632928
39	2	12.93	84	37	52.45	39.036925	84.631236
39	2	6.51	84	37	42.74	39.035142	84.628539
39	2	0.96	84	37	26.08	39.033600	84.623911
39	1	56.50	84	37	19.90	39.032361	84.622194
39	1	52.27	84	37	13.21	39.031186	84.620336
39	2	6.84	84	37	52.43	39.035233	84.631231

KENTUCKY TRANSPORTATION CABINET
COMMUNICATING ALL PROMISES (CAP)

Item No. **6 - 444** **County:** **Boone** **Route:** **236** **Project Manager:** **MIKE BEZOLD**

Item No. **6 - 444** **County:** **Kenton** **Route:** **236** **Project Manager:** **MIKE BEZOLD**

10/4/22

CAP #	Date of Promise	Promise made to:	Location of Promise:	CAP Description
1	4/8/22	John Paselsky	X317 Properties, Parcel 56	The existing driveway is 19.7 feet wide. The portion of the driveway that is being reconstructed will be 24 feet wide with this additional width constructed on the east side of the driveway.

MATERIAL SUMMARY

CONTRACT ID: 221059 **121GR22D059- STP** **DE00802362259**

DONALDSON HIGHWAY(KY-236) IMPROVE SAFETY AND REDUCE CONGESTION ALONG KY-236 (DONALDSON ROAD)
FROM KY-842 (HOUSTON ROAD) TO KY-3076 (MINEOLA PIKE) GRADE & DRAIN WITH ASPHALT SURFACE, A

Project Line No	Bid Code	DESCRIPTION	Quantity	Unit
0005	00003	CRUSHED STONE BASE	33,156.00	TON
0010	00013	LIME STABILIZED ROADBED	75,639.00	SQYD
0015	00014	LIME	2,206.00	TON
0020	00100	ASPHALT SEAL AGGREGATE	33.00	TON
0025	00103	ASPHALT SEAL COAT	4.00	TON
0030	00194	LEVELING & WEDGING PG76-22	104.00	TON
0035	00214	CL3 ASPH BASE 1.00D PG64-22	33,987.00	TON
0040	00216	CL3 ASPH BASE 1.00D PG76-22	15,122.00	TON
0045	00221	CL2 ASPH BASE 0.75D PG64-22	1,147.00	TON
0050	00296	ASPHALT PRIME COAT	42.00	TON
0055	00301	CL2 ASPH SURF 0.38D PG64-22	626.00	TON
0060	00336	CL3 ASPH SURF 0.38A PG76-22	8,412.00	TON
0065	00356	ASPHALT MATERIAL FOR TACK	113.00	TON
0070	00358	ASPHALT CURING SEAL	76.00	TON
0075	02101	CEM CONC ENT PAVEMENT-8 IN	2,911.00	SQYD
0080	02676	MOBILIZATION FOR MILL & TEXT - BOONE	1.00	LS
0085	02677	ASPHALT PAVE MILLING & TEXTURING	138.00	TON
0090	02702	SAND FOR BLOTTER	95.00	TON
0095	21799EN	BORE AND JACK PIPE-24 IN	119.00	LF
0100	23126EN	BORE AND JACK PIPE-18 IN	105.00	LF
0105	00021	DRAINAGE BLANKET-EMBANKMENT	1,500.00	CUYD
0110	00078	CRUSHED AGGREGATE SIZE NO 2	209.00	TON
0115	00440	ENTRANCE PIPE-15 IN	76.00	LF
0120	00462	CULVERT PIPE-18 IN	39.00	LF
0125	00464	CULVERT PIPE-24 IN	42.00	LF
0130	00466	CULVERT PIPE-30 IN	120.00	LF
0135	01810	STANDARD CURB AND GUTTER	18,165.00	LF
0140	01875	STANDARD HEADER CURB	1,944.00	LF
0145	01917	STANDARD BARRIER MEDIAN TYPE 2	287.00	SQYD
0150	01987	DELINEATOR FOR GUARDRAIL BI DIRECTIONAL WHITE	10.00	EACH
0155	02015	CEMENT CONCRETE ISLAND	54.00	SQYD
0160	02159	TEMP DITCH	5,655.00	LF
0165	02160	CLEAN TEMP DITCH	2,828.00	LF
0170	02200	ROADWAY EXCAVATION	178,784.00	CUYD
0175	02242	WATER	2,141.00	MGAL
0180	02351	GUARDRAIL-STEEL W BEAM-S FACE	425.00	LF
0185	02360	GUARDRAIL TERMINAL SECTION NO 1	1.00	EACH
0190	02360	GUARDRAIL TERMINAL SECTION NO 1	3.00	EACH
0195	02367	GUARDRAIL END TREATMENT TYPE 1	2.00	EACH
0200	02381	REMOVE GUARDRAIL	475.00	LF
0205	02391	GUARDRAIL END TREATMENT TYPE 4A	1.00	EACH
0210	02397	TEMP GUARDRAIL	825.00	LF
0215	02429	RIGHT-OF-WAY MONUMENT TYPE 1	69.00	EACH

MATERIAL SUMMARY

Project Line No	Bid Code	DESCRIPTION	Quantity	Unit
0220	02432	WITNESS POST	3.00	EACH
0225	02483	CHANNEL LINING CLASS II	819.00	TON
0230	02545	CLEARING AND GRUBBING - 14.51 ACRES BOONE	1.00	LS
0235	02562	TEMPORARY SIGNS	461.00	SQFT
0240	02585	EDGE KEY	1,198.00	LF
0245	02602	FABRIC-GEOTEXTILE CLASS 1	75,638.00	SQYD
0250	02603	FABRIC-GEOTEXTILE CLASS 2	9,500.00	SQYD
0255	02604	FABRIC-GEOTEXTILE CLASS 1A	1,000.00	SQYD
0260	02650	MAINTAIN & CONTROL TRAFFIC - BOONE	1.00	LS
0265	02671	PORTABLE CHANGEABLE MESSAGE SIGN	4.00	EACH
0270	02690	SAFELOADING	1,165.00	CUYD
0275	02701	TEMP SILT FENCE	5,655.00	LF
0280	02703	SILT TRAP TYPE A	38.00	EACH
0285	02704	SILT TRAP TYPE B	38.00	EACH
0290	02705	SILT TRAP TYPE C	38.00	EACH
0295	02706	CLEAN SILT TRAP TYPE A	38.00	EACH
0300	02707	CLEAN SILT TRAP TYPE B	38.00	EACH
0305	02708	CLEAN SILT TRAP TYPE C	38.00	EACH
0310	02720	SIDEWALK-4 IN CONCRETE	6,045.00	SQYD
0315	02726	STAKING - BOONE	1.00	LS
0320	03171	CONCRETE BARRIER WALL TYPE 9T	860.00	LF
0325	04953	TEMP RELOCATION OF SIGNAL HEAD	54.00	EACH
0330	05950	EROSION CONTROL BLANKET	9,743.00	SQYD
0335	05952	TEMP MULCH	122,186.00	SQYD
0340	05953	TEMP SEEDING AND PROTECTION	91,183.00	SQYD
0345	05963	INITIAL FERTILIZER	2.40	TON
0350	05964	MAINTENANCE FERTILIZER	3.90	TON
0355	05985	SEEDING AND PROTECTION	52,660.00	SQYD
0360	05990	SODDING	14,927.00	SQYD
0365	05992	AGRICULTURAL LIMESTONE	47.00	TON
0370	05998	SPREADING STOCKPILED TOPSOIL	2,488.00	CUYD
0375	06511	PAVE STRIPING-TEMP PAINT-6 IN	163,237.00	LF
0380	06582	PAVEMENT MARKER TYPE IV-BY	1,513.00	EACH
0385	08018	RETAINING WALL	3,528.00	SQFT
0390	08100	CONCRETE-CLASS A	17.00	CUYD
0395	08901	CRASH CUSHION TY VI CLASS BT TL2	3.00	EACH
0400	10020NS	FUEL ADJUSTMENT	141,765.00	DOLL
0405	10030NS	ASPHALT ADJUSTMENT	232,531.00	DOLL
0410	20191ED	OBJECT MARKER TY 3	4.00	EACH
0415	20430ED	SAW CUT	279.00	LF
0420	20818ND	GAS UTILITY COORDINATION - BOONE	1.00	LS
0425	21289ED	LONGITUDINAL EDGE KEY	26.00	LF
0430	21596ND	GMSS TYPE D	10.00	EACH
0435	22680EN	QWICK CURB MEDIAN SEPARATOR	995.00	LF
0440	23010EN	PAVE MARK TEMP PAINT STOP BAR-24 IN	1,251.00	LF
0445	23158ES505	DETECTABLE WARNINGS	1,626.00	SQFT
0450	23188EC	STAMPED CONCRETE-10 IN	157.00	SQYD
0455	23274EN11F	TURF REINFORCEMENT MAT 1	481.00	SQYD
0460	23626EC	DETENTION BASIN - BOONE	1.00	LS
0465	24631EC	BARCODE SIGN INVENTORY	30.00	EACH

MATERIAL SUMMARY

Project Line No	Bid Code	DESCRIPTION	Quantity	Unit
0470	24814EC	PIPELINE INSPECTION	6,340.00	LF
0475	24845EC	UTILITY COORDINATION - BOONE	1.00	LS
0480	26129EC	DECORATIVE HANDRAIL	790.00	LF
0485	00078	CRUSHED AGGREGATE SIZE NO 2	9.00	TON
0490	00440	ENTRANCE PIPE-15 IN	105.00	LF
0495	00462	CULVERT PIPE-18 IN	41.00	LF
0500	00464	CULVERT PIPE-24 IN	599.00	LF
0505	00521	STORM SEWER PIPE-15 IN	2,685.00	LF
0510	00522	STORM SEWER PIPE-18 IN	4,203.00	LF
0515	00524	STORM SEWER PIPE-24 IN	2,544.00	LF
0520	00526	STORM SEWER PIPE-30 IN	1,095.00	LF
0525	01000	PERFORATED PIPE-4 IN	14,406.00	LF
0530	01002	PERFORATED PIPE-8 IN	580.00	LF
0535	01010	NON-PERFORATED PIPE-4 IN	70.00	LF
0540	01012	NON-PERFORATED PIPE-8 IN	20.00	LF
0545	01020	PERF PIPE HEADWALL TY 1-4 IN	9.00	EACH
0550	01202	PIPE CULVERT HEADWALL-15 IN	2.00	EACH
0555	01204	PIPE CULVERT HEADWALL-18 IN	2.00	EACH
0560	01208	PIPE CULVERT HEADWALL-24 IN	10.00	EACH
0565	01210	PIPE CULVERT HEADWALL-30 IN	3.00	EACH
0570	01434	SLOPED BOX OUTLET TYPE 1-24 IN	4.00	EACH
0575	01443	SLOPED AND PARALLEL HEADWALL-15 IN	9.00	EACH
0580	01444	SLOPED AND PARALLEL HEADWALL-18 IN	2.00	EACH
0585	01456	CURB BOX INLET TYPE A	77.00	EACH
0590	01459	CURB BOX INLET TYPE A MOD	3.00	EACH
0595	01480	CURB BOX INLET TYPE B	3.00	EACH
0600	01497	DROP BOX INLET TYPE 3 MOD	10.00	EACH
0605	01544	DROP BOX INLET TYPE 11	1.00	EACH
0610	01559	DROP BOX INLET TYPE 13G	5.00	EACH
0615	01577	DROP BOX INLET TYPE 14	3.00	EACH
0620	01584	CAP DROP BOX INLET	8.00	EACH
0625	01650	JUNCTION BOX	7.00	EACH
0630	01756	MANHOLE TYPE A	3.00	EACH
0635	01761	MANHOLE TYPE B	1.00	EACH
0640	02607	FABRIC-GEOTEXTILE CLASS 2 FOR PIPE	21,631.00	SQYD
0645	24810ED	SIDEWALK FLUME - BOONE	4.00	EACH
0650	06406	SBM ALUM SHEET SIGNS .080 IN	151.00	SQFT
0655	06410	STEEL POST TYPE 1	370.00	LF
0660	06490	CLASS A CONCRETE FOR SIGNS	2.00	CUYD
0665	06515	PAVE STRIPING-PERM PAINT-6 IN	38,658.00	LF
0670	06516	PAVE STRIPING-PERM PAINT-8 IN	8,553.00	LF
0675	06517	PAVE STRIPING-PERM PAINT-12 IN	496.00	LF
0680	06565	PAVE MARKING-THERMO X-WALK-6 IN	2,326.00	LF
0685	06568	PAVE MARKING-THERMO STOP BAR-24IN	509.00	LF
0690	06569	PAVE MARKING-THERMO CROSS-HATCH	4,275.00	SQFT
0695	06574	PAVE MARKING-THERMO CURV ARROW	179.00	EACH
0700	06576	PAVE MARKING-THERMO ONLY	5.00	EACH
0705	06610	INLAID PAVEMENT MARKER-MW	83.00	EACH
0710	06612	INLAID PAVEMENT MARKER-BY	90.00	EACH
0715	04780	FUSED CONNECTOR KIT	21.00	EACH

MATERIAL SUMMARY

Project Line No	Bid Code	DESCRIPTION	Quantity	Unit
0720	04820	TRENCHING AND BACKFILLING	505.00	LF
0725	04844	CABLE-NO. 14/5C	7,590.00	LF
0730	04845	CABLE-NO. 14/7C	10,600.00	LF
0735	04885	MESSENGER-10800 LB	500.00	LF
0740	04886	MESSENGER-15400 LB	3,410.00	LF
0745	04932	INSTALL STEEL STRAIN POLE	28.00	EACH
0750	04953	TEMP RELOCATION OF SIGNAL HEAD	152.00	EACH
0755	06406	SBM ALUM SHEET SIGNS .080 IN	475.00	SQFT
0760	06472	INSTALL SPAN MOUNTED SIGN	53.00	EACH
0765	20093NS835	INSTALL PEDESTRIAN HEAD-LED	44.00	EACH
0770	20188NS835	INSTALL LED SIGNAL-3 SECTION	61.00	EACH
0775	20189NS835	INSTALL LED SIGNAL-5 SECTION	4.00	EACH
0780	20266ES835	INSTALL LED SIGNAL- 4 SECTION	4.00	EACH
0785	20390NS835	INSTALL COORDINATING UNIT	6.00	EACH
0790	21659NN	RELOCATE SIGNAL HEAD	7.00	EACH
0795	21743NN	INSTALL PEDESTRIAN DETECTOR	44.00	EACH
0800	22939ND	INSTALL LUMINAIRE POLE	1.00	EACH
0805	23157EN	TRAFFIC SIGNAL POLE BASE	152.00	CUYD
0810	23222EC	INSTALL SIGNAL PEDESTAL	8.00	EACH
0815	23235EC	INSTALL PEDESTAL POST	10.00	EACH
0820	23409EC	TRAFFIC SIGNAL POLE	4.00	EACH
0825	24601EC	INSTALL - SOLAR SCHOOL FLASHER ASSEMBLY	3.00	EACH
0830	24900EC	PVC CONDUIT-1 1/4 IN-SCHEDULE 80	445.00	LF
0835	24901EC	PVC CONDUIT-2 IN-SCHEDULE 80	250.00	LF
0840	24908EC	INSTALL SIGNAL CONTROLLER-TY ATC	6.00	EACH
0845	24955ED	REMOVE SIGNAL EQUIPMENT	5.00	EACH
0850	26119EC	INSTALL RADAR PRESENCE DETECTOR TYPE A	25.00	EACH
0855	26120EC	INSTALL RADAR ADVANCE DETECTOR TYPE B	15.00	EACH
0860	14005	W ENCASEMENT CONCRETE	70.00	LF
0865	14009	W ENCASEMENT STEEL BORED RANGE 4	90.00	LF
0870	14010	W ENCASEMENT STEEL BORED RANGE 5	309.00	LF
0875	14011	W ENCASEMENT STEEL BORED RANGE 6	478.00	LF
0880	14019	W FIRE HYDRANT ASSEMBLY	1.00	EACH
0885	14020	W FIRE HYDRANT RELOCATE	16.00	EACH
0890	14030	W METER RELOCATE	18.00	EACH
0895	14032	W METER/FIRE SERVICE COMBO VAULT	1.00	EACH
0900	14036	W PIPE DUCTILE IRON 06 INCH	101.00	LF
0905	14037	W PIPE DUCTILE IRON 08 INCH	960.00	LF
0910	14039	W PIPE DUCTILE IRON 12 INCH	1,316.00	LF
0915	14042	W PIPE DUCTILE IRON 24 INCH	8,694.00	LF
0920	14088	W STRUCTURE REMOVAL	1.00	EACH
0925	14091	W TIE-IN 02 INCH	2.00	EACH
0930	14094	W TIE-IN 06 INCH	8.00	EACH
0935	14095	W TIE-IN 08 INCH	7.00	EACH
0940	14097	W TIE-IN 12 INCH	8.00	EACH
0945	14100	W TIE-IN 24 INCH	2.00	EACH
0950	14105	W VALVE 06 INCH	7.00	EACH
0955	14106	W VALVE 08 INCH	9.00	EACH
0960	14108	W VALVE 12 INCH	7.00	EACH
0965	14111	W VALVE 24 INCH	15.00	EACH

