



CALL NO. 100

CONTRACT ID. 171024

JEFFERSON COUNTY

FED/STATE PROJECT NUMBER TGR 0311 034

DESCRIPTION DIXIE HIGHWAY(US-31W)

WORK TYPE GRADE & DRAIN WITH ASPHALT SURFACE

PRIMARY COMPLETION DATE 12/31/2019

LETTING DATE: August 25,2017

Sealed Bids will be received electronically through the Bid Express bidding service until 10:00 AM EASTERN DAYLIGHT TIME August 25,2017. Bids will be publicly announced at 10:00 AM EASTERN DAYLIGHT TIME.

PLANS AVAILABLE FOR THIS PROJECT.

DBE CERTIFICATION REQUIRED - 15%

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

TABLE OF CONTENTS

PART I	SCOPE OF WORK
	<ul style="list-style-type: none">• PROJECT(S), COMPLETION DATE(S), & LIQUIDATED DAMAGES• CONTRACT NOTES• FEDERAL CONTRACT NOTES• ASPHALT MIXTURE• DGA BASE• DGA BASE FOR SHOULDERS• INCIDENTAL SURFACING• JPC RIDE QUALITY• FUEL AND ASPHALT PAY ADJUSTMENT• ASPHALT PAVEMENT RIDE QUALITY CAT A• COMPACTION OPTION A• PREAPPROVED UTILITY CONTRACTORS• SPECIAL NOTE(S) APPLICABLE TO PROJECT• TRAFFIC CONTROL PLAN• RIGHT OF WAY NOTES• UTILITY IMPACT & RAIL CERTIFICATION NOTES• GENERAL UTILITY NOTES• WATER STANDARD UTILITY BID ITEMS• WATERLINE SPECS• KPDES STORM WATER PERMIT, BMP AND APPROVAL LETTER• PRE-BID CONFERENCE
PART II	SPECIFICATIONS AND STANDARD DRAWINGS
	<ul style="list-style-type: none">• SPECIFICATIONS REFERENCE• SUPPLEMENTAL SPECIFICATION• [SN-1I] PORTABLE CHANGEABLE SIGNS
PART III	EMPLOYMENT, WAGE AND RECORD REQUIREMENTS
	<ul style="list-style-type: none">• FEDERAL-AID CONSTRUCTION CONTRACTS - FHWA 1273• NONDISCRIMINATION OF EMPLOYEES• EXECUTIVE BRANCH CODE OF ETHICS• PROJECT WAGE RATES LOCALITY 3 / FEDERAL• NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION TO ENSURE EEO JEFFERSON
PART IV	INSURANCE
PART V	BID ITEMS

PART I
SCOPE OF WORK

ADMINISTRATIVE DISTRICT - 05

CONTRACT ID - 171024

TGR 0311 034

COUNTY - JEFFERSON

PCN - DE056031W1724

TGR 0311 034

DIXIE HIGHWAY (US 31W) (MP 4.000) ADDRESS CONGESTION, SAFETY, AND FUNCTIONALITY OF THE DIXIE HIGHWAY CORRIDOR(FEDERAL TIGER PROJECT). (MP 20.000), A DISTANCE OF 014.50 MILES.GRADE & DRAIN WITH ASPHALT SURFACE SYP NO. 05-0478.70.

GEOGRAPHIC COORDINATES LATITUDE 38:06:21.00 LONGITUDE 85:35:40.00

COMPLETION DATE(S):

COMPLETED BY 12/31/2019

APPLIES TO ENTIRE CONTRACT

CONTRACT NOTES

PROPOSAL ADDENDA

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

BID SUBMITTAL

Bidder must use the Department's Expedite Bidding Program available on the Internet web site of the Department of Highways, Division of Construction Procurement. (www.transportation.ky.gov/construction-procurement)

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.

SPECIAL NOTE FOR COMPOSITE OFFSET BLOCKS

Contrary to the Standard Drawings (2016 edition) the Cabinet will allow 6" composite offset blocks in lieu of wooden offset blocks, except as specified on proprietary end treatments and crash cushions. The composite blocks shall be selected from the Cabinet's List of Approved Materials.

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.

06/01/16

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 Capacity Rating 102.10 Delivery of Proposals
102.8 Irregular Proposals 102.14 Disqualification of Bidders
102.9 Proposal Guaranty

CIVIL RIGHTS ACT OF 1964

The Kentucky Department of Highways, in accordance with the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252) and the Regulations of the Federal Department of Transportation (49 C.F.R., Part 21), issued pursuant to such Act, hereby notifies all bidders that it will affirmatively insure that the contract entered into pursuant to this advertisement will be awarded to the lowest responsible bidder without discrimination on the ground of race, color, or national origin.

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 on federally assisted projects shall be permitted. However, in the case of DBE's, second tier subcontracts will only be permitted where the other subcontractor is also a DBE. All second tier subcontracts shall have the consent of both the Contractor and the Engineer.

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 Project Code Number (PCN), 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, the DBE's certificate of insurance, and an affidavit for bidders, offerors, and contractors from the DBE to the Division of Construction Procurement. The affidavit can be found on the Construction Procurement website. If the DBE is a supplier of materials for the project, a signed purchase order and an affidavit for bidders, offerors, and contractors 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 and nine (9) copies of this information must be received in the office of 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 certainty 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 DBE Liaison in the Office of Minority Affairs 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:

- 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 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 (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 submitted within 10 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.

The Prime Contractor should supply the payment information at the time the DBE is compensated for their work. Form to use is located at:

<http://transportation.ky.gov/Construction/Pages/Subcontracts.aspx>

The prime contractor should notify the KYTC Office of Civil Rights and Small Business Development seven (7) days prior to DBE contractors commencing work on the project. The contact is Melvin Bynes and the telephone number is (502) 564-3601.

Photocopied payments and completed, signed and notarized affidavit must be submitted by the Prime Contractor to: Office of Civil Rights and Small Business Development
6th Floor West 200 Mero Street
Frankfort, KY 40622

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.

1/27/2017

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.

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.

DGA BASE

Unless otherwise noted, the Department estimates the rate of application for DGA Base to be 115 lbs/sy per inch of depth.

DGA BASE FOR SHOULDERS

Unless otherwise noted, the Department estimates the rate of application for DGA Base for Shoulders to be 115 lbs/sy per inch of depth. The Department will not measure necessary grading and/or shaping of existing shoulders prior to placing of DGA Base, but shall be incidental to the Contract unit price per ton for DGA Base.

Accept payment at the Contract unit price per ton as full compensation for all labor, materials, equipment, and incidentals for grading and/or shaping of existing shoulders and furnishing, placing, and compacting the DGA Base.

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.

JPC RIDE QUALITY

JPC Pavement Smoothness requirements shall apply on this project in accordance with Section 501 of the current Standard Specifications.

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.

ASPHALT PAVEMENT RIDE QUALITY CATEGORY A

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

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.

PREAPPROVED UTILITY CONTRACTORS

The Preapproved Utility Contractors that must be used on this project will be listed under the General Utility Notes.

KYTC

Transforming Dixie Highway

Item 5-478.7

Special Note for Landscaping

Pay Items

1. Sodding

- a. All turf areas will be excavated and any existing pavement and subbase totally removed to allow free drainage. Payment is made per the **Roadway Excavation** bid item (Cubic Yard).
 - b. Sod paid per the **Sodding** bid item (Square Yard) in accordance with Section 212 of the Specifications with the following clarifications:
 - c. Turf type shall be Tall Fescue (Section 827.11)
 - d. **Initial Fertilizer and Agriculture Lime** will be required (Sections 827.02 and 827.03) and are incidental to Sodding.
 - e. Topsoil (6") is required and paid per the **Topsoil Furnished and Placed** item (Cubic Yard). **Select Borrow Material** - Payment will be per the Cubic Yard. To be placed in all landscaping areas; beneath the "Topsoil" layer (6") in sod areas and beneath the "Planting Mix for Planting Bed Areas" layer (12") in landscape bed areas.
 - f. Material will be free of all roots, debris, and aggregate and not more than 50% clay. The material will need to be preapproved by the Engineer. The intent is to allow sod and plant establishment and long-term growth.
2. **Concrete (Verge & Median)** – The area between the sidewalk and curb that receives a decorative scoring pattern as shown on the roadway plans. See Road Sheet R001B for scoring detail. The area is poured monolithically with the sidewalk but paid as a separate bid item. Reference KYTC standard specifications for concrete sidewalk. (Pay unit - SY)
 3. **Paver (Verge)** – The area between the sidewalk and curb that receives concrete pavers as shown on the roadway plans. See detail as shown on R001B. See Pavers specification below. (Pay unit - SY)
 4. **Tree in Tree Grate** – Street trees around bus station locations. Includes tree, tree grate with grate foundation. See R135 for trees in tree grate detail. See sheet R134 for Tree types. (Pay unit - EA)
 5. **Structural Soil Vault System (SSVS)** – This is the bedding and drainage system beneath and surrounding all trees identified and paid as "Trees in Tree Grate" and includes all items listed on the Structural Soil Vault System Component List identified on R135. See the Structural Soil Vault System (SSVS) specification. (Pay unit - SY)

6. **Tree** – Trees planted in planting bed at I-264 and Dixie Highway interchange. See R136 for planting detail and R134 for planting schedule. See Planting and Planting Soil Preparation special notes below. (Pay unit EA)
7. **Ornamental Tree** – Smaller tree species planted in plantings beds within the Right-of-Way of I-264. Includes tree, planting backfill, mulch, tree staking with (rubber hose, guy wire, and reflective flagging) – all incidental to this pay item. See R136 for planting detail and R134 for planting schedule. See Planting and Planting Soil Preparation special notes below. (Pay unit EA)

All items listed below include (per details on R136): Planting Soil, 3" Hardwood Mulch, Landscape Edging, and Weed Control Barrier.

8. **Large Shrubs (More Than 3' Tall)** – Shrubs with a 36" or greater average mature height. See R134 for schedule and quantities and R136 for planting detail. See Plants and Planting Soil Preparation special notes below. (Pay unit EA)
9. **Small Shrubs (Less Than 3' Tall)** – Shrubs with a 36" or less average mature height. See R134 for schedule and quantities and R136 for planting detail. See Planting and Planting Soil Preparation special notes. (Pay unit EA)
10. **Ornamental Grass** – Ornamental grasses used in median and interchange plantings. See R134 for schedule and quantities and R136 for plants detail. See Plants and Planting Soil Preparation special notes. (Pay unit EA)
11. **Perennials** – Perennials used in median and interchange plantings. See R134 for schedule and quantities and R136 for planting detail. See Plants and Planting Soil Preparation special notes below. (Pay unit EA)
12. **Groundcover** – Groundcover used in median and interchange plantings. See R134 for schedule and quantities and R136 for planting detail. See Plants and Planting Soil Preparation special notes below. (Pay unit EA)

***See Roadway sheets for all landscape layout. Reference sheet R134 for schedule of plants, quantities, and landscape notes. Planting layout on plans supersede quantities derived from planting schedule.**

Specifications

The following specifications will supersede the KYTC Standard Specifications for the specific items identified.

SECTION 321400 – PAVERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Concrete unit pavers set in bituminous setting beds.
- B. Related Requirements:
 - 1. KYTC Class A concrete as base under unit pavers.

1.3 ACTION SUBMITTALS

- A. Product Data: For materials other than water and aggregates.
- B. Product Data: For the following:
 - 1. Pavers.
 - 2. Bituminous setting materials.
- C. Samples for Verification: For full-size units of each type of unit paver indicated.

1.4 INFORMATIONAL SUBMITTALS

- A. Material Certificates: For unit pavers. Include statements of material properties indicating compliance with requirements, including compliance with standards. Provide for each type and size of unit.

1.5 QUALITY ASSURANCE

- A. Mockups- Concrete Pavers: Build 6' x 10' mockup to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.

1. Mock up shall include 2' stripe of concrete paver and 2' adjoining concrete on each side of stripe.
2. Approved mockups may not become part of the completed Work.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store pavers on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied.
- B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- D. Store liquids in tightly closed containers protected from freezing.
- E. Store asphalt cement and other bituminous materials in tightly closed containers.

1.7 FIELD CONDITIONS

- A. Cold-Weather Protection: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen subgrade or setting beds. Remove and replace unit paver work damaged by frost or freezing.
- B. Weather Limitations for Bituminous Setting Bed:
 1. Install bituminous setting bed only when ambient temperature is above 40 deg F (4 deg C) and when base is dry.
 2. Apply asphalt adhesive only when ambient temperature is above 50 deg F (10 deg C) and when temperature has not been below 35 deg F (2 deg C) for 12 hours immediately before application. Do not apply when setting bed is wet or contains excess moisture.
 3. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6. Provide artificial shade and windbreaks and use cooled materials as required.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain each type of unit paver, joint material, and setting material from single source with resources to provide materials and products of consistent quality in appearance and physical properties.

2.2 CONCRETE PAVERS

- A. Concrete Pavers: This specification covers the requirements for interlocking concrete pavers manufactured for the construction of paved surfaces. Concrete units covered by this specification may be made from lightweight or normal weight aggregates or mixed lightweight and normal weight aggregates
- B. Belgard Commercial Hardscapes, Holland Stone Paver. Smooth finish, Crimson Ember color blend or similar.
 - 1. Concrete Paver: Holland Stone Pavers
 - 2. Thickness: 3.15 inches (80 mm).
 - 3. Face Size: 4" X 8"
 - 4. Dimensional Tolerances: Plus or minus 1/16 inch (1.6 mm).
 - 5. Finish: Smooth finish, Crimson Ember color blend

2.3 ACCESSORIES

- A. Cork Joint Filler: Preformed strips complying with ASTM D 1752, Type II.
- B. Compressible Foam Filler: Preformed strips complying with ASTM D 1056, Grade 2A1.

2.4 BITUMINOUS SETTING-BED MATERIALS

- A. Primer for Base: ASTM D 2028/D 2028M, cutback asphalt, grade as recommended by unit paver manufacturer.
- B. Fine Aggregate for Setting Bed: ASTM D 1073, No. 2 or No. 3.
- C. Asphalt Cement: ASTM D 3381/D 3381M, Viscosity Grade AC-10 or Grade AC-20.
- D. Neoprene-Modified Asphalt Adhesive: Paving manufacturer's standard adhesive consisting of oxidized asphalt combined with 2 percent neoprene and 10 percent long-fibered mineral fibers containing no asbestos.
- E. Sand for Joints: Fine, sharp, washed, natural sand or crushed stone with 100 percent passing No. 16 (1.18-mm) sieve and no more than 10 percent passing No. 200 (0.075-mm) sieve.
 - 1. Provide sand of color needed to produce required joint color.

2.5 BITUMINOUS SETTING-BED MIX

- A. Mix bituminous setting-bed materials at an asphalt plant in approximate proportion, by weight, of 7 percent asphalt cement to 93 percent fine aggregate unless otherwise indicated. Heat mixture to 300 deg F (149 deg C).

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine surfaces indicated to receive unit paving, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Sweep concrete substrates to remove dirt, dust, debris, and loose particles.

3.3 INSTALLATION, GENERAL

- A. Minimum qualifications 5-years experience working on similar installation projects.
- B. Do not use unit pavers with chips, cracks, voids, discolorations, or other defects that might be visible or cause staining in finished work.
- C. Mix pavers from several pallets or cubes, as they are placed, to produce uniform blend of colors and textures.
- D. Cut unit pavers with motor-driven masonry saw equipment to provide clean, sharp, unchipped edges. Cut units to provide pattern indicated and to fit adjoining work neatly. Use full units without cutting where possible. Hammer cutting is not acceptable.
- E. Joint Pattern: Running bond based upon longitudinal centerline of paver bands.
- F. Tolerances: Do not exceed 1/32-inch (0.8-mm) unit-to-unit offset from flush (lippage) or 1/8 inch in 10 feet (3 mm in 3 m) from level, or indicated slope, for finished surface of paving.
- G. Expansion and Control Joints: Provide for sealant-filled joints at locations and of widths indicated. Provide compressible foam filler as backing for sealant-filled joints unless otherwise indicated; where unfilled joints are indicated, provide temporary filler until paver installation is complete. Install joint filler before setting pavers. Sealant materials and installation are specified in Section 079200 "Joint Sealants."
- H. Expansion and Control Joints: Provide cork joint filler at locations and of widths indicated. Install joint filler before setting pavers. Make top of joint filler flush with top of pavers.
- I. Install concrete edge.

3.4 BITUMINOUS SETTING-BED APPLICATIONS

- A. Apply primer to concrete slab or binder course immediately before placing setting bed.

- B. Prepare for setting-bed placement by locating 3/4-inch- (19-mm-) deep control bars approximately 11 feet (3.3 m) apart and parallel to one another, to serve as guides for striking board. Adjust bars to subgrades required for accurate setting of paving units to finished grades indicated.
- C. Place bituminous setting bed where indicated, in panels, by spreading bituminous material between control bars. Spread mix at a minimum temperature of 250 deg F (121 deg C). Strike setting bed smooth, firm, even, and not less than 3/4 inch (19 mm) thick. Add fresh bituminous material to low, porous spots after each pass of striking board. After each panel is completed, advance first control bar to next position in readiness for striking adjacent panels. Carefully fill depressions that remain after removing depth-control bars.
 - 1. Roll setting bed with power roller to a nominal depth of 3/4 inch (19 mm). Adjust thickness as necessary to allow accurate setting of unit pavers to finished grades indicated. Complete rolling before mix temperature cools to 185 deg F (85 deg C).
- D. Apply neoprene-modified asphalt adhesive to cold setting bed by squeegeeing or troweling to a uniform thickness of 1/16 inch (1.6 mm). Proceed with setting of paving units only after adhesive is tacky and surface is dry to touch.
- E. Place pavers carefully by hand in straight courses, maintaining accurate alignment and uniform top surface. Protect newly laid pavers with plywood panels on which workers can stand. Advance protective panels as work progresses, but maintain protection in areas subject to continued movement of materials and equipment to avoid creating depressions or disrupting alignment of pavers. If additional leveling of paving is required, and before treating joints, roll paving with power roller after sufficient heat has built up in the surface from several days of hot weather.
- F. Joint Treatment: Place unit pavers with hand-tight joints. Fill joints by sweeping sand over paved surface until joints are filled. Remove excess sand after joints are filled.

3.5 REPAIRING, POINTING, AND CLEANING

- A. Remove and replace unit pavers that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Provide new units to match adjoining units and install in same manner as original units, with same joint treatment and with no evidence of replacement.

END OF SECTION 321400

SECTION 129300 – TREE GRATE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each exposed product and for each color and texture specified.
- C. Samples for Initial Selection: For units with factory-applied finishes.
- D. Samples for Verification: For each type of exposed finish, not less than 6-inch- long linear components and 4-inch- square sheet components.
- E. Product Schedule: For site furnishings. Use same designations indicated on Drawings.

1.3 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For site furnishings to include in maintenance manuals.

1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

PART 2 - PRODUCTS

2.1 TREE GRATES

- A. Tree Grates: Manufacturer's standard tree grates and frames
 - 1. Provide the following tree grate or similar
 - a. Model: Ironsmith Starburst Tree Grate, Model 4816-1 with custom medallions
 - 1) Contact Information:
Ironsmith Inc.
41-701 Corporate Way #3
Palm Desert, CA 92260
Phone: 800-338-4766
 - 2. Material: ASTM A 48/, Class 35B
- B. Shape and Size: 48 inches square.
- C. Finish: Oxidized iron

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for correct and level finished grade, mounting surfaces, installation tolerances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Comply with manufacturer's written installation instructions unless more stringent requirements are indicated. Complete field assembly of site furnishings where required.
- B. Unless otherwise indicated, install site furnishings after landscaping and paving have been completed.
- C. Install site furnishings level, plumb, true, and securely anchored at locations indicated on Drawings.

END OF SECTION 129300

SECTION 329450 STRUCTURAL SOIL VAULT SYSTEM (SSVS)

1. GENERAL

1.01 SUMMARY

1. Section Includes: Supply and installation of structural soil cell system and related materials, components and activities necessary to form a complete functioning system.