MATERIAL SUMMARY

Project Line No	Bid Code	DESCRIPTION	Quantity	Unit
0970	14125	W VAULT SPECIAL	1.00	EACH
0975	14146	W SERV COPPER LONG SIDE 1-1/2 IN	2.00	EACH
0980	14147	W SERV COPPER LONG SIDE 2 IN	1.00	EACH
0985	14148	W SERV COPPER LONG SIDE 3/4 IN	13.00	EACH
0990	14151	W SERV COPPER SHORT SIDE 2 IN	1.00	EACH
0995	14152	W SERV COPPER SHORT SIDE 3/4 IN	15.00	EACH
1000	15000	S BYPASS PUMPING	9.00	EACH
1005	15017	S ENCASEMENT STEEL BORED RANGE 4	72.00	LF
1010	15018	S ENCASEMENT STEEL BORED RANGE 5	381.00	LF
1015	15067	S FORCE MAIN POINT RELOCATE	1.00	EACH
1020	15086	S LATERAL CLEANOUT	4.00	EACH
1025	15087	S LATERAL LONG SIDE 04 INCH	1.00	EACH
1030	15089	S LATERAL SHORT SIDE 04 INCH	3.00	EACH
1035	15092	S MANHOLE	12.00	EACH
1040	15093	S MANHOLE ABANDON/REMOVE	10.00	EACH
1045	15094	S MANHOLE ADJUST TO GRADE	7.00	EACH
1050	15095	S MANHOLE CASTING STANDARD	6.00	EACH
1055	15098	S MANHOLE SPECIAL	4.00	EACH
1060	15099	S MANHOLE TAP EXISTING	1.00	EACH
1065	15112	S PIPE PVC 08 INCH	225.00	LF
1070	15113	S PIPE PVC 10 INCH	255.00	LF
1075	15114	S PIPE PVC 12 INCH	1,490.00	LF
1080	15136	S LATERAL LOCATE	4.00	EACH
1085	02568	MOBILIZATION	1.00	LS
1090	02569	DEMOBILIZATION	1.00	LS
1095	16076	G SPECIAL ITEM	31.00	EACH
1100	16515	G PIPE POLYETHYLENE/PLASTIC 02 INCH INST	21.00	LF
1105	16517	G PIPE POLYETHYLENE/PLASTIC 04 INCH INST	80.00	LF
1110	16519	G PIPE POLYETHYLENE/PLASTIC 08 INCH INST	80.00	LF
1115	16521	G PIPE POLYETHYLENE/PLASTIC 12 INCH INST	8,800.00	LF
1120	16531	G SERVICE LONG SIDE 1 OR 1-1/4 INCH INST	11.00	EACH
1125	16533	G SERVICE LONG SIDE 2 INCH INST	3.00	EACH
1130	16536	G SERVICE SHORT SIDE 1 OR 1-1/4 INCH INST	12.00	EACH
1135	16538	G SERVICE SHORT SIDE 2 INCH INST	5.00	EACH
1140	16540	G SERVICE SPECIAL INST	1.00	EACH
1145	16553	G VALVE POLYETHYLENE/PLASTIC 08 IN INST	7.00	EACH
1150	16555	G VALVE POLYETHYLENE/PLASTIC 12 IN INST	4.00	EACH
1155	17001	EC COMMUNICATIONS PULL BOX	24.00	EACH
1160	17003	EC DUCT - 02 BANK	575.00	LF
1165	17007	EC DUCT - 04 BANK	3,884.00	LF
1170	17008	EC DUCT - 04 BANK CONCRETE ENCASED	400.00	LF
1175	17011	EC DUCT - 06 BANK	3,884.00	LF
1180	17012	EC DUCT - 06 BANK CONCRETE ENCASED	400.00	LF
1185	17028	EC ELECTRIC MANHOLE	8.00	EACH
1190	17029	EC ELECTRIC PIT	2.00	EACH

MATERIAL SUMMARY

DONALDSON HIGHWAY (KY-236) IMPROVE SAFETY AND REDUCE CONGESTION ALONG KY-236
(DONALDSON ROAD)
FROM KY-842 (HOUSTON ROAD) TO KY-3076 GRADE & DRAIN WITH ASPHALT SURFACE, A DISTANCE OF .09

Project Line No	Bid Code	DESCRIPTION	Quantity	Unit
1195	00003	CRUSHED STONE BASE	1,081.00	TON
1200	00013	LIME STABILIZED ROADBED	3,693.00	SQYD
1205	00014	LIME	108.00	TON
1210	00214	CL3 ASPH BASE 1.00D PG64-22	1,370.00	TON
1215	00216	CL3 ASPH BASE 1.00D PG76-22	678.00	TON
1220	00221	CL2 ASPH BASE 0.75D PG64-22	43.00	TON
1225	00296	ASPHALT PRIME COAT	2.00	TON
1230	00301	CL2 ASPH SURF 0.38D PG64-22	24.00	TON
1235	00336	CL3 ASPH SURF 0.38A PG76-22	456.00	TON
1240	00356	ASPHALT MATERIAL FOR TACK	5.00	TON
1245	00358	ASPHALT CURING SEAL	4.00	TON
1250	02101	CEM CONC ENT PAVEMENT-8 IN	213.00	SQYD
1255	02702	SAND FOR BLOTTER	5.00	TON
1260	00078	CRUSHED AGGREGATE SIZE NO 2	2.00	TON
1265	01810	STANDARD CURB AND GUTTER	729.00	LF
1270	01921	STANDARD BARRIER MEDIAN TYPE 4	143.00	SQYD
1275	02159	TEMP DITCH	469.00	LF
1280	02160	CLEAN TEMP DITCH	234.50	LF
1285	02200	ROADWAY EXCAVATION	2,807.00	CUYD
1290	02242	WATER	469.00	MGAL
1295	02429	RIGHT-OF-WAY MONUMENT TYPE 1	9.00	EACH
1300	02545	CLEARING AND GRUBBING - 0.32 ACRES KENTON	1.00	LS
1305	02562	TEMPORARY SIGNS	113.00	SQFT
1310	02585	EDGE KEY	192.00	LF
1315	02602	FABRIC-GEOTEXTILE CLASS 1	3,693.00	SQYD
1320	02650	MAINTAIN & CONTROL TRAFFIC - KENTON	1.00	LS
1325	02671	PORTABLE CHANGEABLE MESSAGE SIGN	2.00	EACH
1330	02690	SAFELOADING	2.00	CUYD
1335	02701	TEMP SILT FENCE	469.00	LF
1340	02703	SILT TRAP TYPE A	2.00	EACH
1345	02704	SILT TRAP TYPE B	2.00	EACH
1350	02705	SILT TRAP TYPE C	2.00	EACH
1355	02706	CLEAN SILT TRAP TYPE A	2.00	EACH
1360	02707	CLEAN SILT TRAP TYPE B	2.00	EACH
1365	02708	CLEAN SILT TRAP TYPE C	2.00	EACH
1370	02720	SIDEWALK-4 IN CONCRETE	660.00	SQYD
1375	02726	STAKING - KENTON	1.00	LS
1380	05950	EROSION CONTROL BLANKET	311.00	SQYD
1385	05952	TEMP MULCH	6,943.00	SQYD
1390	05953	TEMP SEEDING AND PROTECTION	5,181.00	SQYD
1395	05963	INITIAL FERTILIZER	.10	TON
1400	05964	MAINTENANCE FERTILIZER	.20	TON
1405	05985	SEEDING AND PROTECTION	3,167.00	SQYD
1410	05990	SODDING	1,022.00	SQYD
1415	05992	AGRICULTURAL LIMESTONE	2.00	TON
1420	05998	SPREADING STOCKPILED TOPSOIL	170.00	CUYD
1425	06511	PAVE STRIPING-TEMP PAINT-6 IN	8,930.00	LF

MATERIAL SUMMARY

Project Line No	Bid Code	DESCRIPTION	Quantity	Unit
1430	06582	PAVEMENT MARKER TYPE IV-BY	106.00	EACH
1435	10020NS	FUEL ADJUSTMENT	358.00	DOLL
1440	21289ED	LONGITUDINAL EDGE KEY	842.00	LF
1445	22680EN	QWICK CURB MEDIAN SEPARATOR	151.00	LF
1450	23010EN	PAVE MARK TEMP PAINT STOP BAR-24 IN	234.00	LF
1455	23158ES505	DETECTABLE WARNINGS	20.00	SQFT
1460	24631EC	BARCODE SIGN INVENTORY	5.00	EACH
1465	24814EC	PIPELINE INSPECTION	322.00	LF
1470	00078	CRUSHED AGGREGATE SIZE NO 2	2.00	TON
1475	00521	STORM SEWER PIPE-15 IN	533.00	LF
1480	00522	STORM SEWER PIPE-18 IN	83.00	LF
1485	00524	STORM SEWER PIPE-24 IN	5.00	LF
1490	01000	PERFORATED PIPE-4 IN	1,479.00	LF
1495	01002	PERFORATED PIPE-8 IN	27.00	LF
1500	01010	NON-PERFORATED PIPE-4 IN	10.00	LF
1505	01020	PERF PIPE HEADWALL TY 1-4 IN	2.00	EACH
1510	01456	CURB BOX INLET TYPE A	7.00	EACH
1515	01559	DROP BOX INLET TYPE 13G	1.00	EACH
1520	01584	CAP DROP BOX INLET	2.00	EACH
1525	01650	JUNCTION BOX	2.00	EACH
1530	01756	MANHOLE TYPE A	1.00	EACH
1535	02607	FABRIC-GEOTEXTILE CLASS 2 FOR PIPE	1,087.00	SQYD
1540	06406	SBM ALUM SHEET SIGNS .080 IN	33.00	SQFT
1545	06410	STEEL POST TYPE 1	90.00	LF
1550	06515	PAVE STRIPING-PERM PAINT-6 IN	4,052.00	LF
1555	06516	PAVE STRIPING-PERM PAINT-8 IN	206.00	LF
1560	06565	PAVE MARKING-THERMO X-WALK-6 IN	220.00	LF
1565	06566	PAVE MARKING-THERMO X-WALK-12 IN	530.00	LF
1570	06568	PAVE MARKING-THERMO STOP BAR-24IN	108.00	LF
1575	06574	PAVE MARKING-THERMO CURV ARROW	19.00	EACH
1580	06610	INLAID PAVEMENT MARKER-MW	10.00	EACH
1585	06612	INLAID PAVEMENT MARKER-BY	13.00	EACH
1590	02568	MOBILIZATION	1.00	LS
1595	02569	DEMOBILIZATION	1.00	LS
1600	15000	S BYPASS PUMPING	2.00	EACH
1605	15017	S ENCASEMENT STEEL BORED RANGE 4	80.00	LF
1610	15092	S MANHOLE	1.00	EACH
1615	15093	S MANHOLE ABANDON/REMOVE	1.00	EACH
1620	15094	S MANHOLE ADJUST TO GRADE	1.00	EACH
1625	15099	S MANHOLE TAP EXISTING	1.00	EACH
1630	15112	S PIPE PVC 08 INCH	151.00	LF

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 2019* and *Standard Drawings, Edition of 2020.*

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

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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.

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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/⇒⇒⇒/
/KEEP/LEFT/⇐⇐⇐/
/LOOSE/GRAVEL/AHEAD/
/RD WORK/NEXT/**MILES/
/TWO WAY/TRAFFIC/AHEAD/
/PAINT/CREW/AHEAD/
/REDUCE/SPEED/**MPH/
/BRIDGE/WORK/***0 FT/
/MAX/SPEED/**MPH/
/SURVEY/PARTY/AHEAD/
/MIN/SPEED/**MPH/
/ICY/BRIDGE/AHEAD/ /ONE LANE/BRIDGE/AHEAD/
/ROUGH/ROAD/AHEAD/
/MERGING/TRAFFIC/AHEAD/
/NEXT/***/MILES/
/HEAVY/TRAFFIC/AHEAD/
/SPEED/LIMIT/**MPH/
/BUMP/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

1I

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:

Code	Pay Item	Pay Unit
02671	Portable Changeable Message Sign	Each

Effective June 15, 2012

11E

SPECIAL NOTE FOR BORING AND JACKING STEEL PIPE WITHOUT CARRIER PIPE

This Special Note will apply where 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. Bore and jack steel pipe. Use this note when no carrier pipe will be encased.

2.0 MATERIALS.

2.1 Pipe. Provide plain end steel pipe with a specific minimum yield strength, SMYS, of at least 35,000 psi and tensile strength of 60,000 psi per API-5L grade B material. The steel pipe supplied shall be manufactured by the seamless, electric-weld, submerged-arc weld or gas metal-arc well process as specified in API –5L. Certification of 35,000 psi SMYS shall be furnished by the supplier through the Contractor to the Engineer to retain 3 copies.

MINIMUM WALL THICKNESS FOR STEEL PIPE	
Nominal Diameter (Inches)	Wall Thickness (Inches)
18 or less	0.375
24	0.500
30	0.500
36	0.532
42	0.625

2.2 Grout. Conform to Subsection 601.03.03.

2.3 High Grade Bentonite. Conform to the following:

API 13A Section 4		
Requirement	Specification	Result
Viscometer Dial Reading at 600 rpm	30, minimum	40
Yield Point/Plastic Viscosity Ratio	3, maximum	3.00 maximum
Filtrate Volume	15 cm3, maximum	14.50 maximum
Residue greater than 75 micrometers	4.0 wt percent maximum	1.0-1.5 %
Moisture	10.0 wt percent maximum	9.0-9.5%

3.0 CONSTRUCTION. Perform the following:

1. Locate a suitable pit and obtain the Engineer's approval.
2. Excavate the pit or trenches for the BORE AND JACK operation and for placing the end joints of pipe, when required. Securely sheet and brace the pits or trenches to prevent caving, where necessary.

11E

3. When installing pipe under railroads, highways, streets, or other facilities by Bore and Jack, perform construction without interfering with the facility operation or weakening the roadbed or structure.
4. Place excavated material near the top of the working pit and dispose of it as required. Use water or other fluids with the boring operation to lubricate the cuttings. Do not perform jetting.
5. In unconsolidated soil formations, use a gel-forming collodial drilling fluid with at least 10 percent of high grade bentonite to consolidate excavated material, seal the walls of the hole, and lubricate subsequent removal of material and immediate pipe installation.
6. Ensure that the diameter of the excavation conforms to the outside diameter of the pipe as closely as possible.
7. Pressure grout voids that develop during the installation operation and that the Engineer determines are detrimental to the Work.
8. To force the pipe through the roadbed into the bored space, use a jack with a head constructed to apply uniform pressure around the ring of the pipe, which shall be square cut.
9. Set the pipe to be jacked on guides, braced together to properly support the pipe section and to direct it to the proper line and grade.
10. When the installation is made by concurrent boring and jacking, solidly weld all joints. Ensure the weld is strong enough to withstand the forces exerted from the boring and jacking operations as well as the vertical loading imposed on the pipe after installation and that it provides a smooth, non-obstructing joint in the interior of the pipe.
11. When the pipe is installed in open trench, bed and backfill according to Section 701.
12. The line and grade from the pipe's final position, as shown on plans, may vary no more than 2 percent in lateral alignment and one percent in vertical grade. Ensure that the final grade of the flow line is in the direction indicated on the Plans.
13. Use a cutting edge around the head end. Extend it a short distance beyond the pipe end with inside angles or lugs to keep the cutting edge from slipping back into the pipe.
14. Once the pipe installation begins, proceed with the operation without interruption to prevent the pipe from becoming firmly set in the embankment.
15. Remove and replace pipe damaged in jacking operations.
16. After completing the installation, backfill the excavated pits and trenches with flowable fill according to Section 601.03.03 B) 5 a) if the pit is in median area where it will have pavement over it.

4.0 MEASUREMENT. The Department will measure the completed length of Bore and Jacked pipe through the flowline from end to end in linear feet. The Department will not measure pressure grouting voids or removal and replacement of pipe damaged in jacking operations for payment and will consider it incidental to Bore and Jack. When abandoning a bore hole due to mechanical malfunction, improper alignment, or other problems due to construction operations, the Department will not measure the backfill and relocation for payment and will consider it incidental to this item of work. When abandoning a bore hole due to an unforeseen physical obstruction or situation, the Department will measure the work according to a negotiated supplemental agreement.

5.0 PAYMENT. The Department will make payment for the completed and accepted quantities under the following:

11E

Code	Pay Item	Pay Unit
----	Bore and Jack, Size Pipe	Linear Foot

The Department will consider payment as full compensation for all materials, earthwork, shoring, pipe and work required under this section.

June 15, 2012

11F

SPECIAL NOTE FOR TURF REINFORCING MAT

1.0 DESCRIPTION. Install turf reinforcement mat at locations specified in the Contract or as the Engineer directs. Section references herein are to the Department's current Standard Specifications for Road and Bridge Construction.

2.0 MATERIALS.

2.1 Turf Reinforcement Mat (TRM). Use a Turf Reinforcement Mat defined as permanent rolled erosion control product composed of non-degradable synthetic fibers, filaments, nets, wire mesh and/or other elements, processed into a three-dimensional matrix of sufficient thickness and from the Department's List of Approved Materials. Mats must be 100% UV stabilized materials. For TRMs containing degradable components, all physical property values must be obtained on the non-degradable portion of the matting exclusively. Ensure product labels clearly show the manufacturer or supplier name, style name, and roll number. Ensure labeling, shipment and storage follows ASTM D-4873. The Department will require manufacturer to provide TRMs that are machine constructed web of mechanically or melt bonded nondegradable fibers entangled to form a three dimensional matrix. The Department will require all long term performance property values in table below to be based on non degradable portion of the matting alone. Approved methods include polymer welding, thermal or polymer fusion, or placement of fibers between two high strength biaxially oriented nets mechanically bound by parallel stitching with polyolefin thread. Ensure that mats designated in the plans as Type 4 mats, are not to be manufactured from discontinuous or loosely held together by stitching or glued netting or composites. Type 4 mats shall be composed of geosynthetic matrix that exhibits a very high interlock and reinforcement capacities with both soil and root systems and with high tensile modulus. The Department will require manufacturer to use materials chemically and biologically inert to the natural soil environments conditions. Ensure the blanket is smolder resistant without the use of chemical additives. When stored, maintain the protective wrapping and elevate the mats off the ground to protect them from damage. The Department will not specify these materials for use in heavily acidic coal seam areas or other areas with soil problems that would severally limit vegetation growth.

A) Dimensions. Ensure TRMs are furnished in strips with a minimum width of 4 feet and length of 50 feet.
B) Weight. Ensure that all mat types have a minimum mass per unit area of 7 ounces per square yard according to ASTM D 6566.
C) Performance Testing: The Department will require AASHTO's NTPEP index testing. The Department will also require the manufacturer to perform internal MARV testing at a Geosynthetic Accreditation Institute – Laboratory Accreditation Program (GAI-LAP) accredited laboratory for tensile strength, tensile elongation, mass per unit area, and thickness once every 24,000 yds of production or whatever rate is required to ensure 97.7% confidence under ASTM D4439& 4354. The Department will require Full scale testing for slope and channel applications shear stress shall be done under ASTM D 6459, ASTM D 6460-07 procedures.

2.2 Classifications

The basis for selection of the type of mat required will be based on the long term shear stress level of the mat of the channel in question or the degree of slope to protect and will be designated in the contract. The Type 4 mats are to be used at structural backfills protecting critical

structures, utility cuts, areas where vehicles may be expected to traverse the mat, channels with large heavy drift, and where higher factors of safety, very steep slopes and/or durability concerns are needed as determined by project team and designer and will be specified in the plans by designer.

Turf Reinforcement Matting					
Properties[1]	Type 1	Type 2	Type 3	Type 4	Test Method
Minimum tensile Strength lbs/ft	125	150	175	3000 by 1500	ASTM D6818[2]
UV stability (minimum % tensile retention)	80	80	80	90	ASTM D4355[3] (1000-hr exposure)
Minimum thickness (inches)	0.25	0.25	0.25	0.40	ASTM D6525
Slopes applications	2H:1V or flatter	1.5H:1V or flatter	1H:1V or flatter	1 H: 1V or greater	
Shear stress lbs/ft^2 Channel applications	6.0[4]	8.0[4]	10.0[4]	12.0[4]	ASTM D6459 ASTM D6460-07

[1] For TRMs containing degradable components, all physical property values must be obtained on the non-degradable portion of the matting alone.
[2]Minimum Average Roll Values for tensile strength of sample material machine direction.
[3]Tensile Strength percentage retained after stated 1000 hr duration of exposure under ASTM D4355 testing. Based on nondegradable components exclusively.
[4]Maximum permissible shear design values based on short-term (0.5 hr) vegetated data obtained by full scale flume testing ASTM D6459, D6460-07. Based on nondegradable components exclusively. Testing will be done at Independent Hydraulics Facility such as Colorado State University hydraulics laboratory, Utah State University hydraulics laboratory, Texas Transportation Institute (TTI) hydraulics and erosion control laboratory.

2.3 Quality Assurance Sampling, Testing, and Acceptance

A) Provide TRM listed on the Department's List of Approved Materials. Prior to inclusion on the LAM, the manufacturer of TRM must meet the physical and performance criteria as outlined in the specification and submit a Letter Certifying compliance of the product under the above ASTM testing procedures and including a copy of report from Full Scale Independent Hydraulics Facility that Fully Vegetated Shear Stress meets shear stress requirements tested under D6459 and D6460-07.

B) Contractors will provide a Letter of Certification from Manufacturer stating the product name, manufacturer, and that the product MARV product unit testing results meets Department criteria. Provide Letters once per project and for each product.

C) Acceptance shall be in accordance with ASTM D-4759 based on testing performed by a Geosynthetic Accreditation Institute – Laboratory Accreditation Program (GAI-LAP) accredited laboratory using Procedure A of ASTM D-4354.

Current mats meeting the above criteria are shown on the Department's List of Approved Materials.

2.4 Fasteners. When the mat manufacturer does not specify a specific fastener, use steel wire U-shaped staples with a minimum diameter of 0.09 inches (11 gauge), a minimum width of one inch and a minimum length of 12 inches. Use a heavier gauge when working in rocky or clay soils and longer lengths in sandy soils as directed by Engineer or Manufacturer's Representative. Provide staples with colored tops when requested by the Engineer.

3.0 CONSTRUCTION. When requested by the Engineer, provide a Manufacturer's Representative on-site to oversee and approve the initial installation of the mat. When requested by the Engineer, provide a letter from the Manufacturer approving the installation. When there is a conflict between the Department's criteria and the Manufacturer's criteria, construct using the more restrictive. The Engineer and Manufacturer's Representative must approve all alternate installation methods prior to execution. Construct according to the Manufacturer's recommendations and the following as minimum installation technique:

3.1 Site Preparation. Grade areas to be treated with matting and compact. Remove large rocks, soil clods, vegetation, roots, and other sharp objects that could keep the mat from intimate contact with subgrade. Prepare seedbed by loosening the top 2 to 3 inch of soil.

3.2 Installation. Install mats according to Standard Drawing Sepias "Turf Mat Channel Installation" and "Turf Mat Slope Installation." Install mats at the specified elevation and alignment. Anchor the mats with staples with a minimum length of 12 inches. Use longer anchors for installations in sandy, loose, or wet soils as directed by the Engineer or Manufacturer's Representative. The mat should be in direct contact with the soil surface.

4.0 MEASUREMENT. The Department will measure the quantity of Turf Reinforcement Mat by the square yard of surface covered. The Department will not measure preparation of the bed, providing a Manufacturer's Representative, topsoil, or seeding for payment and will consider them incidental to the Turf Reinforcement Mat. The Department will not measure any reworking of slopes or channels for payment as it is considered corrective work and incidental to the Turf Reinforcement Mat. Seeding and protection will be an incidental item.

5.0 PAYMENT. The Department will make payment for the completed and accepted quantities under the following:

Code	Pay Item	Pay Unit
23274EN11F	Turf Reinforcement Mat 1	Square Yard
23275EN11F	Turf Reinforcement Mat 2	Square Yard
23276EN11F	Turf Reinforcement Mat 3	Square Yard
23277EN11F	Turf Reinforcement Mat 4	Square Yard

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 Standard Specifications for Road and Bridge Construction, current edition.

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).

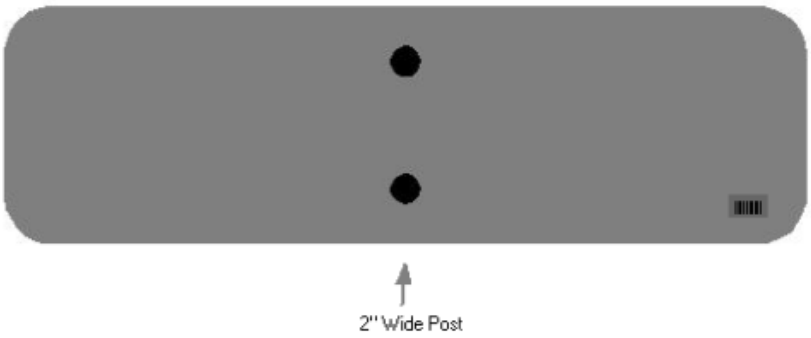
The installation of the permanent sign will be measured in accordance to Section 715.

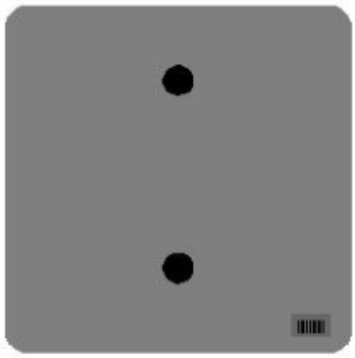
5.0 PAYMENT. The Department will make payment for the completed and accepted quantities under the following:

Code	Pay Item	Pay Unit
24631EC	Barcode Sign Inventory	Each

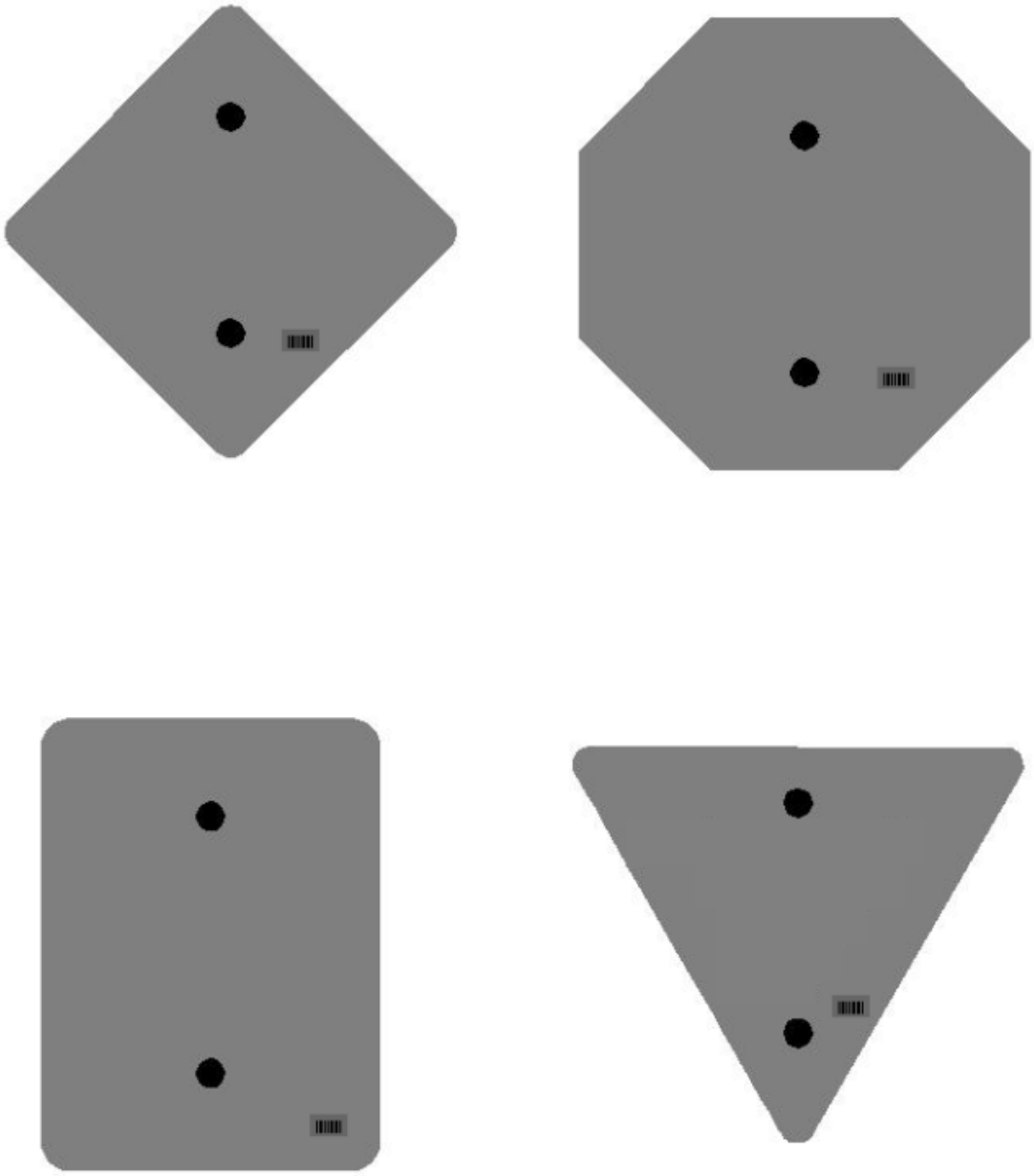
The Department will not make payment for this item until all barcodes are installed and sign inventory is complete on every permanent sign installed on the project. The Department will make payment for installation of the permanent sign in accordance to Section 715. The Department will consider payment as full compensation for all work required under this special note.