1.02 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

1. KYTC Class A Concrete
2. Trees and Planting Soil
3. Tree Grate
4. Section 32 94 55 - Soil Cell Filler Soil

1.03 DEFINITIONS

1. Soil Cell module: Patented, load-bearing engineered plastic module with vertical and lateral interlocks, for creating void space beneath pavements.
2. Soil Cell Bridge Connector – component for connecting Soil Cell modules laterally. Is removable.
3. Soil Cell Connector – Component for connecting Soil Cell modules vertically.
4. Soil Cell Foot Plate – Component for placement at base of matrix, connecting to feet, for point load dispersion.
5. Soil Cell Top Grate – Component for placement at top of matrix for pavement support.
6. Soil Cell Matrix: Assembled and interconnected volume of soil cell modules.
7. Lateral Piping System: Perforated piping system for circulation of air and distribution of water and nutrients, connected to surface inlet.
8. Vertical Piping System: Large diameter plastic pipe system for inspection, circulation of air and connected to surface inlet.
9. Root and Moisture Barrier: Linear membrane to prevent root and moisture penetration.
10. Root Barrier: Linear root barrier with vertical integral root training ribs.
11. Filler Soil: Correctly balanced soil mix to provide optimum growth conditions for tree root systems within the soil cell matrix.
12. Geocomposite: High strength geogrid bonded to filter fabric for reinforcement of granular pavement base.
13. Tree Pit Opening: The pavement opening within which a tree is planted.
14. Granular Base Course: Compacted granular material to specified requirements.
15. Tree Pit: Excavated space filled with appropriate soil media for tree planting.

16. Reinforcing Collar: A trench between the soil cell matrix and surrounding soil, lined with geocomposite, filled with granular base course and compact

1.07 DESIGN

1. Soil Cell Matrix:
 1. Structural Design: Design soil cell matrix, sub-grade and subsequent fill layers to resist dead, live, lateral and environmental loads, with settlement, deflection and displacement within design limits.
 2. Wheel Load Rating: AASHTO H-20.
 3. Matrix Void Space: Minimum 90% free volume.

1.08 TESTING AGENCY SERVICES

1. Provide and pay for the services of an independent testing agency to perform the testing activities specified in this section. Testing agency shall be acceptable to Consultant.
2. Test work in accordance with specified standards. In the absence of a specified standard, comply with the relevant ASTM standard.
3. Test Reports: Testing agency shall prepare test reports for all tests performed. Submit copies of test reports to Consultant immediately upon their becoming available.

1.09 QUALITY ASSURANCE

1. Installer Qualifications: Work shall be performed by an experienced installer with a successful track record in performing work of the same scope and quality as required by these specifications. [Installer shall be acceptable to manufacturer of soil cells.] [Installer shall be accredited by GreenBlue as having successfully completed the GreenBlue learning program.]
2. Installer's Site Supervision: Appoint an experienced full time site supervisor to be responsible for site activities for duration of work. Do not change site supervisor without Consultant's prior written approval.
3. Site Mock-Up: Prior to installation of soil cells, construct on site a 9 square metre mock-up of the entire system including granular sub-base, placement of filler soil and granular base course. Materials and techniques used in construction of mock-up shall be acceptable to Consultant who shall be present during mock-up construction. Mock-up may remain part of permanent installation if acceptable to Consultant.
4. Manufacturer's Representative: Arrange for a representative of the soil cell manufacturer to be available to visit site within 48 hours' notice.

1.10 DELIVERY, STORAGE AND HANDLING

1. Deliver, store and handle materials in strict accordance with manufacturer's instructions.
2. Make provision on site to properly receive, handle and store materials. Provide sheltered and weathertight storage to protect materials from the elements.
3. Store soil cell modules on pallets, with pallet wrap intact until required for installation. Position pallets on firm, level base.

4. Protect geosynthetics from physical damage and from temperatures in excess of 70 degrees C. Do not expose geosynthetics to direct sunlight for more than 7 days.
5. Store and protect bulk materials by covering with tarpaulins and in a manner to prevent erosion.

1.11 SITE CONDITIONS

1. Ambient Conditions: Perform work on site when ambient conditions are conducive to proper performance and in accord with recommendations of soil cell manufacturer. Take all reasonable precautions to guard against effects of adverse weather conditions.
2. Site Information: Before commencing work on site examine available documentation pertaining to site and determine nature and location of above ground and underground utilities. Report demonstrable and potential conflicts with work of this section to Consultant.
3. Existing Soil Conditions: Before proceeding with full scale excavation work, confirm nature of existing soil conditions and in particular the drainage characteristics of existing soil. Refer to clause 2.07 Source Quality Control.
4. Abandoned utilities encountered during excavation shall be removed and their ends plugged.
5. Active utilities encountered during excavation and not indicated in Contract Documents shall be reported immediately to Consultant and utility owner who shall determine measures necessary to repair, relocate or remove utility.

2. PRODUCTS

2.01 STRUCTURAL SOIL CELLS

1. Proprietary Product: **Stratavault by GreenBlue**, 71 Bysham Park Drive Woodstock ON N4T1P1 or approved equal.
2. Material: 100% recycled polypropylene.
3. Form and Configuration: Engineered plastic modules designed to assemble together to create a matrix under pavements. Interconnected skeletal matrix shall provide void space of at least 90% to accommodate filling with soil media or storing storm water.
4. Dimensions of Soil Cell Units: 60cm (24 inch) x 60 cm (24 inch) x 40cm (16 inches) in height. System also includes Bridge connectors, Vertical connectors, Foot plates, Top Grates.
5. Ultimate Load Strength: Stratavault 30 Series: 300 kpa (44.38 psi);;

2.02 GEOSYNTHETICS

1. Geocomposite:
 1. Composition: Geogrid and geotextile composite.
 2. Geogrid: Stretched monolithic polypropylene flat bars with welded junctions.
 3. Geotextile: Mechanically bonded filter geotextile welded within geogrid structure.
 4. Colour: White.
 5. Physical Properties: As specified in Appendix 'A'.

2.02 GEOSYNTHETICS (CONT'D)

2. Root Barrier:
 1. Material: High density polyethylene.
 2. Thickness: 1.00 mm.
 3. Form: Linear sheet with integral vertical ribs.
 4. Color: Black.
 5. Physical Properties: As specified in Appendix 'A'.

4. Filter Fabric:
 1. Description: Fabric of polypropylene or polyester fibers, nonwoven, needle-punched continuous filament in flat and sock form.
 2. Physical Properties: As specified in Appendix 'A'.

5. Proprietary Products: The following by GreenBlue, 71 Bysham Park Drive Woodstock ON N4T1P or approved equal.
 1. Geocomposite: FilterGrid
 2. Root Barrier: ReRoot.
 3. Root and Moisture Barrier: RootStop Premium.

2.03 AERATION AND INSPECTION PIPING

1. Lateral Aeration Piping System:
 1. Lateral Pipe: Flexible, perforated, 60 mm in diameter.
 2. Vertical Riser: Flexible, perforated, 60 mm in diameter, connecting lateral piping to surface inlet.
 3. Connectors: Molded connectors to effect proper jointing.
 4. Material: 100% high density polyethylene.
 5. Configuration: Optimize oxygen exchange with tree pit soil, facilitate supplementary irrigation and nutrient dosing and, where applicable, distribution of harvested storm water.

2. Vertical Drainage Inspection Pipe: 100mm diameter rigid 100% high density polyethylene.

3. Vertical Soil Inspection Pipe: 150 mm diameter rigid 100% high density polyethylene.

2.05 Soil Cell Filler Soil

1. As specified in Section 329455.

2.06 BACKFILL AND AGGREGATES

1. Backfill: Clean, native excavated soil, free from organic matter, frozen materials, stones larger than 75 mm in diameter, debris and other foreign substances.
2. Granular Base Course: ASTM D1241-07, Type 1, Gradation B consisting of stone, gravel or slag with natural or crushed sand and fine mineral particles passing a No. 200 sieve, graded as follows:

SIEVE	PERCENT PASSING
37.5 mm	100
25 mm	75-95
9.5 mm	40-75
4.75 mm	30-60
2.0 mm	20-45
425 um	15-30
75 um	5-15

3. Drainage Pipe Covering Fill: ASTM D448-08, No.57 consisting of narrowly graded mixture of crushed stone or crushed or uncrushed gravel, with 100% passing a 37.5 mm sieve and 0% to 5% passing a 2.36 mm sieve.
4. Drainage Pipe Bedding Fill: ASTM D2940-09, consisting of crushed stone or gravel graded from 13 mm to 4.75 mm.

2.07 SOURCE QUALITY CONTROL

1. Provide testing agency with representative samples of existing, on-site soil and of each type of fill proposed for use.
2. Testing agency shall perform the following laboratory tests on each soil and fill sample:
 1. Sieve analysis
 2. Particle size distribution
 3. Liquid limit
 4. Plastic limit
 5. Plasticity index
 6. Hydraulic conductivity
 7. Compaction.
3. Compaction testing shall be in accordance with ASTM D698 – 07e1 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (Standard Proctor Density).

3. EXECUTION

3.01 PREPARATION

1. Tree Pit Layout: Layout tree pit locations and dimensions using string lines, survey pegs and marking paint. Obtain Consultant's approval of layout before proceeding with excavation.
2. Tree Pit Depths: Confirm excavation depths with reference to finished pavement elevations. Allow for granular base course layer and, where applicable, drainage layer.

3.02 TREE PIT EXCAVATION

1. Excavation: Accurately excavate to dimensions shown on Drawings. Allow 200 mm additional clearance in length and width. Excavation side walls shall be clean and straight, within 15 degrees of vertical. Measure and confirm that correct horizontal and vertical dimensions have been achieved.
2. Reinforcing Collar: Further excavate top perimeter of tree pit to a depth of 300 mm and to a width of 200mm, sufficient to accommodate a narrow foot compacting plate. Excavated surfaces shall be clean and straight.
3. Protect sub-grade from softening, undermining, washout, or damage by rain or water accumulation. Reroute surface water runoff from excavated areas and do not allow water to accumulate in excavations.