One Sign Post

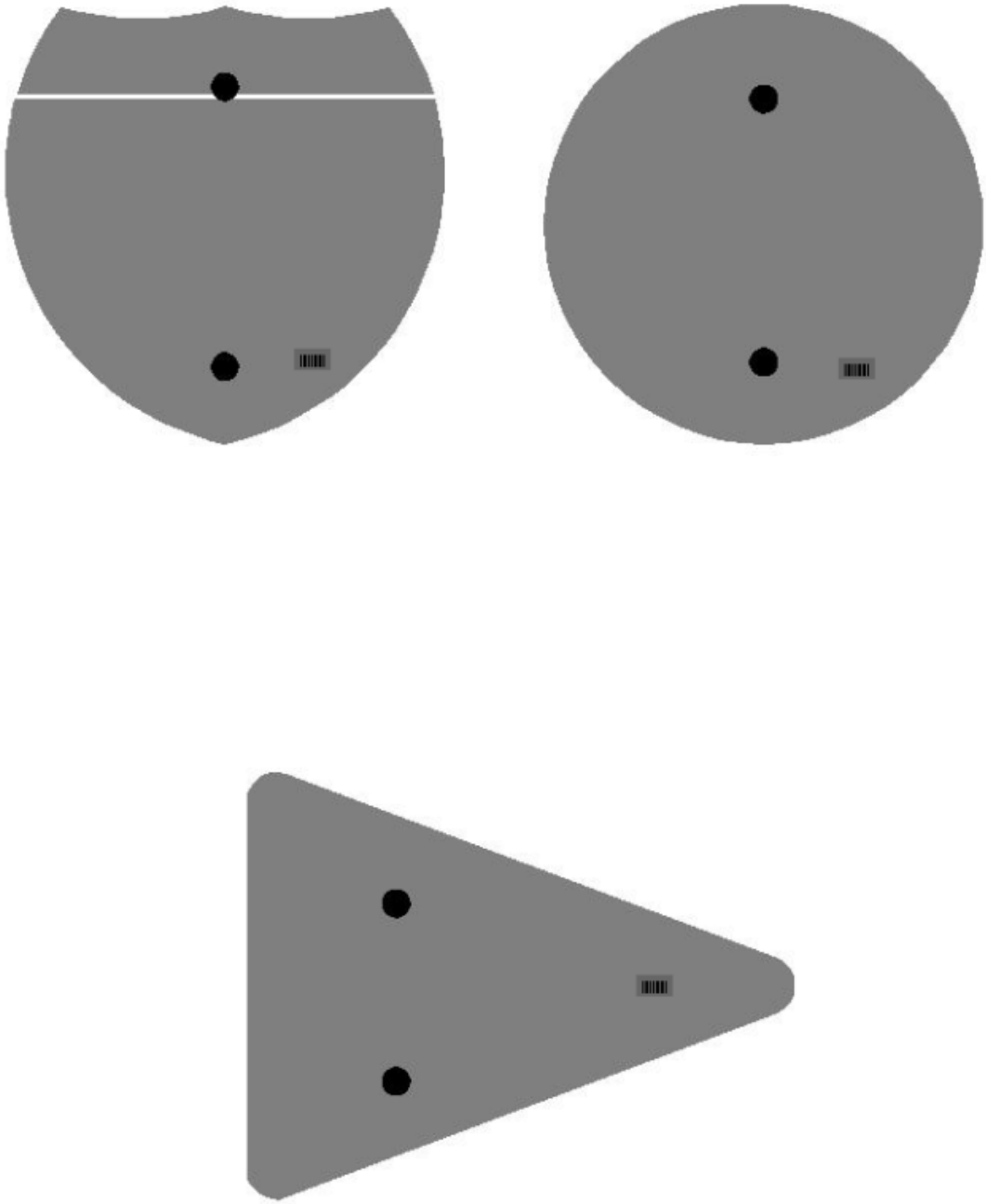




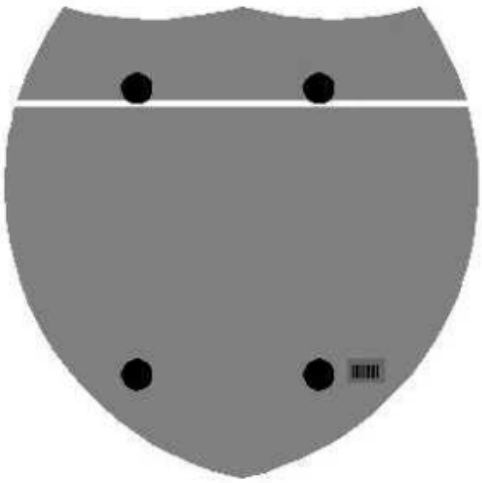
One Sign Post



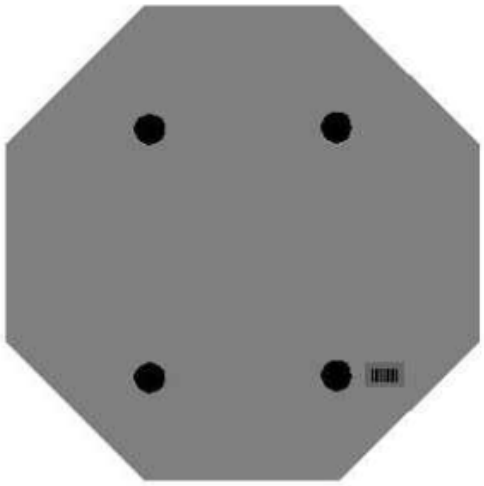
One Sign Post



Double Sign Post

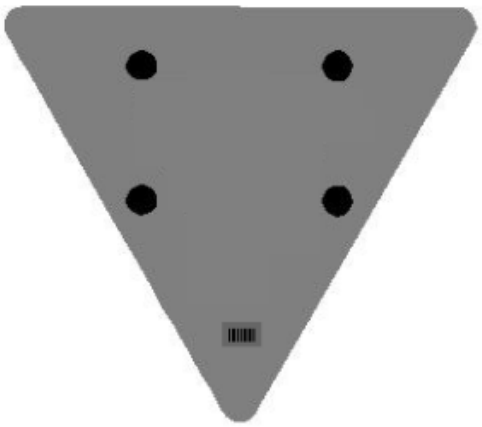


Interstate
Shield



48" Stop

2 Post Signs



PART III

EMPLOYMENT, WAGE AND RECORD REQUIREMENTS

FHWA-1273 -- Revised July 5, 2022

REQUIRED CONTRACT PROVISIONS
FEDERAL-AID CONSTRUCTION CONTRACTS

I. GENERAL

1. Form FHWA-1273 must be physically incorporated in each construction contract funded under title 23, United States Code, as required in 23 CFR 633.102(b) (excluding emergency contracts solely intended for debris removal). The contractor (or subcontractor) must insert this form in each subcontract and further require its inclusion in all lower tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services). 23 CFR 633.102(e).

The applicable requirements of Form FHWA-1273 are incorporated by reference for work done under any purchase order, rental agreement or agreement for other services. The prime contractor shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider. 23 CFR 633.102(e).

Form FHWA-1273 must be included in all Federal-aid design-build contracts, in all subcontracts and in lower tier subcontracts (excluding subcontracts for design services, purchase orders, rental agreements and other agreements for supplies or services) in accordance with 23 CFR 633.102. The design-builder shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

Contracting agencies may reference Form FHWA-1273 in solicitation-for-bids or request-for-proposals documents, however, the Form FHWA-1273 must be physically incorporated (not referenced) in all contracts, subcontracts and lower-tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services related to a construction contract). 23 CFR 633.102(b).

2. Subject to the applicability criteria noted in the following sections, these contract provisions shall apply to all work performed on the contract by the contractor's own organization and with the assistance of workers under the contractor's immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract. 23 CFR 633.102(d).

3. A breach of any of the stipulations contained in these Required Contract Provisions may be sufficient grounds for withholding of progress payments, withholding of final payment, termination of the contract, suspension / debarment or any other action determined to be appropriate by the contracting agency and FHWA.

4. Selection of Labor: During the performance of this contract, the contractor shall not use convict labor for any purpose within the limits of a construction project on a Federal-aid highway unless it is labor performed by convicts who are on parole, supervised release, or probation. 23 U.S.C. 114(b). The term Federal-aid highway does not include roadways functionally classified as local roads or rural minor collectors. 23 U.S.C. 101(a).

II. NONDISCRIMINATION (23 CFR 230.107(a); 23 CFR Part 230, Subpart A, Appendix A; EO 11246)

The provisions of this section related to 23 CFR Part 230, Subpart A, Appendix A are applicable to all Federal-aid construction contracts and to all related construction subcontracts of $10,000 or more. The provisions of 23 CFR Part 230 are not applicable to material supply, engineering, or architectural service contracts.

In addition, the contractor and all subcontractors must comply with the following policies: Executive Order 11246, 41 CFR Part 60, 29 CFR Parts 1625-1627, 23 U.S.C. 140, Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. 794), Title VI of the Civil Rights Act of 1964, as amended (42 U.S.C. 2000d et seq.), and related regulations including 49 CFR Parts 21, 26, and 27; and 23 CFR Parts 200, 230, and 633.

The contractor and all subcontractors must comply with: the requirements of the Equal Opportunity Clause in 41 CFR 60-1.4(b) and, for all construction contracts exceeding $10,000, the Standard Federal Equal Employment Opportunity Construction Contract Specifications in 41 CFR 60-4.3.

Note: The U.S. Department of Labor has exclusive authority to determine compliance with Executive Order 11246 and the policies of the Secretary of Labor including 41 CFR Part 60, and 29 CFR Parts 1625-1627. The contracting agency and the FHWA have the authority and the responsibility to ensure compliance with 23 U.S.C. 140, Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. 794), and Title VI of the Civil Rights Act of 1964, as amended (42 U.S.C. 2000d et seq.), and related regulations including 49 CFR Parts 21, 26, and 27; and 23 CFR Parts 200, 230, and 633.

The following provision is adopted from 23 CFR Part 230, Subpart A, Appendix A, with appropriate revisions to conform to the U.S. Department of Labor (US DOL) and FHWA requirements.

1. Equal Employment Opportunity: Equal Employment Opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (*see* 28 CFR Part 35, 29 CFR Part 1630, 29 CFR Parts 1625-1627, 41 CFR Part 60 and 49 CFR Part 27) and orders of the Secretary of Labor as modified by the provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140, shall constitute the EEO and specific affirmative action standards for the contractor's project activities under this contract. The provisions of the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR Part 35 and 29 CFR Part 1630 are incorporated by reference in this contract. In the execution of this contract, the contractor agrees to comply with the following minimum specific requirement activities of EEO:

a. The contractor will work with the contracting agency and the Federal Government to ensure that it has made every good faith effort to provide equal opportunity with respect to all of its terms and conditions of employment and in their review of activities under the contract. 23 CFR 230.409 (g)(4) & (5).

b. The contractor will accept as its operating policy the following statement:

"It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, sexual orientation, gender identity, color, national origin, age or disability. Such action shall include: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, pre-apprenticeship, and/or on-the-job training."

2. EEO Officer: The contractor will designate and make known to the contracting officers an EEO Officer who will have the responsibility for and must be capable of effectively administering and promoting an active EEO program and who must be assigned adequate authority and responsibility to do so.

3. Dissemination of Policy: All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action or are substantially involved in such action, will be made fully cognizant of and will implement the contractor's EEO policy and contractual responsibilities to provide EEO in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum:

a. Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the contractor's EEO policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer or other knowledgeable company official.

b. All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer, covering all major aspects of the contractor's EEO obligations within thirty days following their reporting for duty with the contractor.

c. All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer in the contractor's procedures for locating and hiring minorities and women.

d. Notices and posters setting forth the contractor's EEO policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.

e. The contractor's EEO policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.

4. Recruitment: When advertising for employees, the contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer." All such advertisements will be placed in publications having a large circulation among minorities and women in the area from which the project work force would normally be derived.

a. The contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minorities and women. To meet this requirement, the contractor will identify sources of potential minority group employees and establish with such identified sources procedures whereby minority and women applicants may be referred to the contractor for employment consideration.

b. In the event the contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, the contractor is expected to observe the provisions of that agreement to the extent that the system meets the contractor's compliance with EEO contract provisions. Where implementation of such an agreement has the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Federal nondiscrimination provisions.

c. The contractor will encourage its present employees to refer minorities and women as applicants for employment. Information and procedures with regard to referring such applicants will be discussed with employees.

5. Personnel Actions: Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, sexual orientation, gender identity, national origin, age or disability. The following procedures shall be followed:

a. The contractor will conduct periodic inspections of project sites to ensure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.

b. The contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.

c. The contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.

d. The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with its obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action

within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of their avenues of appeal.

6. Training and Promotion:

a. The contractor will assist in locating, qualifying, and increasing the skills of minorities and women who are applicants for employment or current employees. Such efforts should be aimed at developing full journey level status employees in the type of trade or job classification involved.

b. Consistent with the contractor's work force requirements and as permissible under Federal and State regulations, the contractor shall make full use of training programs (i.e., apprenticeship and on-the-job training programs for the geographical area of contract performance). In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision. The contracting agency may reserve training positions for persons who receive welfare assistance in accordance with 23 U.S.C. 140(a).

c. The contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.

d. The contractor will periodically review the training and promotion potential of employees who are minorities and women and will encourage eligible employees to apply for such training and promotion.

7. Unions: If the contractor relies in whole or in part upon unions as a source of employees, the contractor will use good faith efforts to obtain the cooperation of such unions to increase opportunities for minorities and women. 23 CFR 230.409. Actions by the contractor, either directly or through a contractor's association acting as agent, will include the procedures set forth below:

a. The contractor will use good faith efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minorities and women for membership in the unions and increasing the skills of minorities and women so that they may qualify for higher paying employment.

b. The contractor will use good faith efforts to incorporate an EEO clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, sexual orientation, gender identity, national origin, age, or disability.

c. The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to the contracting agency and shall set forth what efforts have been made to obtain such information.

d. In the event the union is unable to provide the contractor with a reasonable flow of referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, sexual orientation, gender identity, national origin, age, or disability; making full efforts to obtain qualified and/or qualifiable minorities and women. The failure of a union to provide sufficient referrals (even though it is obligated to provide exclusive referrals under the terms of a collective bargaining agreement) does not relieve the contractor from the requirements of this paragraph. In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the contracting agency.

8. Reasonable Accommodation for Applicants / Employees with Disabilities: The contractor must be familiar with the requirements for and comply with the Americans with Disabilities Act and all rules and regulations established thereunder. Employers must provide reasonable accommodation in all employment activities unless to do so would cause an undue hardship.

9. Selection of Subcontractors, Procurement of Materials and Leasing of Equipment: The contractor shall not discriminate on the grounds of race, color, religion, sex, sexual orientation, gender identity, national origin, age, or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment. The contractor shall take all necessary and reasonable steps to ensure nondiscrimination in the administration of this contract.

a. The contractor shall notify all potential subcontractors, suppliers, and lessors of their EEO obligations under this contract.

b. The contractor will use good faith efforts to ensure subcontractor compliance with their EEO obligations.

10. Assurances Required:

a. The requirements of 49 CFR Part 26 and the State DOT's FHWA-approved Disadvantaged Business Enterprise (DBE) program are incorporated by reference.

b. The contractor, subrecipient or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the recipient deems appropriate, which may include, but is not limited to:
(1) Withholding monthly progress payments;
(2) Assessing sanctions;
(3) Liquidated damages; and/or
(4) Disqualifying the contractor from future bidding as non-responsible.

c. The Title VI and nondiscrimination provisions of U.S. DOT Order 1050.2A at Appendixes A and E are incorporated by reference. 49 CFR Part 21.

11. Records and Reports: The contractor shall keep such records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years following the date of the final payment to the contractor for all contract work and shall be available at reasonable times and places for inspection by authorized representatives of the contracting agency and the FHWA.

a. The records kept by the contractor shall document the following:

(1) The number and work hours of minority and non-minority group members and women employed in each work classification on the project;

(2) The progress and efforts being made in cooperation with unions, when applicable, to increase employment opportunities for minorities and women; and

(3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minorities and women.

b. The contractors and subcontractors will submit an annual report to the contracting agency each July for the duration of the project indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on Form FHWA-1391. The staffing data should represent the project work force on board in all or any part of the last payroll period preceding the end of July. If on-the-job training is being required by special provision, the contractor will be required to collect and report training data. The employment data should reflect the work force on board during all or any part of the last payroll period preceding the end of July.

III. NONSEGREGATED FACILITIES

This provision is applicable to all Federal-aid construction contracts and to all related construction subcontracts of more than $10,000. 41 CFR 60-1.5.

As prescribed by 41 CFR 60-1.8, the contractor must ensure that facilities provided for employees are provided in such a manner that segregation on the basis of race, color, religion, sex, sexual orientation, gender identity, or national origin cannot result. The contractor may neither require such segregated use by written or oral policies nor tolerate such use by employee custom. The contractor's obligation extends further to ensure that its employees are not assigned to perform their services at any location under the contractor's control where the facilities are segregated. The term "facilities" includes waiting rooms, work areas, restaurants and other eating areas, time clocks, restrooms, washrooms, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing provided for employees. The contractor shall provide separate or single-user restrooms and necessary dressing or sleeping areas to assure privacy between sexes.