3.03 SUB-GRADE PREPARATION

1. Remove unstable bottom material, including large stones, debris and compressible soils. Scarify and mix sub-grade surface and moisture condition as required. Accurately construct and fine grade the sub-grade to required lines and levels. Compact sub-grade to 95% Standard Proctor Density.
2. Finished sub-grade shall be flat, uniform, dense, smooth, free from loose stones and foreign matter, and sloped to a grade of 5%.

3.05 TREE PIT GRANULAR BASE COURSE

1. Install granular base course to depth shown on Drawings on sub-grade and under first layer of soil cell modules. Compact granular base course to minimum 95% Standard Proctor Density.

3.06 SOIL CELL INSTALLATION

1. Prior to installation of soil cell modules, confirm tree pit dimensions and mark location of trees with surveyor pegs. Rectify discrepancies and errors.
2. Install soil cell modules in strict accordance with manufacturer's written instructions and installation diagrams. Prior to placement, check each soil cell module for damage. Reject cracked, chipped and otherwise damaged modules. Ensure that modules in contact with granular base course are firmly seated, with no rocking. Ensure that modules are mechanically interconnected both horizontally and, in multiple layers, vertically.

3.07 AERATION AND INSPECTION PIPING

1. Lateral Aeration Piping: Install piping within top layer of soil cell modules in a complete connected circuit, within 600 mm of outer edge of matrix. Fit junctions and risers at maximum spacing of 3.6 meters.
2. Vertical Inspection Piping: Place vertical piping within central opening of soil cell module.
3. Trim vertical pipes to 150 mm above finished pavement and support in vertical position by temporary staking. Seal open ends of pipes.

3.08 ROOT BARRIERS AND ROOT AND MOISTURE BARRIERS

1. Install root barrier as shown on Drawings. Overlap barrier joints 150 mm and tape both sides of joint. Top edge of barriers shall be level with adjacent construction. Ensure that earth surfaces in contact with barriers are flat and free of sharp debris and stones so as to avoid puncturing barriers. Install root barriers with ribs facing inward.

3.09 SOIL FILLING

1. Obtain Consultant's prior approval to load soil cell matrix with filler soil .Install filler soil after soil cell matrix is fully assembled and piping systems and barriers are in place.
2. Except as shown otherwise on Drawings completely fill all void spaces with filler soil. Place filler soil using an excavator bucket and spread with rakes or shovels
3. Keep outer trench free of filler soil.
4. Vibrate matrix using plate vibration or needle vibration equipment to shake filler soil into voids.

3.10 GEOCOMPOSITE LAYER

1. Install a single layer of geocomposite over the entire top area of soil cell matrix. At perimeter, extend geocomposite over upper side walls of soil cell matrix and over bottom of adjacent trench.
2. Overlap geocomposite joints 150mm. Allow for pipe penetrations with two intersecting slits cut with a sharp knife.

3.11 GRANULAR REINFORCING COLLAR

1. Fill collar trench with granular base course material so that the collar is level with top of soil cell matrix.
2. Place granular base course in 150 mm lifts and compact each lift to 95% Standard Proctor density.
3. Do not displace geocomposite from base of trench.

3.12 TREE PIT OPENINGS

1. Confirm exact location of tree pit openings. Cut geocomposite layer and fold back to expose opening. Position perimeter formwork.

2. Line opening with root barrier with ribs facing inward. Extend root barrier down to top of soil cell matrix and up to level of finished pavement. Lap root barrier joints 150 mm and tape both sides of joint.

3.13 GRANULAR BASE COURSE FOR PAVEMENT

1. Place granular base course material over geocomposite to depth shown on drawings. Place granular base course in 100 mm lifts and compact each lift to 95% Standard Proctor Density.

3.15 SITE QUALITY CONTROL

1. Compaction Tests: Testing agency shall perform compaction testing on sub-grade and on each layer of fill to determine compliance with specified compaction. Determine method and frequency of testing in consultation with Consultant.

3.16 CLEANING

1. Upon completion of work on site, clean areas within contract limits. Remove tools, equipment, debris, rubbish and excess materials. Leave site in broom clean condition.

3.18 APPENDIX 'A'

Appendix 'A' Geosynthetic Physical Properties is attached.

END OF SECTION

APPENDIX 'A' GEOSYNTHETIC PHYSICAL PROPERTIES

1. **Geocomposite** shall meet the following requirements:

PROPERTY	TEST METHOD *	UNIT	REQUIREMENT
GEOGRID			
Raw Material			Polypropylene,white
Mass per unit area	EN ISO 9864	g/m ²	200
Max. tensile strength, md/cmd	EN ISO 10319	kN/m	≥ 30/≥ 30
Elongation at nominal strength, md/cmd	EN ISO 10319	%	≤8/≤8
Tensile strength at 2% elongation, md/cmd	EN ISO 10319	kN/m	12/12
Tensile strength at 5% elongation, md/cmd	EN ISO 10319	kN/m	24/24
Aperture size, md x cmd	-	mm x mm	Approx. 32 x 32
Production specific elongation	-	%	0
GEOTEXTILE			
Raw material			Polypropylene, white
Mass per unit area	EN ISO 9864	g/m ²	≥ 150
Maximum tensile strength, md/cmd	EN ISO 10319	kN/m	7.5/11.0
Elongation at maximum tensile strength, md/cmd	EN ISO 10319	%	40/30
Puncture force	EN ISO 12236	N	1,670
Displacement at static puncture strength	EN ISO 12236	mm	30
Detector tested	-	-	Yes
Roll dimensions, width x length	-	m x m	4.75 x 100

*based on md = machine direction, cmd = cross machine direction

2. **Root Barrier** shall meet the following requirements:

PROPERTY *	ASTM D	UNIT	REQUIREMENT
Density	1505	g/cm ³	0.952
Melt Index	1238	g/10 min.	0.35
ESCR, F ₅₀ Condition B	1693	h	50
Tensile Yield Strength	638@50mm/min	MPa	27
Elongation at break	638@50mm/min	%	>600
Brittleness Temperature	746	Degrees C	<-90
Flexural Modulus	790	MPa	1310
Shore Hardness D	2240	-	66
Thermoforming**		cm	18-23
----Sheet sag		h	>700

*Physical properties reported herein were determined on compression molded specimens prepared in accordance with Procedure C of ASTM D 1928. ** 0.61 x 1.22 x 3.2mm thick blank heated to forming temperature. *** Test conditions: 296 ml, 23gbottle, 10% fill, Orvus K Detergent.

APPENDIX 'A' GEOSYNTHETIC PHYSICAL PROPERTIES (CONT'D)

3. Root and Water Barrier shall meet the same requirements as specified for Root Barrier.

4. Filter Fabric shall meet the following requirements:

PROPERTY	ASTM TEST	UNIT	REQUIREMENT
Grab tensile strength	D4632	N	400 min.
Grab tensile elongation	D4632	%	50% min.
Mullen Burst	D3786	MPa	1.2 min.
Puncture	D4833	N	240 min.
Trapezoid Tear	D4533	N	180 min.
Ultraviolet stability	D4355	% retained strength	70% @ 150 hr.
Apparent opening size	D4751	mm	0.2 max.
Permittivity	D4491	per sec.	2.1 min.
Flow rate	D4491	l/sec/m ²	102 min.
Min. fabric lap of 300 mm			

END OF APPENDIX

Section 329455 - Soil Cell Filler Soil

GENERAL

1.01 SUMMARY

1. Section Includes: Production and supply of filler soil for structural soil cells, including related Materials and activities.

1.02 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

1. Structural soil cells
2. Installation of filler soil

1.03 DEFINITIONS

1. Growing medium is defined as an amended existing topsoil that contains organic matter, is capable of sustaining vigorous plant growth, contains a typical clay content of >25% by mass, complies generally with the typical uses specified in and is free from unwanted matter

Such as:

1. Stones, rock and pebbles greater than 10 mm measured by longest dimension
2. Hard clods or objects greater than 15mm dimension
3. Roots with a section diameter exceeding 10mm or a length exceeding 100mm
4. Sticks and rubbish
5. Material toxic to plants
6. Materials that may pose a danger to human health, e.g. glass, hard plastic Filler soil is synonymous with growing medium.

1.05 ADMINISTRATIVE REQUIREMENTS

1. Coordination: Coordinate work of this section with other related work and in particular with work specified in clause 1.02.
2. Scheduling: Conform to schedule specified in Section 32 94 50 Structural Soil Cells.
3. Cooperation: Contractor, Consultant and testing agency shall cooperate and coordinate their activities to the fullest extent to ensure that filler soil meets the qualitative and quantitative requirements specified in this Section and that such quality is maintained for the duration of the work.

1.06 CONSULTANT'S AUTHORITY

1. Consultant shall be, in the first instance, the interpreter of the requirements of this Section of the Specifications.
2. Consultant shall have access to the place or places where filler soil mixes are designed and produced.
3. Consultant may require testing of filler soil by testing agency in addition to the testing specified elsewhere in this Section.
4. Consultant may require that changes be made to any proposed filler soil mix.
5. Consultant may reject work that Consultant believes to be defective.
6. Work to be performed by Contractor as a result of Consultant's instructions under this clause shall be performed at no additional cost to Owner and without an extension to Contract Time.

7. Provisions of this clause shall in no way limit Consultant's responsibilities and authority specified elsewhere in the Contract.

1.07 SUBMITTALS

1. Product Data: Submit manufacturer's product data for each type of product to be used. For soils
2. provide testing agency laboratory analysis.
3. Samples: Submit to testing agency, when and as required, samples of each type of filler soil for testing purposes.
4. Qualification Data: Submit proof of qualifications of filler soil supplier and of testing agency.

1.08 TESTING AGENCY SERVICES

1. Provide and pay for the services of an independent testing agency to perform the testing activities specified in this Section.
2. Testing agency shall have an established track record in testing the type of soil required by this specification and shall have soils testing facilities and personnel capable of performing the physical and chemical testing required by this specification. Testing agency personnel shall be experienced in soil mix design and in making soil recommendations.
3. Test materials in accordance with specified standards. In the absence of a specified standard, comply with the relevant ASTM standard.
4. Test Reports: Testing agency shall prepare test reports for all tests performed. Submit copies of test reports to Consultant immediately upon their becoming available.