IV. DAVIS-BACON AND RELATED ACT PROVISIONS

This section is applicable to all Federal-aid construction projects exceeding $2,000 and to all related subcontracts and lower-tier subcontracts (regardless of subcontract size), in accordance with 29 CFR 5.5. The requirements apply to all projects located within the right-of-way of a roadway that is functionally classified as Federal-aid highway. 23 U.S.C. 113. This excludes roadways functionally classified as local roads or rural minor collectors, which are exempt. 23 U.S.C. 101. Where applicable law requires that projects be treated as a project on a Federal-aid highway, the provisions of this subpart will apply regardless of the location of the project. Examples include: Surface Transportation Block Grant Program projects funded under 23 U.S.C. 133 [excluding recreational trails projects], the Nationally Significant Freight and Highway Projects funded under 23 U.S.C. 117, and National Highway Freight Program projects funded under 23 U.S.C. 167.

The following provisions are from the U.S. Department of Labor regulations in 29 CFR 5.5 “Contract provisions and related matters” with minor revisions to conform to the FHWA-1273 format and FHWA program requirements.

1. Minimum wages (29 CFR 5.5)

a. All laborers and mechanics employed or working upon the site of the work, will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph 1.d. of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph 1.b. of this section) and the Davis-Bacon poster (WH–1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

b.(1) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(i) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(ii) The classification is utilized in the area by the construction industry; and

(iii) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(2) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(3) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(4) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs 1.b.(2) or 1.b.(3) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

c. Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

d. If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

2. Withholding (29 CFR 5.5)

The contracting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor under this contract, or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the contracting agency may, after written notice to the contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

3. Payrolls and basic records (29 CFR 5.5)

a. Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

b.(1) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the contracting agency. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH–347 is available for this purpose from the Wage and Hour Division Web site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the contracting agency for transmission to the State DOT, the FHWA or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the contracting agency.

(2) Each payroll submitted shall be accompanied by a “Statement of Compliance,” signed by the contractor or

subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(i) That the payroll for the payroll period contains the information required to be provided under 29 CFR 5.5(a)(3)(ii), the appropriate information is being maintained under 29 CFR 5.5(a)(3)(i), and that such information is correct and complete;

(ii) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in 29 CFR part 3;

(iii) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(3) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH–347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 3.b.(2) of this section.

(4) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under 18 U.S.C. 1001 and 31 U.S.C. 231.

c. The contractor or subcontractor shall make the records required under paragraph 3.a. of this section available for inspection, copying, or transcription by authorized representatives of the contracting agency, the State DOT, the FHWA, or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the FHWA may, after written notice to the contractor, the contracting agency or the State DOT, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

4. Apprentices and trainees (29 CFR 5.5)

a. Apprentices (programs of the USDOL).

Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice.

The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed.

Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination.

In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

b. Trainees (programs of the USDOL).

Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration.

The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration.

Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the

corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed.

In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

c. Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.

d. Apprentices and Trainees (programs of the U.S. DOT).

Apprentices and trainees working under apprenticeship and skill training programs which have been certified by the Secretary of Transportation as promoting EEO in connection with Federal-aid highway construction programs are not subject to the requirements of paragraph 4 of this Section IV. 23 CFR 230.111(e)(2). The straight time hourly wage rates for apprentices and trainees under such programs will be established by the particular programs. The ratio of apprentices and trainees to journeymen shall not be greater than permitted by the terms of the particular program.

5. Compliance with Copeland Act requirements. The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract as provided in 29 CFR 5.5.

6. Subcontracts. The contractor or subcontractor shall insert Form FHWA-1273 in any subcontracts and also require the subcontractors to include Form FHWA-1273 in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

7. Contract termination: debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

8. Compliance with Davis-Bacon and Related Act requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract as provided in 29 CFR 5.5.

9. Disputes concerning labor standards. As provided in 29 CFR 5.5, disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

10. Certification of eligibility (29 CFR 5.5)

a. By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

b. No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

c. The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

V. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

Pursuant to 29 CFR 5.5(b), the following clauses apply to any Federal-aid construction contract in an amount in excess of $100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by 29 CFR 5.5(a) or 29 CFR 4.6. As used in this paragraph, the terms laborers and mechanics include watchmen and guards.

1. Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek. 29 CFR 5.5.

2. Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph 1 of this section, the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph 1 of this section, in the sum currently provided in 29 CFR 5.5(b)(2)* for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph 1 of this section. 29 CFR 5.5.

* $27 as of January 23, 2019 (See 84 FR 213-01, 218) as may be adjusted annually by the Department of Labor; pursuant to the Federal Civil Penalties Inflation Adjustment Act of 1990).

3. Withholding for unpaid wages and liquidated damages. The FHWA or the contacting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph 2 of this section. 29 CFR 5.5.

4. Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraphs 1 through 4 of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs 1 through 4 of this section. 29 CFR 5.5.

VI. SUBLETTING OR ASSIGNING THE CONTRACT

This provision is applicable to all Federal-aid construction contracts on the National Highway System pursuant to 23 CFR 635.116.

1. The contractor shall perform with its own organization contract work amounting to not less than 30 percent (or a greater percentage if specified elsewhere in the contract) of the total original contract price, excluding any specialty items designated by the contracting agency. Specialty items may be performed by subcontract and the amount of any such specialty items performed may be deducted from the total original contract price before computing the amount of work required to be performed by the contractor's own organization (23 CFR 635.116).

a. The term “perform work with its own organization” in paragraph 1 of Section VI refers to workers employed or leased by the prime contractor, and equipment owned or rented by the prime contractor, with or without operators. Such term does not include employees or equipment of a subcontractor or lower tier subcontractor, agents of the prime contractor, or any other assignees. The term may include payments for the costs of hiring leased employees from an employee leasing firm meeting all relevant Federal and State regulatory requirements. Leased employees may only be included in this term if the prime contractor meets all of the following conditions: (based on longstanding interpretation)

(1) the prime contractor maintains control over the supervision of the day-to-day activities of the leased employees;
(2) the prime contractor remains responsible for the quality of the work of the leased employees;
(3) the prime contractor retains all power to accept or exclude individual employees from work on the project; and
(4) the prime contractor remains ultimately responsible for the payment of predetermined minimum wages, the submission of payrolls, statements of compliance and all other Federal regulatory requirements.

b. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or equipment not ordinarily available in the type of contracting organizations qualified and expected to bid or propose on the contract as a whole and in general are to be limited to minor components of the overall contract. 23 CFR 635.102.

2. Pursuant to 23 CFR 635.116(a), the contract amount upon which the requirements set forth in paragraph (1) of Section VI is computed includes the cost of material and manufactured products which are to be purchased or produced by the contractor under the contract provisions.

3. Pursuant to 23 CFR 635.116(c), the contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work) and (b) such other of its own organizational resources (supervision, management, and engineering services) as the contracting officer determines is necessary to assure the performance of the contract.

4. No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the contracting officer, or authorized representative, and such consent when given shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract. Written consent will be given only after the contracting agency has assured that each subcontract is evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract. (based on long-standing interpretation of 23 CFR 635.116).

5. The 30-percent self-performance requirement of paragraph (1) is not applicable to design-build contracts; however, contracting agencies may establish their own self-performance requirements. 23 CFR 635.116(d).

VII. SAFETY: ACCIDENT PREVENTION

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

1. In the performance of this contract the contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23 CFR Part 635). The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as the contracting officer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract. 23 CFR 635.108.

2. It is a condition of this contract, and shall be made a condition of each subcontract, which the contractor enters into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in surroundings or under conditions which are unsanitary, hazardous or dangerous to his/her health or safety, as determined under construction safety and health standards (29 CFR Part 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704). 29 CFR 1926.10.

3. Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance

with the construction safety and health standards and to carry out the duties of the Secretary under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704).

VIII. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

In order to assure high quality and durable construction in conformity with approved plans and specifications and a high degree of reliability on statements and representations made by engineers, contractors, suppliers, and workers on Federal-aid highway projects, it is essential that all persons concerned with the project perform their functions as carefully, thoroughly, and honestly as possible. Willful falsification, distortion, or misrepresentation with respect to any facts related to the project is a violation of Federal law. To prevent any misunderstanding regarding the seriousness of these and similar acts, Form FHWA-1022 shall be posted on each Federal-aid highway project (23 CFR Part 635) in one or more places where it is readily available to all persons concerned with the project:

18 U.S.C. 1020 reads as follows:

"Whoever, being an officer, agent, or employee of the United States, or of any State or Territory, or whoever, whether a person, association, firm, or corporation, knowingly makes any false statement, false representation, or false report as to the character, quality, quantity, or cost of the material used or to be used, or the quantity or quality of the work performed or to be performed, or the cost thereof in connection with the submission of plans, maps, specifications, contracts, or costs of construction on any highway or related project submitted for approval to the Secretary of Transportation; or

Whoever knowingly makes any false statement, false representation, false report or false claim with respect to the character, quality, quantity, or cost of any work performed or to be performed, or materials furnished or to be furnished, in connection with the construction of any highway or related project approved by the Secretary of Transportation; or

Whoever knowingly makes any false statement or false representation as to material fact in any statement, certificate, or report submitted pursuant to provisions of the Federal-aid Roads Act approved July 11, 1916, (39 Stat. 355), as amended and supplemented;

Shall be fined under this title or imprisoned not more than 5 years or both."

IX. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT (42 U.S.C. 7606; 2 CFR 200.88; EO 11738)

This provision is applicable to all Federal-aid construction contracts in excess of $150,000 and to all related subcontracts. 48 CFR 2.101; 2 CFR 200.326.

By submission of this bid/proposal or the execution of this contract or subcontract, as appropriate, the bidder, proposer, Federal-aid construction contractor, subcontractor, supplier, or vendor agrees to comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act (42 U.S.C. 7401-7671q) and the Federal Water Pollution Control Act, as amended (33 U.S.C. 1251-1387). Violations must be reported to the Federal Highway Administration and the Regional Office of the Environmental Protection Agency. 2 CFR Part 200, Appendix II.

The contractor agrees to include or cause to be included the requirements of this Section in every subcontract, and further agrees to take such action as the contracting agency may direct as a means of enforcing such requirements. 2 CFR 200.326.

X. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION

This provision is applicable to all Federal-aid construction contracts, design-build contracts, subcontracts, lower-tier subcontracts, purchase orders, lease agreements, consultant contracts or any other covered transaction requiring FHWA approval or that is estimated to cost $25,000 or more – as defined in 2 CFR Parts 180 and 1200. 2 CFR 180.220 and 1200.220.

1**. Instructions for Certification – First Tier Participants:**

a. By signing and submitting this proposal, the prospective first tier participant is providing the certification set out below.

b. The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this covered transaction. The prospective first tier participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective first tier participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction. 2 CFR 180.320.

c. The certification in this clause is a material representation of fact upon which reliance was placed when the contracting agency determined to enter into this transaction. If it is later determined that the prospective participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the contracting agency may terminate this transaction for cause of default. 2 CFR 180.325.

d. The prospective first tier participant shall provide immediate written notice to the contracting agency to whom this proposal is submitted if any time the prospective first tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances. 2 CFR 180.345 and 180.350.

e. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180, Subpart I, 180.900-180.1020, and 1200. “First Tier Covered Transactions” refers to any covered transaction between a recipient or subrecipient of Federal funds and a participant (such as the prime or general contract). “Lower Tier Covered Transactions” refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). “First Tier Participant” refers to the participant

who has entered into a covered transaction with a recipient or subrecipient of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

f. The prospective first tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction. 2 CFR 180.330.

g. The prospective first tier participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transactions," provided by the department or contracting agency, entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the $25,000 threshold. 2 CFR 180.220 and 180.300.

h. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. 2 CFR 180.300; 180.320, and 180.325. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. 2 CFR 180.335. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the System for Award Management website (https://www.sam.gov/). 2 CFR 180.300, 180.320, and 180.325.

i. Nothing contained in the foregoing shall be construed to require the establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of the prospective participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

j. Except for transactions authorized under paragraph (f) of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default. 2 CFR 180.325.

* * * * *

2. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion – First Tier Participants:

a. The prospective first tier participant certifies to the best of its knowledge and belief, that it and its principals:

(1) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency, 2 CFR 180.335;.

(2) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property, 2 CFR 180.800;

(3) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (a)(2) of this certification, 2 CFR 180.700 and 180.800; and

(4) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default. 2 CFR 180.335(d).

(5) Are not a corporation that has been convicted of a felony violation under any Federal law within the two-year period preceding this proposal (USDOT Order 4200.6 implementing appropriations act requirements); and

(6) Are not a corporation with any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted, or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability (USDOT Order 4200.6 implementing appropriations act requirements).

b. Where the prospective participant is unable to certify to any of the statements in this certification, such prospective participant should attach an explanation to this proposal. 2 CFR 180.335 and 180.340.

3. **Instructions for Certification - Lower Tier Participants:**

(Applicable to all subcontracts, purchase orders, and other lower tier transactions requiring prior FHWA approval or estimated to cost $25,000 or more - 2 CFR Parts 180 and 1200). 2 CFR 180.220 and 1200.220.

a. By signing and submitting this proposal, the prospective lower tier participant is providing the certification set out below.

b. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department, or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

c. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous by reason of changed circumstances. 2 CFR 180.365.

d. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180, Subpart I, 180.900 – 180.1020, and 1200. You may contact the person to which this proposal is

submitted for assistance in obtaining a copy of those regulations. “First Tier Covered Transactions” refers to any covered transaction between a recipient or subrecipient of Federal funds and a participant (such as the prime or general contract). “Lower Tier Covered Transactions” refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). “First Tier Participant” refers to the participant who has entered into a covered transaction with a recipient or subrecipient of Federal funds (such as the prime or general contractor). “Lower Tier Participant” refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

e. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated. 2 CFR 1200.220 and 1200.332.

f. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the $25,000 threshold. 2 CFR 180.220 and 1200.220.

g. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the System for Award Management website (https://www.sam.gov/), which is compiled by the General Services Administration. 2 CFR 180.300, 180.320, 180.330, and 180.335.

h. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

i. Except for transactions authorized under paragraph e of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment. 2 CFR 180.325.

* * * * *

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Participants:

1. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals:

(a) is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency, 2 CFR 180.355;

(b) is a corporation that has been convicted of a felony violation under any Federal law within the two-year period preceding this proposal (USDOT Order 4200.6 implementing appropriations act requirements); and

(c) is a corporation with any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted, or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability. (USDOT Order 4200.6 implementing appropriations act requirements)

2. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant should attach an explanation to this proposal.

* * * * *

XI. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts which exceed $100,000. 49 CFR Part 20, App. A.

1. The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

a. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

b. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

2. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

3. The prospective participant also agrees by submitting its bid or proposal that the participant shall require that the language of this certification be included in all lower tier

subcontracts, which exceed $100,000 and that all such recipients shall certify and disclose accordingly.

XII. USE OF UNITED STATES-FLAG VESSELS:

This provision is applicable to all Federal-aid construction contracts, design-build contracts, subcontracts, lower-tier subcontracts, purchase orders, lease agreements, or any other covered transaction. 46 CFR Part 381.

This requirement applies to material or equipment that is acquired for a specific Federal-aid highway project. 46 CFR 381.7. It is not applicable to goods or materials that come into inventories independent of an FHWA funded-contract.

When oceanic shipments (or shipments across the Great Lakes) are necessary for materials or equipment acquired for a specific Federal-aid construction project, the bidder, proposer, contractor, subcontractor, or vendor agrees:

1. To utilize privately owned United States-flag commercial vessels to ship at least 50 percent of the gross tonnage (computed separately for dry bulk carriers, dry cargo liners, and tankers) involved, whenever shipping any equipment, material, or commodities pursuant to this contract, to the extent such vessels are available at fair and reasonable rates for United States-flag commercial vessels. 46 CFR 381.7.

2. To furnish within 20 days following the date of loading for shipments originating within the United States or within 30 working days following the date of loading for shipments originating outside the United States, a legible copy of a rated, ‘on-board’ commercial ocean bill-of-lading in English for each shipment of cargo described in paragraph (b)(1) of this section to both the Contracting Officer (through the prime contractor in the case of subcontractor bills-of-lading) and to the Office of Cargo and Commercial Sealift (MAR-620), Maritime Administration, Washington, DC 20590. (MARAD requires copies of the ocean carrier's (master) bills of lading, certified onboard, dated, with rates and charges. These bills of lading may contain business sensitive information and therefore may be submitted directly to MARAD by the Ocean Transportation Intermediary on behalf of the contractor). 46 CFR 381.7.

ATTACHMENT A - EMPLOYMENT AND MATERIALS PREFERENCE FOR APPALACHIAN DEVELOPMENT HIGHWAY SYSTEM OR APPALACHIAN LOCAL ACCESS ROAD CONTRACTS (23 CFR 633, Subpart B, Appendix B)
This provision is applicable to all Federal-aid projects funded under the Appalachian Regional Development Act of 1965.

1. During the performance of this contract, the contractor undertaking to do work which is, or reasonably may be, done as on-site work, shall give preference to qualified persons who regularly reside in the labor area as designated by the DOL wherein the contract work is situated, or the subregion, or the Appalachian counties of the State wherein the contract work is situated, except:

a. To the extent that qualified persons regularly residing in the area are not available.

b. For the reasonable needs of the contractor to employ supervisory or specially experienced personnel necessary to assure an efficient execution of the contract work.

c. For the obligation of the contractor to offer employment to present or former employees as the result of a lawful collective bargaining contract, provided that the number of nonresident persons employed under this subparagraph (1c) shall not exceed 20 percent of the total number of employees employed by the contractor on the contract work, except as provided in subparagraph (4) below.

2. The contractor shall place a job order with the State Employment Service indicating (a) the classifications of the laborers, mechanics and other employees required to perform the contract work, (b) the number of employees required in each classification, (c) the date on which the participant estimates such employees will be required, and (d) any other pertinent information required by the State Employment Service to complete the job order form. The job order may be placed with the State Employment Service in writing or by telephone. If during the course of the contract work, the information submitted by the contractor in the original job order is substantially modified, the participant shall promptly notify the State Employment Service.

3. The contractor shall give full consideration to all qualified job applicants referred to him by the State Employment Service. The contractor is not required to grant employment to any job applicants who, in his opinion, are not qualified to perform the classification of work required.

4. If, within one week following the placing of a job order by the contractor with the State Employment Service, the State Employment Service is unable to refer any qualified job applicants to the contractor, or less than the number requested, the State Employment Service will forward a certificate to the contractor indicating the unavailability of applicants. Such certificate shall be made a part of the contractor's permanent project records. Upon receipt of this certificate, the contractor may employ persons who do not normally reside in the labor area to fill positions covered by the certificate, notwithstanding the provisions of subparagraph (1c) above.

5. The provisions of 23 CFR 633.207(e) allow the contracting agency to provide a contractual preference for the use of mineral resource materials native to the Appalachian region.

6. The contractor shall include the provisions of Sections 1 through 4 of this Attachment A in every subcontract for work which is, or reasonably may be, done as on-site work.

KENTUCKY TRANSPORTATION CABINET
DEPARTMENT OF HIGHWAYS

EMPLOYMENT REQUIREMENTS
RELATING TO
NONDISCRIMINATION OF EMPLOYEES
(APPLICABLE TO FEDERAL-AID SYSTEM CONTRACTS)

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.

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

Standard Title VI/Non-Discrimination Assurances

During the performance of this contract, the contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the "contractor") agrees as follows:

1. **Compliance with Regulations:** The contractor (hereinafter includes consultants) will comply with the Acts and the Regulations relative to Non-discrimination in Federally-assisted programs of the U.S. Department of Transportation, **Federal Highway Administration**, as they may be amended from time to time, which are herein incorporated by reference and made a part of this contract.

2. **Non-discrimination:** The contractor, with regard to the work performed by it during the contract, will not discriminate on the grounds of race, color, or national origin in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The contractor will not participate directly or indirectly in the discrimination prohibited by the Acts and the Regulations, including employment practices when the contract covers any activity, project, or program set forth in Appendix B of 49 CFR Part 21.

3. **Solicitations for Subcontracts, Including Procurements of Materials and Equipment:** In all solicitations, either by competitive bidding, or negotiation made by the contractor for work to be performed under a subcontract, including procurements of materials, or leases of equipment, each potential subcontractor or supplier will be notified by the contractor of the contractor's obligations under this contract and the Acts and the Regulations relative to Non-discrimination on the grounds of race, color, or national origin.

4. **Information and Reports:** The contractor will provide all information and reports required by the Acts, the Regulations, and directives issued pursuant thereto and will permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the Recipient or the **Federal Highway Administration** to be pertinent to ascertain compliance with such Acts, Regulations, and instructions. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish the information, the contractor will so certify to the Recipient or the **Federal Highway Administration**, as appropriate, and will set forth what efforts it has made to obtain the information.

5. **Sanctions for Noncompliance:** In the event of a contractor's noncompliance with the Non-discrimination provisions of this contract, the Recipient will impose such contract sanctions as it or the **Federal Highway Administration** may determine to be appropriate, including, but not limited to:

    a. withholding payments to the contractor under the contract until the contractor complies; and/or
    b. cancelling, terminating, or suspending a contract, in whole or in part.

6. **Incorporation of Provisions:** The contractor will include the provisions of paragraphs one through six in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Acts, the Regulations and directives issued pursuant thereto. The contractor will take action with respect to any subcontract or procurement as the Recipient or the **Federal Highway Administration** may direct as a means of enforcing such provisions including sanctions for noncompliance. Provided, that if the contractor becomes involved in, or is threatened with litigation by a subcontractor, or supplier because of such direction, the contractor may request the Recipient to enter into any litigation to protect the interests of the Recipient. In addition, the contractor may request the United States to enter into the litigation to protect the interests of the United States.

Standard Title VI/Non-Discrimination Statutes and Authorities

During the performance of this contract, the contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the "contractor") agrees to comply with the following non-discrimination statutes and authorities; including but not limited to:

- Title VI of the Civil Rights Act of 1964 (42 U.S.C. § 2000d *et seq*., 78 stat. 252), (prohibits discrimination on the basis of race, color, national origin); and 49 CFR Part 21;
- The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, (42 U.S.C. § 4601), (prohibits unfair treatment of persons displaced or whose property has been acquired because of Federal or Federal-aid programs and projects);
- Federal-Aid Highway Act of 1973, (23 U.S.C. § 324 *et seq*.), (prohibits discrimination on the basis of sex);
- Section 504 of the Rehabilitation Act of 1973, (29 U.S.C. § 794 *et seq*.), as amended, (prohibits discrimination on the basis of disability); and 49 CFR Part 27;
- The Age Discrimination Act of 1975, as amended, (42 U.S.C. § 6101 *et seq*.), (prohibits discrimination on the basis of age);
- Airport and Airway Improvement Act of 1982, (49 USC § 471, Section 47123), as amended, (prohibits discrimination based on race, creed, color, national origin, or sex);
- The Civil Rights Restoration Act of 1987, (PL 100-209), (Broadened the scope, coverage and applicability of Title VI of the Civil Rights Act of 1964, The Age Discrimination Act of 1975 and Section 504 of the Rehabilitation Act of 1973, by expanding the definition of the terms "programs or activities" to include all of the programs or activities of the Federal-aid recipients, sub-recipients and contractors, whether such programs or activities are Federally funded or not);
- Titles II and III of the Americans with Disabilities Act, which prohibit discrimination on the basis of disability in the operation of public entities, public and private transportation systems, places of public accommodation, and certain testing entities (42 U.S.C. §§ 12131 -- 12189) as implemented by Department of Transportation regulations at 49 C.F.R. parts 37 and 38;
- The Federal Aviation Administration's Non-discrimination statute (49 U.S.C. § 47123) (prohibits discrimination on the basis of race, color, national origin, and sex);
- Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, which ensures non-discrimination against minority populations by discouraging programs, policies, and activities with disproportionately high and adverse human health or environmental effects on minority and low-income populations;
- Executive Order 13166, Improving Access to Services for Persons with Limited English Proficiency, and resulting agency guidance, national origin discrimination includes discrimination because of limited English proficiency (LEP). To ensure compliance with Title VI, you must take reasonable steps to ensure that LEP persons have meaningful access to your programs (70 Fed. Reg. at 74087 to 74100);
- Title IX of the Education Amendments of 1972, as amended, which prohibits you from discriminating because of sex in education programs or activities (20 U.S.C. 1681 et seq).

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, 1025 Capital Center Drive, Suite 104, Frankfort, Kentucky 40601; telephone (502) 564-7954.

Revised: May 23, 2022

"General Decision Number: KY20220039 11/04/2022

Superseded General Decision Number: KY20210039

State: Kentucky

Construction Type: Highway

Counties: Boone, Campbell, Kenton and Pendleton Counties in Kentucky.

HIGHWAY CONSTRUCTION PROJECTS (excluding tunnels, building structures in rest area projects & railroad construction; bascule, suspension & spandrel arch bridges designed for commercial navigation, bridges involving marine construction; and other major bridges).

Note: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658. Please note that these Executive Orders apply to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but do not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60).

If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022:	. Executive Order 14026 generally applies to the contract. . The contractor must pay all covered workers at least $15.00 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2022.
If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022:	. Executive Order 13658 generally applies to the contract. . The contractor must pay all covered workers at least $11.25 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2022.

The applicable Executive Order minimum wage rate will be adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker protections under the Executive Orders is available at https://www.dol.gov/agencies/whd/government-contracts.

Modification Number	Publication Date
0	01/07/2022
1	02/11/2022
2	02/25/2022
3	06/10/2022
4	07/01/2022
5	08/12/2022
6	11/04/2022

BRKY0002-005 06/01/2021

	Rates	Fringes
BRICKLAYER	$ 30.87	15.87

BROH0001-005 06/01/2021

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER	$ 29.57	14.75

CARP0698-001 06/01/2021

BOONE, CAMPBELL, KENTON & PENDLETON COUNTIES:

	Rates	Fringes
Carpenter & Piledrivermen	$ 27.70	20.23
Diver	$ 40.58	9.69

ELEC0212-007 06/06/2022

	Rates	Fringes
ELECTRICIAN	$ 33.29	20.05

ELEC0212-013 11/25/2019

	Rates	Fringes
Sound & Communication Technician	$ 24.35	12.09

ENGI0018-013 05/01/2019

	Rates	Fringes
POWER EQUIPMENT OPERATOR		
GROUP 1	$ 37.39	14.95
GROUP 2	$ 37.27	14.95
GROUP 3	$ 36.23	14.95
GROUP 4	$ 35.05	14.95
GROUP 5	$ 29.59	14.95
GROUP 6	$ 37.64	14.95
GROUP 7	$ 37.89	14.95

OPERATING ENGINEER CLASSIFICATIONS

GROUP 1 - Air Compressor on Steel Erection; Barrier Moving Machine; Boiler Operator on Compressor or Generator when mounted on a Rig; Cableway; Combination Concrete Mixer & Tower; Concrete Plant (over 4 yd. Capacity); Concrete Pump; Crane (All Types, Including Boom Truck, Cherry Picker);

Crane-Compact, Track or Rubber over 4,000 lbs. capacity; Cranes-Self Erecting, Stationary, Track or Truck (All Configurations); Derrick; Dragline; Dredge (Dipper, Clam or Suction); Elevating Grader or Euclid Loader; Floating Equipment (All Types); Gradall; Helicopter Crew (Operator-Hoist or Winch); Hoe (all types); Hoisting Engine on Shaft or Tunnel Work; Hydraulic Gantry (Lifting System); Industrial-Type Tractor; Jet Engine Dryer (D8 or D9) Diesel Tractor; Locomotive (Standard Gauge); Maintenance Operator Class A; Mixer, Paving (Single or Double Drum); Mucking Machine; Multiple Scraper; Piledriving Machine (All Types); Power Shovel; Prentice Loader; Quad 9 (Double Pusher); Rail Tamper (with auto lifting & aligning device); Refrigerating Machine (Freezer Operation); Rotary Drill, on Caisson work; Rough Terrain Fork Lift with Winch/Hoist; Side-Boom; Slip-Form Paver; Tower Derrick; Tree Shredder; Trench Machine (Over 24"" wide); Truck Mounted Concrete Pump; Tug Boat; Tunnel Machine and/or Mining Machine; & Wheel Excavator

GROUP 2 - Asphalt Paver; Automatic Subgrader Machine, Self-Propelled (CMI Type); Bobcat Type and/or Skid Steer Loader with Hoe Attachment Greater than 7,000 lbs.; Boring Machine More than 48""; Bulldozer; Endloader; Hydro Milling Machine; Horizontal Directional Drill (over 500,000 ft. lbs. thrust); Kolman-type Loader (production type-Dirt); Lead Greaseman; Lighting & Traffic Signal Installation Equipment (includes all groups or classifications); Material Transfer Equipment (Shuttle Buggy) Asphalt; Pettibone-Rail Equipment; Power Grader; Power Scraper; Push Cat; Rotomill (all), Grinders & Planers of All types; Trench Machine (24"" wide & under); & Vermeer type Concrete Saw

GROUP 3 - A-Frame; Air Compressor on Tunnel Work (low pressure); Asphalt Plant Engineer; Bobcat-type and/or Skid Steer Loader with or without Attachments; Highway Drills (all types); Locomotive (narrow gauge); Material Hoist/Elevator; Mixer, Concrete (more than one bag capacity); Mixer, one bag capacity (Side Loader); Power Boiler (Over 15 lbs. Pressure) Pump Operator installing & operating Well Points; Pump (4"" & over discharge); Roller, Asphalt; Rotovator (lime soil stabilizer); Switch & Tie Tampers (without lifting & aligning device); Utility Operator (Small equipment); & Welding Machines

GROUP 4 - Backfiller; Ballast Re-locator; Bars, Joint & Mesh Installing Machine; Batch Plant; Boring Machine Operator (48"" or less); Bull Floats; Burlap & Curing Machine; Concrete Plant (capacity 4 yd. & under); Concrete Saw (Multiple); Conveyor (Highway); Crusher; Deckhand; Farm-type Tractor with attachments (highway) except Masonry); Finishing Machine; Fireperson, Floating Equipment (all types); Fork Lift (highway); Form Trencher; Hydro Hammer; Hydro Seeder; Pavement Breaker; Plant Mixer; Post Driver; Post Hole Digger (Power Auger); Power Brush Burner; Power Form Handling Equipment; Road Widening Trencher; Roller (Brick, Grade & Macadam); Self-Propelled Power Spreader; Self-Propelled Power Subgrader; Steam Fireperson; Tractor (Pulling Sheepfoot, Roller or Grader); & Vibratory Compactor with Integral Power

GROUP 5 - Compressor (Portable, Sewer, Heavy & Highway); Drum Fireperson (Asphalt); Generator; Masonry Fork Lift; Inboard-Outboard Motor Boat Launch; Masonry Fork Lift; Oil

Heater (asphalt plant); Oiler; Power Driven Heater; Power Sweeper & Scrubber; Pump (under 4"" discharge); Signalperson; Tire Repairperson; & VAC/ALLS

GROUP 6 - Master Mechanic & Boom from 150 to 180

GROUP 7 - Boom from 180 and over

IRON0044-008 06/01/2022

	Rates	Fringes
Ironworkers:		
Fence Erector	$ 30.28	22.30
Structural	$ 31.87	22.30

IRON0044-018 06/01/2022

	Rates	Fringes
IRONWORKER, REINFORCING	$ 32.37	22.30

LABO0189-004 07/01/2022

PENDLETON COUNTY:

	Rates	Fringes
LABORER		
GROUP 1	$ 23.76	17.12
GROUP 2	$ 24.01	17.12
GROUP 3	$ 24.06	17.12
GROUP 4	$ 24.66	17.12