1.09 QUALITY ASSURANCE PROGRAM

1. Contractor shall establish and maintain a quality assurance program for the purposes of managing the quality of the work. Quality assurance program shall consist of plans, procedures and organizational design necessary to ensure that work of this Section meets the prescriptive and performance requirements specified. The Quality Control, Source Quality Control and Site Quality Control provisions specified elsewhere in this Section shall form part of the Quality Assurance Program.
2. Filler soil supplier shall have an established track record in supplying soil of the type and quality required by these specifications, shall have facilities and personnel capable of preparing soil mixes for review and testing and shall have the production capacity to produce the quantities required for this project.
3. Single Source of Supply: Entire quantity of filler soil required by this project shall be supplied from a single source.

1.10 QUALITY CONTROL

1. Contractor shall establish and maintain a quality control system which shall set parameters for testing, procedures for sampling, sampling intervals, handling of samples (chain of custody), limits/tolerances or confidence intervals for acceptance or rejection status within a sample and allowable variability of test parameters between samples.
2. Quality control system shall include a paper trail that provides for traceability at any point. Each batch of soil shall be identified by date of manufacture, quality, and a corresponding test result and shall link into when material was delivered and where material was placed.
3. Records: Records shall be systematically recorded, indexed, and files so as to be retrievable and accessible to Consultant or quality auditor on a project basis within one working day of requisition.

4. Quality Register: Conformance records shall be stored and maintained such that they are readily retrievable and in facilities that provide a suitable environment to minimize deterioration and to prevent loss.
5. Storage: Quality records shall be available to Consultant at all reasonable times. If requested by Consultant, Contractor shall provide copies of records or test results at no cost to Owner.
6. Non-Conformance:
 1. Non-conforming work detected by Quality Control System shall be reported to Consultant via a Non-Conformance Report (NCR) within one working day of being detected.
 2. NCRs shall be submitted with all records that indicate a departure from specified requirements. NCR shall indicate a proposed corrective action.
 3. If corrective action cannot be determined within one working day, Contractor shall submit a partially completed NCR identifying the non-conformance.
 4. Non-conforming products shall not be covered up unless a corrective action has been approved by Consultant and implemented by Contractor.
 5. An NCR shall create a hold point which shall apply until conformance has been achieved and Consultant signed an authorization to proceed.
 6. Consultant shall issue a Corrective Action Request (CAR) when he detects non-conformance to Contractor's Quality Control System or methods. This will not create a hold point unless specifically stated.
 7. When Consultant detects product non-conformance, he will issue a Notice of Non-Conformance (NNC) which will create a hold point and Contractor shall submit an NCR.
 8. When there is a discrepancy between Consultant's test results and those of the Contractor, Consultant's results shall prevail except when Consultant may determine a specific audit test procedure to resolve the discrepancy.
 9. Contractor shall nominate a complete corrective action for any non-conformance no later than five (5) working days or shall show cause to Consultant for any further delay.
 10. Contractor shall indicate on an NCR corrective action to ensure that the Quality Control System remains effective in avoiding recurrence of the non-conformance.
 11. Contractor and Consultant shall sign off on all actions under this clause.
 12. Work performed by Contractor under this clause shall be at no additional cost to Owner and without an extension to Contract Time.

1.11 QUALITY CONTROL ALTERNATIVES

1. Variations to testing frequencies specified in clause 2.05 may be permitted upon timely submission to Consultant of an alternative testing program that achieves the desired outcome of the quality control program.
2. Materials supplied from operations that have a third party endorsed quality assurance program may be accepted subject to the timely submission to Consultant of the relevant documentation.

1.12 DELIVERY, STORAGE AND HANDLING

1. Refer to Section 32 94 50.
2. When filler soil has been produced and approvals given, protect stockpiled material from rain, wind erosion and other detrimental weather effects.
3. When filler soil is being loaded, ensure that loading equipment does not pick up underlying material and that tires and tracks do not till other material into the mix.
4. When filler soil is delivered to installation site, ensure that haul vehicles and equipment are properly sanitized so as to contain no foreign soil, aggregate, asphalt and other matter that might contaminate filler soil.

2. PRODUCTS

2.02 PERFORMANCE REQUIREMENTS

1. Filler soils shall meet performance requirements specified in Appendix 'A'.

2.03 DESIGN AND PREPARATION OF FILLER SOIL MIX

1. Each proposed filler soil mix shall be tested and analysed for its chemical and physical properties. Contractor shall collect a sufficient number of samples to accurately characterize the resource and if required, determine the amendments required to meet specified requirements.
2. Prior to any growing medium amendment, conduct laboratory testing to confirm soil condition.
3. Perform testing on stockpiled growing medium that has been dedicated for use on this project.
4. Testing frequency shall be as specified in clause 2.05.
5. Supply filler soil for installation from certified stockpiles that have been tested at the rate specified in clause 2.05 and shown to comply with specified requirements.
6. When a stockpile has been tested and certified, no further material shall be added to it.

2.04 UNSUITABLE MATERIAL

1. Unsuitable material is material brought to site by Contractor that fails to comply with specified requirements. Unsuitable material may ultimately be approved for use if sufficient documentation and supporting laboratory testing from a qualified agronomist is submitted to Consultant proving that proposed material is equivalent or superior to specified material.
2. Costs associates with testing, reworking, removal or replacing unsuitable material shall be borne by Contractor.

2.05 SOURCE QUALITY CONTROL

1. Test filler soil as follows:

FILLER SOIL TYPE	APPLICATION	KEY VERIFICATION REQUIREMENTS	QUALITY	MINIMUM FREQUENCY	TEST
GROWING MEDIUM	Growing medium for filling structural soil cell matrix.	Appendix 'A'		Three (3) at approval then one (1) per 100m ³ or part thereof.	

3. EXECUTION

3.01 SITE QUALITY CONTROL

1. Consultant may require testing of filler soil that has been delivered to and stored on site, or that has been installed in soil cell matrix. Such testing shall be performed under provisions of clause 1.06.

3.03 APPENDIX 'A'

Appendix 'A' Filler Soil Performance Requirements is attached.

END OF SECTION

APPENDIX 'A' FILLER SOIL PERFORMANCE REQUIREMENTS

Type 'A' Growing Medium shall meet following requirements:

ITEM		UNITS	GROWING MEDIUM FOR STRUCTURAL SOIL CELLS
Ph	In H ₂ O (1:5)	Ph units	6.0 to 7.2
	In CaCl ₂ (1:5)	Ph units	5.8 to 6.8
Electrical Conductivity (1:5)		Ds/m	<2.5
Cation Analysis	Sodium	% eCEC	<5
	Potassium	% eCEC	<5 to 15
		mg/kg	>262
	Calcium	% eCEC	60 to 75
		mg/kg	>1600
	Magnesium	5 eCEC	15 to 25
		mg/kg	>365
	Ca:Mg	Ratio	3 to 10
	Ca:K		10 to 30
	Mg:K		2 to 10
Aluminium	%eCEC	<2	
Cation Exchange Capacity	Meq/100g	>25	

Phosphate	P sensitive planting	mg/kg	5 to 15
	General plantings		80 to 150
Ammonium + Nitrate		mg/kg	50 to 100
Sulphate		mg/kg	40 to 100
Micronutrient Analysis	Iron	mg/kg	76 to 278
	Manganese	mg/kg	>20
	Zinc	mg/kg	6 to 15
	Copper	mg/kg	7 to 30
	Boron	mg/kg	1.4 to 2.7
Organic Matter		% by mass	3.0 to 8.0
Toxicity Index		mm	>70
Wettability		mm/minute	>5
Dispersibility	In H₂O	-	1 or 2
	In CaCl₂	-	1 or 2

END OF APPENDIX

SECTION 329300 - PLANTS

PART 1 - GENERAL

1.0 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.1 SUMMARY

- A. Section Includes:

- 1. Plants
- 2. Tree Stabilization
- 3. Landscape Edging
- 4. Mulch
- 5. Weed Control Barrier

- B. Related Requirements:

- 1. Section 329113 "Planting Soil " for preparation of planting areas and composition of planting soils
- 2. "Sod" for turf areas (per KYTC standard specification)

1.2 DEFINITIONS

- A. Backfill: The earth used to replace or the act of replacing earth in an excavation (KYTC Select Borrow).
- B. Balled and Burlapped Stock: Plants dug with firm, natural balls of earth in which they were grown, with a ball size not less than diameter and depth recommended by ANSI Z60.1 for type and size of plant required; wrapped with burlap, tied, rigidly supported, and drum laced with twine with the root flare visible at the surface of the ball as recommended by ANSI Z60.1.
- C. Balled and Potted Stock: Plants dug with firm, natural balls of earth in which they are grown and placed, unbroken, in a container. Ball size is not less than diameter and depth recommended by ANSI Z60.1 for type and size of plant required.
- D. Container-Grown Stock: Healthy, vigorous, well-rooted plants grown in a container, with a well-established root system reaching sides of container and maintaining a firm ball when removed from container. Container shall be rigid enough to hold ball shape and protect root mass during shipping and be sized according to ANSI Z60.1 for type and size of plant required.

- E. Finish Grade: Elevation of finished surface of planting soil.
- F. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. Pesticides include insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. They also include substances or mixtures intended for use as a plant regulator, defoliant, or desiccant. Some sources classify herbicides separately from pesticides.
- G. Pests: Living organisms that occur where they are not desired or that cause damage to plants, animals, or people. Pests include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.
- H. Planting Area: Areas to be planted.
- I. Planting Soil: Imported soil suitable for growing plants. See Section 329113 "Planting Soil" for drawing designations for planting soils.
- J. Backfill Mixture: Imported soil that has been modified with soil amendments and perhaps fertilizers to backfill planting excavations (KYTC Topsoil 827.10).
- K. Plant; Plants; Plant Material: These terms refer to vegetation in general, including trees, shrubs, vines, ground covers, ornamental grasses, bulbs, corms, tubers, or herbaceous vegetation.
- L. Root Flare: Also called "trunk flare." The area at the base of the plant's stem or trunk where the stem or trunk broadens to form roots; the area of transition between the root system and the stem or trunk.
- M. Stem Girdling Roots: Roots that encircle the stems (trunks) of trees below the soil surface.
- N. Subgrade: The surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.

1.3 COORDINATION

- A. Coordination with Sod Areas (Lawns): Plant trees, shrubs, and other plants after finish grades are established and before installing sod areas unless otherwise indicated.
 - 1. When planting trees, shrubs, and other plants after planting sod areas, protect sod areas, and promptly repair damage caused by planting operations.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Plant Materials: Include quantities, sizes, quality, and sources for plant materials.
 - 2. Plant Photographs: Include color photographs in digital format of each required species and size of plant material as it will be furnished to Project. Take photographs from an angle depicting true size and condition of the typical plant to be furnished. Include a scale rod or other measuring device in each photograph. For species where more than 20 plants

are required, include a minimum of three photographs showing the average plant, the best quality plant, and the worst quality plant to be furnished. Identify each photograph with the full scientific name of the plant, plant size, and name of the growing nursery.

B. Samples for Verification: For each of the following:

1. Trees and Shrubs: Three Samples of each variety and size delivered to site for review. Maintain approved Samples on-site as a standard for comparison. Plants may remain as part of permanent installation if approved.
2. Organic Mulch: 1-quart volume of each organic mulch required; in sealed plastic bags labeled with composition of materials by percentage of weight and source of mulch. Each Sample shall be typical of the lot of material to be furnished; provide an accurate representation of color, texture, and organic makeup.
3. Edging Materials and Accessories: 12" length to verify color and size selected.
4. Gravel Mulch: 2 lb of each mineral mulch required, in sealed plastic bags labeled with source of mulch. Sample shall be typical of the lot of material to be delivered and installed on-site; provide an accurate indication of color, texture, and makeup of the material.
5. Weed Control Barrier: 12 by 12 inches.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For landscape Installer. Include list of similar projects completed by Installer demonstrating Installer's capabilities and experience. Include project names, addresses, and year completed, and include names and addresses of owners' contact persons.
- B. Product Certificates: For each type of manufactured product, from manufacturer, and complying with the following:
 1. Manufacturer's certified analysis of standard products.
 2. Analysis of other materials by a recognized laboratory made according to methods established by the Association of Official Analytical Chemists, where applicable.
- C. Pesticides and Herbicides: Product label and manufacturer's application instructions specific to Project.
- D. Material Test Reports: For existing, native surface and imported topsoil.
- E. Sample Warranty: For special warranty.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: Recommended procedures to be established by Owner for maintenance of plants during a calendar year. Submit before expiration of required maintenance periods.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified landscape installer whose work has resulted in successful establishment of plants.
1. Professional Membership: Installer shall be a member in good standing of either the Professional Landcare Network or the American Nursery and Landscape Association.
 2. Experience: Five years' experience in landscape installation in addition to requirements.
 3. Installer's Project Manager: Require Installer's project manager to have the following credentials and be available to the project as follows:
 - a. Hold a minimum of a four-year bachelor degree in the field of landscape contracting, landscape management, agronomy, landscape architecture or horticulture or be a Landscape Industry Certified Manger from the Professional Landcare Network
 - b. Be available to respond to inquiries from the Architect.
 4. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.
 - a. Hold a minimum of a two-year degree in the field of landscape contracting, landscape management, agronomy, or horticulture or be a Landscape Industry Certified Technician
 - b. Be present on the project site a minimum of 85% of the time the Installer's crew is present on site.
 5. Pesticide Applicator: State licensed, commercial.
- B. Provide quality, size, genus, species, and variety of plants indicated, complying with applicable requirements in ANSI Z60.1.
- C. Measurements: Measure according to ANSI Z60.1. Do not prune to obtain required sizes.
1. Trees and Shrubs: Measure with branches and trunks or canes in their normal position. Take height measurements from or near the top of the root flare for field-grown stock and container-grown stock. Measure main body of tree or shrub for height and spread; do not measure branches or roots tip to tip. Take caliper measurements 6 inches above the root flare for trees up to 4-inch caliper size, and 12 inches above the root flare for larger sizes.
 2. Other Plants: Measure with stems, petioles, and foliage in their normal position.
- D. Plant Material Observation: Engineer may observe plant material either at place of growth or at site before planting for compliance with requirements for genus, species, variety, cultivar, size, and quality. Architect may also observe trees and shrubs further for size and condition of balls and root systems, pests, disease symptoms, injuries, and latent defects and may reject unsatisfactory or defective material at any time during progress of work. Remove rejected trees or shrubs immediately from Project site.
1. Notify Engineer of sources of planting materials seven days in advance of delivery to site.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of compliance with state and Federal laws if applicable.
- B. Bulk Materials:
 - 1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
 - 2. Provide erosion-control measures to prevent erosion or displacement of bulk materials; discharge of soil-bearing water runoff; and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
 - 3. Accompany each delivery of bulk materials with appropriate certificates.
- C. Do not prune trees and shrubs before delivery. Protect bark, branches, and root systems from sun scald, drying, wind burn, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees or shrubs in such a manner as to destroy their natural shape. Provide protective covering of plants during shipping and delivery. Do not drop plants during delivery and handling.
- D. Handle planting stock by root ball.
- E. Apply antidesiccant to trees and shrubs using power spray to provide an adequate film over trunks (before wrapping), branches, stems, twigs, and foliage to protect during digging, handling, and transportation.
 - 1. If deciduous trees or shrubs are moved in full leaf, spray with antidesiccant at nursery before moving and again two weeks after planting.
- F. Deliver plants after preparations for planting have been completed, and install immediately. If planting is delayed more than six hours after delivery, set plants and trees in their appropriate aspect (sun, filtered sun, or shade), protect from weather and mechanical damage, and keep roots moist.
 - 1. Set balled stock on ground and cover ball with soil, peat moss, sawdust, or other acceptable material.
 - 2. Do not remove container-grown stock from containers before time of planting.
 - 3. Water root systems of plants stored on-site deeply and thoroughly with a fine-mist spray. Water as often as necessary to maintain root systems in a moist, but not overly wet condition.

1.9 FIELD CONDITIONS

- A. Field Measurements: Verify actual grade elevations, service and utility locations, irrigation system components, and dimensions of plantings and construction contiguous with new plantings by field measurements before proceeding with planting work.

- B. Planting Restrictions: Plant during the following periods. Coordinate planting periods with maintenance periods to provide required maintenance from date of Substantial Completion.
 - 1. Spring Planting: March 15th – April 30th.
 - 2. Fall Planting: September 1 – October 31.

- C. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions and warranty requirements.

1.10 WARRANTY

- A. Special Warranty: Installer agrees to repair or replace plantings and accessories that fail in materials, workmanship, or growth within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Death and unsatisfactory growth, except for defects resulting from abuse, lack of adequate maintenance, or neglect by Owner.
 - b. Structural failures including plantings falling or blowing over.
 - c. Faulty performance of tree stabilization edgings and tree grates.
 - d. Deterioration of metals, metal finishes, and other materials beyond normal weathering.

 - 2. Warranty Periods: From date of planting inspection by Owner's Representative.
 - a. Trees, Shrubs, Vines, and Ornamental Grasses: 12 months.
 - b. Ground Covers, Biennials, Perennials, and Other Plants: 12 months.

 - 3. Include the following remedial actions as a minimum:
 - a. Immediately remove dead plants and replace unless required to plant in the succeeding planting season.
 - b. Replace plants that are more than 25 percent dead or in an unhealthy condition at end of warranty period.
 - c. A limit of one replacement of each plant is required except for losses or replacements due to failure to comply with requirements.
 - d. Provide extended warranty for period equal to original warranty period, for replaced plant material.

PART 2 - PRODUCTS

2.1 All products shall comply with American Nursery and Landscape Association standards

2.2 PLANT MATERIAL

- A. General: Furnish nursery-grown plants true to genus, species, variety, cultivar, stem form, shearing, and other features indicated in Plant List, Plant Schedule, or Plant Legend indicated on Drawings and complying with ANSI Z60.1; and with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully branched, healthy, vigorous stock, densely foliated when in leaf and free of disease, pests, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.
1. Trees with damaged, crooked, or multiple leaders; tight vertical branches where bark is squeezed between two branches or between branch and trunk ("included bark"); crossing trunks; cut-off limbs more than 3/4 inch in diameter; or with stem girdling roots are unacceptable.
 2. Collected Stock: Do not use plants harvested from the wild, from native stands, from an established landscape planting, or not grown in a nursery unless otherwise indicated.
- B. Provide plants of sizes, grades, and ball or container sizes complying with ANSI Z60.1 for types and form of plants required. Plants of a larger size may be used if acceptable to Architect, with a proportionate increase in size of roots or balls.
- C. Root-Ball Depth: Furnish trees and shrubs with root balls measured from top of root ball, which begins at root flare according to ANSI Z60.1. Root flare shall be visible before planting.
- D. Labeling: Label at least one plant of each variety, size, and caliper with a securely attached, waterproof tag bearing legible designation of common name and full scientific name, including genus and species. Include nomenclature for hybrid, variety, or cultivar, if applicable for the plant.

2.3 FERTILIZERS

- A. Slow Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.

2.4 MULCHES

- A. Organic Mulch: Free from deleterious materials and suitable as a top dressing of trees and shrubs, consisting of one of the following:
1. Type: Shredded hardwood.
 2. Size Range: 3 inches maximum, 1/2 inch minimum.

3. Color: Natural.

2.5 WEED-CONTROL BARRIERS

- A. Nonwoven Geotextile Filter Fabric: Polypropylene or polyester fabric, 3 oz./sq. yd. minimum, composed of fibers formed into a stable network so that fibers retain their relative position. Fabric shall be inert to biological degradation and resist naturally encountered chemicals, alkalis, and acids.