LABORERS CLASSIFICATIONS

GROUP 1 - Aging & Curing of Concrete; Asbestos Abatement Worker; Asphalt Plant; Asphalt; Batch Truck Dump; Carpenter Tender; Cement Mason Tender; Cleaning of Machines; Concrete; Demolition; Dredging; Environmental - Nuclear, Radiation, Toxic & Hazardous Waste - Level D; Flagperson; Grade Checker; Hand Digging & Hand Back Filling; Highway Marker Placer; Landscaping, Mesh Handler & Placer; Puddler; Railroad; Rip-rap & Grouter; Right-of-Way; Sign, Guard Rail & Fence Installer; Signal Person; Sound Barrier Installer; Storm & Sanitary Sewer; Swamper; Truck Spotter & Dumper; Wrecking of Concrete Forms; General Cleanup

GROUP 2 - Batter Board Man (Sanitary & Storm Sewer); Brickmason Tender; Mortar Mixer Operator; Scaffold Builder; Burner & Welder; Bushammer; Chain Saw Operator; Concrete Saw Operator; Deckhand Scow Man; Dry Cement Handler; Environmental - Nuclear, Radiation, Toxic & Hazardous Waste - Level C; Forklift Operator for Masonary; Form Setter; Green Concrete Cutting; Hand Operated Grouter & Grinder Machine Operator; Jackhammer; Pavement Breaker; Paving Joint Machine; Pipelayer; Plastic Pipe Fusion; Power Driven Georgia Buggy & Wheel Barrow; Power Post Hole Digger; Precast Manhole Setter; Walk-Behind Tamper; Walk-Behind Trencher; Sand Blaster; Concrete Chipper; Surface Grinder; Vibrator Operator; Wagon Driller

GROUP 3 - Asphalt Luteman & Raker; Gunnite Nozzleman; Gunnite Operator & Mixer; Grout Pump Operator; Side Rail Setter;

Rail Paved Ditches; Screw Operator; Tunnel (Free Air); Water Blaster

GROUP 4 - Caisson Worker (Free Air); Cement Finisher; Environmental - Nuclear, Radiation, Toxic & Hazardous Waste - Levels A & B; Miner & Driller (Free Air); Tunnel Blaster; & Tunnel Mucker (Free Air); Directional & Horizontal Boring; Air Track Driller (All Types); Powderman & Blaster; Troxler & Concrete Tester if Laborer is Utilized

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LABO0265-009 05/01/2018

BOONE, CAMPBELL & KENTON COUNTIES:

	Rates	Fringes
LABORER		
GROUP 1	$ 30.62	10.95
GROUP 2	$ 30.79	10.95
GROUP 3	$ 31.12	10.95
GROUP 4	$ 31.57	10.95

LABORER CLASSIFICATIONS

GROUP 1 - Asphalt Laborer; Carpenter Tender; Concrete Curing Applicator; Dump Man (Batch Truck); Guardrail and Fence Installer; Joint Setter; Laborer (Construction); Landscape Laborer; Highway Lighting Worker; Signalization Worker; Mesh Handlers & Placer; Right-of-way Laborer; Riprap Laborer & Grouter; Scaffold Erector; Seal Coating; Surface Treatment or Road Mix Laborer; Sign Installer; Slurry Seal; Utility Man; Bridge Man; Handyman; Waterproofing Laborer; Flagperson; Hazardous Waste (level D); Diver Tender; Zone Person & Traffic Control

GROUP 2 - Skid Steer; Asphalt Raker; Concrete Puddler; Kettle Man (Pipeline); Machine Driven Tools (Gas, Electric, Air); Mason Tender; Brick Paver; Mortar Mixer; Power Buggy or Power Wheelbarrow; Sheeting & Shoring Man; Surface Grinder Man; Plastic Fusing Machine Operator; Pug Mill Operator; & Vacuum Devices (wet or dry); Rodding Machine Operator; Diver; Screwman or Paver; Screed Person; Water Blast, Hand Held Wand; Pumps 4"" & Under (Gas, Air or Electric) & Hazardous Waste (level C); Air Track and Wagon Drill; Bottom Person; Cofferdam (below 25 ft. deep); Concrete Saw Person; Cutting with Burning Torch; Form Setter; Hand Spiker (Railroad); Pipelayer; Tunnel Laborer (without air) & Caisson; Underground Person (working in Sewer and Waterline, Cleaning, Repairing & Reconditioning); Sandblaster Nozzle Person; & Hazardous Waste (level B)

GROUP 3 - Blaster; Mucker; Powder Person; Top Lander; Wrencher (Mechanical Joints & Utility Pipeline); Yarner; Hazardous Waste (level A); Concrete Specialist; Concrete Crew in Tunnels (With Air-pressurized - $1.00 premium); Curb Setter & Cutter; Grade Checker; Utility Pipeline Tapper; Waterline; and Caulker

GROUP 4 - Miner; & Gunite Nozzle Person

TUNNEL LABORER WITH AIR-PRESSURIZED ADD $1.00 TO BASE RATE

SIGNAL PERSON WILL RECEIVE THE RATE EQUAL TO THE RATE PAID THE LABORER CLASSIFICATION FOR WHICH HE OR SHE IS

SIGNALING.

PAIN0012-016 05/01/2015

	Rates	Fringes
PAINTER		
Bridge	$ 24.39	9.06
Bridge Equipment Tender and Containment Builder	$ 20.73	9.06
Brush & Roller	$ 23.39	9.06
Sandblasting & Water Blasting	$ 24.14	9.06
Spray	$ 23.89	9.06

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* PLUM0392-008 06/01/2022

	Rates	Fringes
PLUMBER	$ 36.81	27.35

SUKY2010-161 02/05/1996

	Rates	Fringes
Truck drivers:		
GROUP 1	$ 15.85	4.60
GROUP 2	$ 16.29	4.60

TRUCK DRIVER CLASSIFICATIONS

GROUP 1 - Driver

GROUP 2 - Euclid Wagon; End Dump; Lowboy; Heavy Duty Equipment; Tractor-Trailer Combination; & Drag

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WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at https://www.dol.gov/agencies/whd/government-contracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after

award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of ""identifiers"" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than ""SU"" or ""UAVG"" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the ""SU"" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage

determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour National Office because National Office has responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

END OF GENERAL DECISIO"

Fringe benefit amounts are applicable for all hours worked except when otherwise noted.

No laborer, workman or mechanic shall be paid at a rate less than that of a Journeyman except those classified as bona fide apprentices.

Apprentices or trainees shall be permitted to work as such subject to Administrative Regulations adopted by the Commissioner of Workplace Standards. Copies of these regulations will be furnished upon request from any interested person.

Before using apprentices on the job the contractor shall present to the Contracting Officer written evidence of registration of such employees in a program of a State apprenticeship and training agency approved and recognized by the U. S. Bureau of Apprenticeship and Training. In the absence of such a State agency, the contractor shall submit evidence of approval and registration by the U. S. Bureau of Apprenticeship and Training.

The contractor shall submit to the Contracting Officer, written evidence of the established apprenticeship-journeyman ratios and wage rates in the project area, which will be the basis for establishing such ratios and rates for the project under the applicable contract provisions.

TO: EMPLOYERS/EMPLOYEES

PREVAILING WAGE SCHEDULE:

The wages indicated on this wage schedule are the least permitted to be paid for the occupations indicated. When an employee works in more than one classification, the employer must record the number of hours worked in each classification at the prescribed hourly base rate.

OVERTIME:

Overtime is to be paid to an employee at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty (40) hours in such workweek. Wage violations or questions should be directed to the designated Engineer or the undersigned.

Director
Division of Construction Procurement
Frankfort, Kentucky 40622
502-564-3500

NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY (Executive Order 11246)

1. The Offeror's or Bidder's attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Specifications" set forth herein.

2. The goals and timetables for minority and female participation, expressed in percentage terms for the Contractor's aggregate work force in each trade on all construction work in the covered area, are as follows:

GOALS FOR MINORITY PARTICIPATION IN EACH TRADE	GOALS FOR FEMALE PARTICIPATION IN EACH TRADE
11.0%	6.9%

These goals are applicable to all the Contractor's construction work (whether or not it is Federal or federally-assisted) performed in the covered area. If the contractor performs construction work in a geographical area located outside of the covered area, it shall apply the goals established for such geographical area where the work is actually performed. With regard to this second area, the contractor also is subject to the goals for both its federally involved and non-federally involved construction.

The Contractor's compliance with the Executive Order and the regulations in CFR Part 60-4 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in 41 CFR 60-4, 3(a), and its efforts to meet the goals. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade, and the contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, the Executive Order and the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed.

3. The Contractor shall provide written notification to the Director of the Office of Federal Contract Compliance Programs within ten (10) working days of award of any construction subcontract in excess of $10,000.00 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the name, address and telephone number of the subcontractor; employer identification number of the subcontractor; estimated dollar amount of the subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the subcontract is to be performed. The notification shall be mailed to:

Evelyn Teague, Regional Director
Office of Federal Contract Compliance Programs
61 Forsyth Street, SW, Suite 7B75
Atlanta, Georgia 30303-8609

4. As used in this Notice, and in the contract resulting from this solicitation, the **"covered area"** is Boone County.

PART IV

INSURANCE

Refer to
Kentucky Standard Specifications for Road and Bridge Construction,
current edition

PART V

BID ITEMS

221059

PROPOSAL BID ITEMS

Report Date 11/14/22

Section: 0001 - PAVING

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
0010	00003		CRUSHED STONE BASE	34,237.00	TON		$	
0020	00013		LIME STABILIZED ROADBED	79,332.00	SQYD		$	
0030	00014		LIME	2,314.00	TON		$	
0040	00100		ASPHALT SEAL AGGREGATE	33.00	TON		$	
0050	00103		ASPHALT SEAL COAT	4.00	TON		$	
0060	00194		LEVELING & WEDGING PG76-22	104.00	TON		$	
0070	00214		CL3 ASPH BASE 1.00D PG64-22	35,357.00	TON		$	
0080	00216		CL3 ASPH BASE 1.00D PG76-22	15,800.00	TON		$	
0090	00221		CL2 ASPH BASE 0.75D PG64-22	1,190.00	TON		$	
0100	00296		ASPHALT PRIME COAT	44.00	TON		$	
0110	00301		CL2 ASPH SURF 0.38D PG64-22	650.00	TON		$	
0120	00336		CL3 ASPH SURF 0.38A PG76-22	8,868.00	TON		$	
0130	00356		ASPHALT MATERIAL FOR TACK	118.00	TON		$	
0140	00358		ASPHALT CURING SEAL	80.00	TON		$	
0150	02101		CEM CONC ENT PAVEMENT-8 IN	3,124.00	SQYD		$	
0160	02676		MOBILIZATION FOR MILL & TEXT BOONE	1.00	LS		$	
0170	02677		ASPHALT PAVE MILLING & TEXTURING	138.00	TON		$	
0180	02702		SAND FOR BLOTTER	100.00	TON		$	
0190	21799EN		BORE AND JACK PIPE-24 IN	119.00	LF		$	
0200	23126EN		BORE AND JACK PIPE-18 IN	105.00	LF		$	

Section: 0002 - ROADWAY

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
0210	00021		DRAINAGE BLANKET-EMBANKMENT	1,500.00	CUYD		$	
0220	00078		CRUSHED AGGREGATE SIZE NO 2	211.00	TON		$	
0230	00440		ENTRANCE PIPE-15 IN	76.00	LF		$	
0240	00462		CULVERT PIPE-18 IN	39.00	LF		$	
0250	00464		CULVERT PIPE-24 IN	42.00	LF		$	
0260	00466		CULVERT PIPE-30 IN	120.00	LF		$	
0270	01810		STANDARD CURB AND GUTTER	18,894.00	LF		$	
0280	01875		STANDARD HEADER CURB	1,944.00	LF		$	
0290	01917		STANDARD BARRIER MEDIAN TYPE 2	287.00	SQYD		$	
0300	01921		STANDARD BARRIER MEDIAN TYPE 4	143.00	SQYD		$	
0310	01987		DELINEATOR FOR GUARDRAIL BI DIRECTIONAL WHITE	10.00	EACH		$	
0320	02015		CEMENT CONCRETE ISLAND	54.00	SQYD		$	
0330	02159		TEMP DITCH	6,124.00	LF		$	
0340	02160		CLEAN TEMP DITCH	3,062.50	LF		$	
0350	02200		ROADWAY EXCAVATION	181,591.00	CUYD		$	
0360	02242		WATER	2,610.00	MGAL		$	
0370	02351		GUARDRAIL-STEEL W BEAM-S FACE	425.00	LF		$	
0380	02360		GUARDRAIL TERMINAL SECTION NO 1	4.00	EACH		$	
0390	02367		GUARDRAIL END TREATMENT TYPE 1	2.00	EACH		$	
0400	02381		REMOVE GUARDRAIL	475.00	LF		$	

221059

PROPOSAL BID ITEMS

Report Date 11/14/22

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
0410	02391		GUARDRAIL END TREATMENT TYPE 4A	1.00	EACH		$	
0420	02397		TEMP GUARDRAIL	825.00	LF		$	
0430	02429		RIGHT-OF-WAY MONUMENT TYPE 1	78.00	EACH		$	
0440	02432		WITNESS POST	3.00	EACH		$	
0450	02483		CHANNEL LINING CLASS II	819.00	TON		$	
0460	02545		CLEARING AND GRUBBING 0.32 ACRES KENTON	1.00	LS		$	
0470	02545		CLEARING AND GRUBBING 14.51 ACRES BOONE	1.00	LS		$	
0480	02562		TEMPORARY SIGNS	574.00	SQFT		$	
0490	02585		EDGE KEY	1,390.00	LF		$	
0500	02602		FABRIC-GEOTEXTILE CLASS 1	79,331.00	SQYD		$	
0510	02603		FABRIC-GEOTEXTILE CLASS 2	9,500.00	SQYD		$	
0520	02604		FABRIC-GEOTEXTILE CLASS 1A	1,000.00	SQYD		$	
0530	02650		MAINTAIN & CONTROL TRAFFIC BOONE	1.00	LS		$	
0540	02650		MAINTAIN & CONTROL TRAFFIC KENTON	1.00	LS		$	
0550	02671		PORTABLE CHANGEABLE MESSAGE SIGN	6.00	EACH		$	
0560	02690		SAFELOADING	1,167.00	CUYD		$	
0570	02701		TEMP SILT FENCE	6,124.00	LF		$	
0580	02703		SILT TRAP TYPE A	40.00	EACH		$	
0590	02704		SILT TRAP TYPE B	40.00	EACH		$	
0600	02705		SILT TRAP TYPE C	40.00	EACH		$	
0610	02706		CLEAN SILT TRAP TYPE A	40.00	EACH		$	
0620	02707		CLEAN SILT TRAP TYPE B	40.00	EACH		$	
0630	02708		CLEAN SILT TRAP TYPE C	40.00	EACH		$	
0640	02720		SIDEWALK-4 IN CONCRETE	6,705.00	SQYD		$	
0650	02726		STAKING BOONE	1.00	LS		$	
0660	02726		STAKING KENTON	1.00	LS		$	
0670	03171		CONCRETE BARRIER WALL TYPE 9T	860.00	LF		$	
0680	04953		TEMP RELOCATION OF SIGNAL HEAD	54.00	EACH		$	
0690	05950		EROSION CONTROL BLANKET	10,054.00	SQYD		$	
0700	05952		TEMP MULCH	129,129.00	SQYD		$	
0710	05953		TEMP SEEDING AND PROTECTION	96,364.00	SQYD		$	
0720	05963		INITIAL FERTILIZER	2.50	TON		$	
0730	05964		MAINTENANCE FERTILIZER	4.10	TON		$	
0740	05985		SEEDING AND PROTECTION	55,827.00	SQYD		$	
0750	05990		SODDING	15,949.00	SQYD		$	
0760	05992		AGRICULTURAL LIMESTONE	49.00	TON		$	
0770	05998		SPREADING STOCKPILED TOPSOIL	2,658.00	CUYD		$	
0780	06511		PAVE STRIPING-TEMP PAINT-6 IN	172,167.00	LF		$	
0790	06582		PAVEMENT MARKER TYPE IV-BY	1,619.00	EACH		$	
0800	08018		RETAINING WALL	3,528.00	SQFT		$	
0810	08100		CONCRETE-CLASS A	17.00	CUYD		$	
0820	08901		CRASH CUSHION TY VI CLASS BT TL2	3.00	EACH		$	
0830	10020NS		FUEL ADJUSTMENT	142,123.00	DOLL	$1.00	$	$142,123.00
0840	10030NS		ASPHALT ADJUSTMENT	232,531.00	DOLL	$1.00	$	$232,531.00
0850	20191ED		OBJECT MARKER TY 3	4.00	EACH		$	