2.6 PESTICIDES

- A. General: Pesticide registered and approved by the EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.
- B. Pre-Emergent Herbicide (Selective and Nonselective): Effective for controlling the germination or growth of weeds within planted areas at the soil level directly below the mulch layer.
- C. Post-Emergent Herbicide (Selective and Nonselective): Effective for controlling weed growth that has already germinated.

2.7 TREE-STABILIZATION MATERIALS (Not applicable for Trees in Tree Grate)

- A. Trunk-Stabilization Materials:
 1. Upright and Guy Stakes: Rough-sawn, sound, new hardwood, free of knots, holes, cross grain, and other defects, 2-by-2-inch nominal by length indicated, pointed at one end.
 2. Wood Deadmen: Timbers measuring 8 inches in diameter and 48 inches long, treated with specified wood pressure-preservative treatment.
 3. Flexible Ties: Wide rubber or elastic bands or straps of length required to reach stakes or turnbuckles.
 4. Guys and Tie Wires: ASTM A 641/A 641M, Class 1, galvanized-steel wire, two-strand, twisted, 0.106 inch in diameter.
 5. Tree-Tie Webbing: UV-resistant polypropylene or nylon webbing with brass grommets.
 6. Guy Cables: Five-strand, 3/16-inch- diameter, galvanized-steel cable, with zinc-coated turnbuckles, a minimum of 3 inches long, with two 3/8-inch galvanized eyebolts.
 7. Flags: Standard surveyor's plastic flagging tape, white, 6 inches long.
- B. Root-Ball Stabilization Materials:
 1. Upright Stakes and Horizontal Hold-Down: Rough-sawn, sound, new hardwood or softwood, free of knots, holes, cross grain, and other defects, 2-by-2-inch nominal by length indicated; stakes pointed at one end.
 2. Wood Screws: ASME B18.6.1.

2.8 LANDSCAPE EDGING

- A. Steel Edging: Standard commercial-steel edging, fabricated in sections of standard lengths, with loops stamped from or welded to face of sections to receive stakes.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following or approved equal:
 - a. Border Concepts, Inc.
 - b. Collier Metal Specialties, Inc.
 - c. Russell, J. D. Company (The).
 - d. Sure-loc Edging Corporation.
 - 2. Edging Size: 3/16 inch thick by 4 inches deep.
 - 3. Stakes: Tapered steel, a minimum of 12 inches long.
 - 4. Accessories: Standard tapered ends, corners, and splicers.
 - 5. Finish: Manufacturer's standard paint.
 - a. Paint Color: Green.

2.9 MISCELLANEOUS PRODUCTS

- A. Antidesiccant: Water-insoluble emulsion, permeable moisture retarder, film forming, for trees and shrubs. Deliver in original, sealed, and fully labeled containers and mix according to manufacturer's written instructions.
- B. Burlap: Non-synthetic, biodegradable.
- C. Mycorrhizal Fungi: Dry, granular inoculant containing at least 5300 spores per lb of vesicular-arbuscular mycorrhizal fungi and 95 million spores per lb of ectomycorrhizal fungi, 33 percent hydrogel, and a maximum of 5.5 percent inert material.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas to receive plants, with Installer present, for compliance with requirements and conditions affecting installation and performance of the Work.
 - 1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.
 - 2. Verify that plants and vehicles loaded with plants can travel to planting locations with adequate overhead clearance.

3. Suspend planting operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
 4. Uniformly moisten excessively dry soil that is not workable or which is dusty.
- B. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Engineer and replace with new planting soil.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities and turf areas and existing plants from damage caused by planting operations.
- B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.
- C. Lay out individual tree and shrub locations and areas for multiple plantings. Stake locations, outline areas, adjust locations when requested, and obtain Engineer acceptance of layout before excavating or planting. Make minor adjustments as required.
- D. Lay out plants at locations directed by Engineer. Stake locations of individual trees and shrubs and outline areas for multiple plantings.

3.3 PLANTING AREA ESTABLISHMENT

- A. General: Prepare planting area for soil placement and planting soil according to Section 329113 "Planting Soil"
- B. Placing Planting Soil: Place and mix planting soil in-place over exposed subgrade.
- C. Before planting, obtain Engineer's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.
- D. Application of Mycorrhizal Fungi: At time directed by Engineer, broadcast dry product uniformly over prepared soil at application rate according to manufacturer's written recommendations.

3.4 EXCAVATION FOR TREES

- A. Planting Pits and Trenches: Excavate circular planting pits.
1. Excavate planting pits with sides sloping inward at a 45-degree angle. Excavations with vertical sides are unacceptable. Trim perimeter of bottom leaving center area of bottom raised slightly to support root ball and assist in drainage away from center. Do not further disturb base. Ensure that root ball will sit on undisturbed base soil to prevent settling. Scarify sides of planting pit smeared or smoothed during excavation.

2. Excavate approximately three times as wide as ball diameter for balled and burlapped and container-grown stock.
3. Do not excavate deeper than depth of the root ball, measured from the root flare to the bottom of the root ball.
4. If area under the plant was initially dug too deep, add soil to raise it to the correct level and thoroughly tamp the added soil to prevent settling.
5. Maintain angles of repose of adjacent materials to ensure stability. Do not excavate subgrades of adjacent paving, structures, hardscapes, or other new or existing improvements.
6. Maintain supervision of excavations during working hours.
7. Keep excavations covered or otherwise protected when unattended by Installer's personnel.
8. If drain tile is indicated on Drawings or required under planting areas, excavate to top of porous backfill over tile.

- B. Backfill Soil: Subsoil and topsoil removed from excavations may not be used as planting soil.
- C. Obstructions: Notify Architect if unexpected rock or obstructions detrimental to trees or shrubs are encountered in excavations.
 1. Hardpan Layer: Drill 6-inch- diameter holes, 24 inches apart, into free-draining strata or to a depth of 10 feet, whichever is less, and backfill with free-draining material.
- D. Drainage: Notify Architect if subsoil conditions evidence unexpected water seepage or retention in tree or shrub planting pits.
- E. Fill excavations with water and allow to percolate away before positioning trees and shrubs.

3.5 TREE, SHRUB, AND VINE PLANTING

- A. Inspection: At time of planting, verify that root flare is visible at top of root ball according to ANSI Z60.1. If root flare is not visible, remove soil in a level manner from the root ball to where the top-most root emerges from the trunk. After soil removal to expose the root flare, verify that root ball still meets size requirements.
- B. Roots: Remove stem girdling roots and kinked roots. Remove injured roots by cutting cleanly; do not break.
- C. Balled and Burlapped Stock: Set each plant plumb and in center of planting pit or trench with root flare 1 inch above adjacent finish grades.
 1. Backfill: Planting soil.
 2. After placing some backfill around root ball to stabilize plant, carefully cut and remove burlap, rope, and wire baskets from tops of root balls and from sides, but do not remove from under root balls. Remove pallets, if any, before setting. Do not use planting stock if root ball is cracked or broken before or during planting operation.

3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
 4. Continue backfilling process. Water again after placing and tamping final layer of soil.
- D. Container-Grown Stock: Set each plant plumb and in center of planting pit or trench with root flare 1 inch above adjacent finish grades.
1. Backfill: Planting soil.
 2. Carefully remove root ball from container without damaging root ball or plant.
 3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
 4. Continue backfilling process. Water again after placing and tamping final layer of soil.
- E. Slopes: When planting on slopes, set the plant so the root flare on the uphill side is flush with the surrounding soil on the slope; the edge of the root ball on the downhill side will be above the surrounding soil. Apply enough soil to cover the downhill side of the root ball.

3.6 TREE, SHRUB, AND VINE PRUNING

- A. Remove only dead, dying, or broken branches. Do not prune for shape.
- B. Prune, thin, and shape trees, shrubs, and vines as directed by Architect.
- C. Prune, thin, and shape trees, shrubs, and vines according to standard professional horticultural and arboricultural practices. Unless otherwise indicated by Architect, do not cut tree leaders; remove only injured, dying, or dead branches from trees and shrubs; and prune to retain natural character.
- D. Do not apply pruning paint to wounds.

3.7 TREE STABILIZATION (Not applicable for Trees in Tree Grate)

- A. Trunk Stabilization by Upright Staking and Tying: Install trunk stabilization as follows unless otherwise indicated:
 1. Upright Staking and Tying: Stake trees of 2- through 5-inch caliper. Stake trees of less than 2-inch caliper only as required to prevent wind tip out. Use a minimum of two stakes of length required to penetrate at least 18 inches below bottom of backfilled excavation and to extend one-third of trunk height above grade. Set vertical stakes and space to avoid penetrating root balls or root masses.
 2. Upright Staking and Tying: Stake trees with two stakes for trees up to 12 feet high and 2-1/2 inches or less in caliper; three stakes for trees less than 14 feet high and up to 4 inches in caliper. Space stakes equally around trees.

3. Support trees with bands of flexible ties at contact points with tree trunk. Allow enough slack to avoid rigid restraint of tree.
 4. Support trees with two strands of tie wire, connected to the brass grommets of tree-tie webbing at contact points with tree trunk. Allow enough slack to avoid rigid restraint of tree.
- B. Trunk Stabilization by Staking and Guying: Install trunk stabilization as follows unless otherwise indicated on Drawings. Stake and guy trees more than 14 feet in height and more than 3 inches in caliper unless otherwise indicated.
1. Site-Fabricated, Staking-and-Guying Method: Install no fewer than three guys spaced equally around tree.
 - a. Securely attach guys to stakes 30 inches long, driven to grade. Adjust spacing to avoid penetrating root balls or root masses. Provide turnbuckle for each guy wire and tighten securely.
 - b. Support trees with bands of flexible ties at contact points with tree trunk and reaching to turnbuckle. Allow enough slack to avoid rigid restraint of tree.
 - c. Support trees with guy cable, connected to the brass grommets of tree-tie webbing at contact points with tree trunk and reaching to turnbuckle. Allow enough slack to avoid rigid restraint of tree.
 - d. Attach flags to each guy wire, 30 inches above finish grade.
 - e. Paint turnbuckles with luminescent white paint.