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PROPOSAL BID ITEMS

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LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
0860	20430ED		SAW CUT	279.00	LF		$	
0870	20818ND		GAS UTILITY COORDINATION BOONE	1.00	LS		$	
0880	21289ED		LONGITUDINAL EDGE KEY	868.00	LF		$	
0890	21596ND		GMSS TYPE D	10.00	EACH		$	
0900	22680EN		QWICK CURB MEDIAN SEPARATOR	1,146.00	LF		$	
0910	23010EN		PAVE MARK TEMP PAINT STOP BAR-24 IN	1,485.00	LF		$	
0920	23158ES505		DETECTABLE WARNINGS	1,646.00	SQFT		$	
0930	23188EC		STAMPED CONCRETE-10 IN	157.00	SQYD		$	
0940	23274EN11F		TURF REINFORCEMENT MAT 1	481.00	SQYD		$	
0950	23626EC		DETENTION BASIN BOONE	1.00	LS		$	
0960	24631EC		BARCODE SIGN INVENTORY	35.00	EACH		$	
0970	24814EC		PIPELINE INSPECTION	6,662.00	LF		$	
0980	24845EC		UTILITY COORDINATION BOONE	1.00	LS		$	
0990	26129EC		DECORATIVE HANDRAIL	790.00	LF		$	

Section: 0003 - DRAINAGE

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
1000	00078		CRUSHED AGGREGATE SIZE NO 2	11.00	TON		$	
1010	00440		ENTRANCE PIPE-15 IN	105.00	LF		$	
1020	00462		CULVERT PIPE-18 IN	41.00	LF		$	
1030	00464		CULVERT PIPE-24 IN	599.00	LF		$	
1040	00521		STORM SEWER PIPE-15 IN	3,218.00	LF		$	
1050	00522		STORM SEWER PIPE-18 IN	4,286.00	LF		$	
1060	00524		STORM SEWER PIPE-24 IN	2,549.00	LF		$	
1070	00526		STORM SEWER PIPE-30 IN	1,095.00	LF		$	
1080	01000		PERFORATED PIPE-4 IN	15,885.00	LF		$	
1090	01002		PERFORATED PIPE-8 IN	607.00	LF		$	
1100	01010		NON-PERFORATED PIPE-4 IN	80.00	LF		$	
1110	01012		NON-PERFORATED PIPE-8 IN	20.00	LF		$	
1120	01020		PERF PIPE HEADWALL TY 1-4 IN	11.00	EACH		$	
1130	01202		PIPE CULVERT HEADWALL-15 IN	2.00	EACH		$	
1140	01204		PIPE CULVERT HEADWALL-18 IN	2.00	EACH		$	
1150	01208		PIPE CULVERT HEADWALL-24 IN	10.00	EACH		$	
1160	01210		PIPE CULVERT HEADWALL-30 IN	3.00	EACH		$	
1170	01434		SLOPED BOX OUTLET TYPE 1-24 IN	4.00	EACH		$	
1180	01443		SLOPED AND PARALLEL HEADWALL-15 IN	9.00	EACH		$	
1190	01444		SLOPED AND PARALLEL HEADWALL-18 IN	2.00	EACH		$	
1200	01456		CURB BOX INLET TYPE A	84.00	EACH		$	
1210	01459		CURB BOX INLET TYPE A MOD	3.00	EACH		$	
1220	01480		CURB BOX INLET TYPE B	3.00	EACH		$	
1230	01497		DROP BOX INLET TYPE 3 MOD	10.00	EACH		$	
1240	01544		DROP BOX INLET TYPE 11	1.00	EACH		$	
1250	01559		DROP BOX INLET TYPE 13G	6.00	EACH		$	
1260	01577		DROP BOX INLET TYPE 14	3.00	EACH		$	
1270	01584		CAP DROP BOX INLET	10.00	EACH		$	

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PROPOSAL BID ITEMS

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LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
1280	01650		JUNCTION BOX	9.00	EACH		$	
1290	01756		MANHOLE TYPE A	4.00	EACH		$	
1300	01761		MANHOLE TYPE B	1.00	EACH		$	
1310	02607		FABRIC-GEOTEXTILE CLASS 2 FOR PIPE	22,718.00	SQYD	$2.00	$	$45,436.00
1320	24810ED		SIDEWALK FLUME BOONE	4.00	EACH		$	

Section: 0004 - GASLINE

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
1330	16076		G SPECIAL ITEM	31.00	EACH	$752.65	$	$23,332.15
1340	16515		G PIPE POLYETHYLENE/PLASTIC 02 INCH INST	21.00	LF	$40.78	$	$856.38
1350	16517		G PIPE POLYETHYLENE/PLASTIC 04 INCH INST	80.00	LF	$50.31	$	$4,024.80
1360	16519		G PIPE POLYETHYLENE/PLASTIC 08 INCH INST	80.00	LF	$108.02	$	$8,641.60
1370	16521		G PIPE POLYETHYLENE/PLASTIC 12 INCH INST	8,800.00	LF	$143.66	$	$1,264,208.00
1380	16531		G SERVICE LONG SIDE 1 OR 1-1/4 INCH INST	11.00	EACH	$1,145.24	$	$12,597.64
1390	16533		G SERVICE LONG SIDE 2 INCH INST	3.00	EACH	$1,364.76	$	$4,094.28
1400	16536		G SERVICE SHORT SIDE 1 OR 1-1/4 INCH INST	12.00	EACH	$304.31	$	$3,651.72
1410	16538		G SERVICE SHORT SIDE 2 INCH INST	5.00	EACH	$440.21	$	$2,201.05
1420	16540		G SERVICE SPECIAL INST	1.00	EACH	$4,357.95	$	$4,357.95
1430	16553		G VALVE POLYETHYLENE/PLASTIC 08 IN INST	7.00	EACH	$801.44	$	$5,610.08
1440	16555		G VALVE POLYETHYLENE/PLASTIC 12 IN INST	4.00	EACH	$1,092.50	$	$4,370.00

Section: 0005 - ELECTRIC AND TELECOM DUCT

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
1450	17001		EC COMMUNICATIONS PULL BOX	24.00	EACH		$	
1460	17003		EC DUCT - 02 BANK	575.00	LF		$	
1470	17007		EC DUCT - 04 BANK	3,884.00	LF		$	
1480	17008		EC DUCT - 04 BANK CONCRETE ENCASED	400.00	LF		$	
1490	17011		EC DUCT - 06 BANK	3,884.00	LF		$	
1500	17012		EC DUCT - 06 BANK CONCRETE ENCASED	400.00	LF		$	
1510	17028		EC ELECTRIC MANHOLE	8.00	EACH		$	
1520	17029		EC ELECTRIC PIT	2.00	EACH		$	

Section: 0006 - SEWER

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
1530	15000		S BYPASS PUMPING	9.00	EACH		$	
1540	15017		S ENCASEMENT STEEL BORED RANGE 4	72.00	LF		$	
1550	15018		S ENCASEMENT STEEL BORED RANGE 5	381.00	LF		$	

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PROPOSAL BID ITEMS

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LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
1560	15067		S FORCE MAIN POINT RELOCATE	1.00	EACH		$	
1570	15086		S LATERAL CLEANOUT	4.00	EACH		$	
1580	15087		S LATERAL LONG SIDE 04 INCH	1.00	EACH		$	
1590	15089		S LATERAL SHORT SIDE 04 INCH	3.00	EACH		$	
1600	15092		S MANHOLE	12.00	EACH		$	
1610	15093		S MANHOLE ABANDON/REMOVE	10.00	EACH		$	
1620	15094		S MANHOLE ADJUST TO GRADE	7.00	EACH		$	
1630	15095		S MANHOLE CASTING STANDARD	6.00	EACH		$	
1640	15098		S MANHOLE SPECIAL	4.00	EACH		$	
1650	15099		S MANHOLE TAP EXISTING	1.00	EACH		$	
1660	15112		S PIPE PVC 08 INCH	225.00	LF		$	
1670	15113		S PIPE PVC 10 INCH	255.00	LF		$	
1680	15114		S PIPE PVC 12 INCH	1,490.00	LF		$	
1690	15136		S LATERAL LOCATE	4.00	EACH		$	

Section: 0007 - SEWER

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
1700	15000		S BYPASS PUMPING	2.00	EACH		$	
1710	15017		S ENCASEMENT STEEL BORED RANGE 4	80.00	LF		$	
1720	15092		S MANHOLE	1.00	EACH		$	
1730	15093		S MANHOLE ABANDON/REMOVE	1.00	EACH		$	
1740	15094		S MANHOLE ADJUST TO GRADE	1.00	EACH		$	
1750	15099		S MANHOLE TAP EXISTING	1.00	EACH		$	
1760	15112		S PIPE PVC 08 INCH	151.00	LF		$	

Section: 0008 - SIGNING

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
1770	06406		SBM ALUM SHEET SIGNS .080 IN	184.00	SQFT		$	
1780	06410		STEEL POST TYPE 1	460.00	LF		$	
1790	06490		CLASS A CONCRETE FOR SIGNS	2.00	CUYD		$	
1800	06515		PAVE STRIPING-PERM PAINT-6 IN	42,710.00	LF		$	
1810	06516		PAVE STRIPING-PERM PAINT-8 IN	8,759.00	LF		$	
1820	06517		PAVE STRIPING-PERM PAINT-12 IN	496.00	LF		$	
1830	06565		PAVE MARKING-THERMO X-WALK-6 IN	2,546.00	LF		$	
1840	06566		PAVE MARKING-THERMO X-WALK-12 IN	530.00	LF		$	
1850	06568		PAVE MARKING-THERMO STOP BAR-24IN	617.00	LF		$	
1860	06569		PAVE MARKING-THERMO CROSS-HATCH	4,275.00	SQFT		$	
1870	06574		PAVE MARKING-THERMO CURV ARROW	198.00	EACH		$	
1880	06576		PAVE MARKING-THERMO ONLY	5.00	EACH		$	
1890	06610		INLAID PAVEMENT MARKER-MW	93.00	EACH		$	
1900	06612		INLAID PAVEMENT MARKER-BY	103.00	EACH		$	

Section: 0009 - SIGNALIZATION

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PROPOSAL BID ITEMS

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LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
1910	04780		FUSED CONNECTOR KIT	21.00	EACH		$	
1920	04820		TRENCHING AND BACKFILLING	505.00	LF		$	
1930	04844		CABLE-NO. 14/5C	7,590.00	LF		$	
1940	04845		CABLE-NO. 14/7C	10,600.00	LF		$	
1950	04885		MESSENGER-10800 LB	500.00	LF		$	
1960	04886		MESSENGER-15400 LB	3,410.00	LF		$	
1970	04932		INSTALL STEEL STRAIN POLE	28.00	EACH		$	
1980	04953		TEMP RELOCATION OF SIGNAL HEAD	152.00	EACH		$	
1990	06406		SBM ALUM SHEET SIGNS .080 IN	475.00	SQFT		$	
2000	06472		INSTALL SPAN MOUNTED SIGN	53.00	EACH		$	
2010	20093NS835		INSTALL PEDESTRIAN HEAD-LED	44.00	EACH		$	
2020	20188NS835		INSTALL LED SIGNAL-3 SECTION	61.00	EACH		$	
2030	20189NS835		INSTALL LED SIGNAL-5 SECTION	4.00	EACH		$	
2040	20266ES835		INSTALL LED SIGNAL- 4 SECTION	4.00	EACH		$	
2050	20390NS835		INSTALL COORDINATING UNIT	6.00	EACH		$	
2060	21659NN		RELOCATE SIGNAL HEAD	7.00	EACH		$	
2070	21743NN		INSTALL PEDESTRIAN DETECTOR	44.00	EACH		$	
2080	22939ND		INSTALL LUMINAIRE POLE	1.00	EACH		$	
2090	23157EN		TRAFFIC SIGNAL POLE BASE	152.00	CUYD		$	
2100	23222EC		INSTALL SIGNAL PEDESTAL	8.00	EACH		$	
2110	23235EC		INSTALL PEDESTAL POST	10.00	EACH		$	
2120	23409EC		TRAFFIC SIGNAL POLE	4.00	EACH		$	
2130	24601EC		INSTALL SOLAR SCHOOL FLASHER ASSEMBLY	3.00	EACH		$	
2140	24900EC		PVC CONDUIT-1 1/4 IN-SCHEDULE 80	445.00	LF		$	
2150	24901EC		PVC CONDUIT-2 IN-SCHEDULE 80	250.00	LF		$	
2160	24908EC		INSTALL SIGNAL CONTROLLER-TY ATC	6.00	EACH		$	
2170	24955ED		REMOVE SIGNAL EQUIPMENT	5.00	EACH		$	
2180	26119EC		INSTALL RADAR PRESENCE DETECTOR TYPE A	25.00	EACH		$	
2190	26120EC		INSTALL RADAR ADVANCE DETECTOR TYPE B	15.00	EACH		$	

Section: 0010 - WATERLINE

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
2200	14005		W ENCASEMENT CONCRETE	70.00	LF		$	
2210	14009		W ENCASEMENT STEEL BORED RANGE 4	90.00	LF		$	
2220	14010		W ENCASEMENT STEEL BORED RANGE 5	309.00	LF		$	
2230	14011		W ENCASEMENT STEEL BORED RANGE 6	478.00	LF		$	
2240	14019		W FIRE HYDRANT ASSEMBLY	1.00	EACH		$	
2250	14020		W FIRE HYDRANT RELOCATE	16.00	EACH		$	
2260	14030		W METER RELOCATE	18.00	EACH		$	
2270	14032		W METER/FIRE SERVICE COMBO VAULT	1.00	EACH		$	
2280	14036		W PIPE DUCTILE IRON 06 INCH	101.00	LF		$	
2290	14037		W PIPE DUCTILE IRON 08 INCH	960.00	LF		$	
2300	14039		W PIPE DUCTILE IRON 12 INCH	1,316.00	LF		$	
2310	14042		W PIPE DUCTILE IRON 24 INCH	8,694.00	LF		$	
2320	14088		W STRUCTURE REMOVAL	1.00	EACH		$	

PROPOSAL BID ITEMS

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LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
2330	14091		W TIE-IN 02 INCH	2.00	EACH		$	
2340	14094		W TIE-IN 06 INCH	8.00	EACH		$	
2350	14095		W TIE-IN 08 INCH	7.00	EACH		$	
2360	14097		W TIE-IN 12 INCH	8.00	EACH		$	
2370	14100		W TIE-IN 24 INCH	2.00	EACH		$	
2380	14105		W VALVE 06 INCH	7.00	EACH		$	
2390	14106		W VALVE 08 INCH	9.00	EACH		$	
2400	14108		W VALVE 12 INCH	7.00	EACH		$	
2410	14111		W VALVE 24 INCH	15.00	EACH		$	
2420	14125		W VAULT SPECIAL	1.00	EACH		$	
2430	14146		W SERV COPPER LONG SIDE 1-1/2 IN	2.00	EACH		$	
2440	14147		W SERV COPPER LONG SIDE 2 IN	1.00	EACH		$	
2450	14148		W SERV COPPER LONG SIDE 3/4 IN	13.00	EACH		$	
2460	14151		W SERV COPPER SHORT SIDE 2 IN	1.00	EACH		$	
2470	14152		W SERV COPPER SHORT SIDE 3/4 IN	15.00	EACH		$	

Section: 0011 - DEMOBILIZATION &/OR MOBILIZATION

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
2480	02568		MOBILIZATION	1.00	LS		$	
2490	02569		DEMOBILIZATION	1.00	LS		$	