3.8 GROUND COVER AND PLANT PLANTING

- A. Set out and space ground cover and plants other than trees, shrubs, and vines as indicated on Drawings in even rows with triangular spacing or as indicated on the drawings.
- B. Use planting soil for backfill.
- C. Dig holes large enough to allow spreading of roots.
- D. For rooted cutting plants supplied in flats, plant each in a manner that minimally disturbs the root system but to a depth not less than two nodes.
- E. Work soil around roots to eliminate air pockets and leave a slight saucer indentation around plants to hold water.
- F. Water thoroughly after planting, taking care not to cover plant crowns with wet soil.
- G. Protect plants from hot sun and wind; remove protection if plants show evidence of recovery from transplanting shock.

3.9 PLANTING AREA MULCHING

- A. Mulch backfilled surfaces of planting areas and other areas indicated.

1. Organic Mulch in Planting Areas: Apply 3-inch average thickness of organic mulch over whole surface of planting area, and finish level with adjacent finish grades. Do not place mulch within 3 inches of trunks or stems.

3.10 EDGING INSTALLATION

- A. Steel Edging: Install steel edging where indicated according to manufacturer's written instructions. Anchor with steel stakes spaced approximately 30 inches apart, driven below top elevation of edging.

3.11 PLANT MAINTENANCE

- A. Maintain plantings by pruning, cultivating, watering, weeding, fertilizing, mulching, restoring planting saucers, adjusting and repairing tree-stabilization devices, resetting to proper grades or vertical position, and performing other operations as required to establish healthy, viable plantings.
- B. Fill in, as necessary, soil subsidence that may occur because of settling or other processes. Replace mulch materials damaged or lost in areas of subsidence.
- C. Apply treatments as required to keep plant materials, planted areas, and soils free of pests and pathogens or disease. Use integrated pest management practices when possible to minimize use of pesticides and reduce hazards. Treatments include physical controls such as hosing off foliage, mechanical controls such as traps, and biological control agents.

3.12 PESTICIDE APPLICATION

- A. Apply pesticides and other chemical products and biological control agents according to authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with Owner's operations and others in proximity to the Work. Notify Owner before each application is performed.
- B. Pre-Emergent Herbicides (Selective and Nonselective): Apply to tree, shrub, and ground-cover areas according to manufacturer's written recommendations. Do not apply to seeded areas.
- C. Post-Emergent Herbicides (Selective and Nonselective): Apply only as necessary to treat already-germinated weeds and according to manufacturer's written recommendations.

3.13 REPAIR AND REPLACEMENT

- A. General: Repair or replace existing or new trees and other plants that are damaged by construction operations, in a manner approved by Architect.
 1. Submit details of proposed pruning and repairs.
 2. Perform repairs of damaged trunks, branches, and roots within 24 hours, if approved.

3. Replace trees and other plants that cannot be repaired and restored to full-growth status, as determined by Architect.
- B. Remove and replace trees that are more than 25 percent dead or in an unhealthy condition or are damaged during construction operations that Engineer determines are incapable of restoring to normal growth pattern.
1. Provide new trees of same size as those being replaced for each tree of 4 inches or smaller in caliper size.
 2. Species of Replacement Trees: Same species being replaced.

3.14 CLEANING AND PROTECTION

- A. During planting, keep adjacent paving and construction clean and work area in an orderly condition. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.
- B. Remove surplus soil and waste material including excess subsoil, unsuitable soil, trash, and debris and legally dispose of them off Owner's property.
- C. Protect plants from damage due to landscape operations and operations of other contractors and trades. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged plantings.
- D. After installation and before Substantial Completion, remove nursery tags, nursery stakes, tie tape, labels, wire, burlap, and other debris from plant material, planting areas, and Project site.
- E. At time of Substantial Completion, verify that tree-watering devices are in good working order and leave them in place. Replace improperly functioning devices.

3.15 MAINTENANCE SERVICE

- A. Maintenance Service for Trees and Shrubs: Provide maintenance by skilled employees of landscape Installer. Maintain as required in "Plant Maintenance" Article. Begin maintenance immediately after plants are installed and continue until plantings are acceptably healthy and well established, but for not less than maintenance period below:
 1. Maintenance Period: Sixty days from date of Substantial Completion.
- B. Maintenance Service for Ground Cover and Other Plants: Provide maintenance by skilled employees of landscape Installer. Maintain as required in "Plant Maintenance" Article. Begin maintenance immediately after plants are installed and continue until plantings are acceptably healthy and well established, but for not less than maintenance period below:
 1. Maintenance Period: Sixty days from date of Substantial Completion.

END OF SECTION 329300

SECTION 329113 – PLANTING SOIL

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes only planting soil for planting bed areas.
- B. Related Requirements:
 - 1. Section 329300 "Plants" for placing planting soil for plantings.

1.2 DEFINITIONS

- A. AAPFCO: Association of American Plant Food Control Officials.
- B. Backfill: The earth used to replace or the act of replacing earth in an excavation. This can be amended or unamended soil as indicated.
- C. CEC: Cation exchange capacity.
- D. Compost: The product resulting from the controlled biological decomposition of organic material that has been sanitized through the generation of heat and stabilized to the point that it is beneficial to plant growth.
- E. Duff Layer: A surface layer of soil, typical of forested areas, that is composed of mostly decayed leaves, twigs, and detritus.
- F. Imported Soil: Soil that is transported to Project site for use.
- G. Manufactured Soil: Soil produced by blending soils, sand, stabilized organic soil amendments, and other materials to produce planting soil.
- H. NAFT: North American Proficiency Testing Program. An SSSA program to assist soil-, plant-, and water-testing laboratories through interlaboratory sample exchanges and statistical evaluation of analytical data.
- I. Organic Matter: The total of organic materials in soil exclusive of undecayed plant and animal tissues, their partial decomposition products, and the soil biomass; also called "humus" or "soil organic matter."
- J. Planting Soil: Existing, on-site soil; imported soil; or manufactured soil that has been modified as specified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.

- K. RCRA Metals: Hazardous metals identified by the EPA under the Resource Conservation and Recovery Act.
- L. SSSA: Soil Science Society of America.
- M. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.
- N. Subsoil: Soil beneath the level of subgrade; soil beneath the topsoil layers of a naturally occurring soil profile, typified by less than 1 percent organic matter and few soil organisms.
- O. Surface Soil: Soil that is present at the top layer of the existing soil profile. In undisturbed areas, surface soil is typically called "topsoil"; but in disturbed areas such as urban environments, the surface soil can be subsoil.
- P. USCC: U.S. Composting Council.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include recommendations for application and use.
 - 2. Include test data substantiating that products comply with requirements.
 - 3. Include sieve analyses for aggregate materials.
 - 4. Material Certificates: For each type of imported soil and soil amendment and fertilizer before delivery to the site, according to the following:
 - a. Manufacturer's qualified testing agency's certified analysis of standard products.
 - b. Analysis of fertilizers, by a qualified testing agency, made according to AAPFCO methods for testing and labeling and according to AAPFCO's SUIP #25.
 - c. Analysis of nonstandard materials, by a qualified testing agency, made according to SSSA methods, where applicable.
- B. Samples: For each bulk-supplied material, 1-quart volume of each in sealed containers labeled with content, source, and date obtained. Each Sample shall be typical of the lot of material to be furnished; provide an accurate representation of composition, color, and texture.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For each testing agency.
- B. Preconstruction Test Reports: For preconstruction soil analyses specified in "Preconstruction Testing" Article.
- C. Field quality-control reports.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and compliance with state and Federal laws if applicable.
- B. Bulk Materials:
 - 1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
 - 2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
 - 3. Do not move or handle materials when they are wet or frozen.
 - 4. Accompany each delivery of bulk fertilizers and soil amendments with appropriate certificates.

PART 2 - PRODUCTS

2.1 PLANTING SOILS SPECIFIED BY COMPOSITION

- A. General: Soil amendments, fertilizers, and rates of application specified in this article are guidelines that may need revision based on testing laboratory's recommendations after preconstruction soil analyses are performed.
- A. Planting-Soil for Sod Areas: See KYTC Topsoil
- B. Planting Soil for Planting Bed Areas :

Fertile, friable soil containing less than 5% total volume of the combination of subsoil, refuse, roots larger than 1 inch diameter, heavy, sticky or stiff clay, stones larger than 2 inches in diameter, noxious seeds, sticks, brush, litter, or any substances deleterious to plant growth. The percent (%) of the above objects shall be controlled by source selection not by screening the soil. Topsoil shall be suitable for the germination of seeds and the support of vegetative growth. Imported Topsoil shall not contain weed seeds in quantities that cause noticeable weed infestations in the final planting beds. Imported Topsoil shall meet the following physical and chemical criteria:

- 1. Soil texture: USDA loam, sandy clay loam or sandy loam with clay content between 15 and 25%. And a combined clay/silt content of no more than 55%.
- 2. pH value shall be between 5.5 and 7.0.
- 3. Percent organic matter (OM): 2.0-5.0%, by dry weight.
- 4. Soluble salt level: Less than 2 mmho/cm.
- 5. Soil chemistry suitable for growing the plants specified.
- 6. Imported Topsoil shall be a harvested soil from fields or development sites. The organic content and particle size distribution shall be the result of natural soil formation.

Manufactured soils where Coarse Sand, Composted organic material or chemical additives has been added to the soil to meet the requirements of this specification section shall not be acceptable.

7. Imported Topsoil for Planting Soil shall NOT have been screened and shall retain clods larger than 2 inches in diameter throughout the stockpile after harvesting.
8. Stockpiled Existing Topsoil at the site meeting the above criteria may be acceptable.
9. Provide a two-gallon sample from each Imported Topsoil source with required soil testing results. The sample shall be a mixture of the random samples taken around the source stockpile or field.

2.2 INORGANIC SOIL AMENDMENTS

- A. Lime: ASTM C 602, agricultural liming material containing a minimum of 80 percent calcium carbonate equivalent and as follows:
 1. Class: T, with a minimum of 99 percent passing through a No. 8 sieve and a minimum of 75 percent passing through a No. 60 sieve.
- B. Sulfur: Granular, biodegradable, and containing a minimum of 90 percent elemental sulfur, with a minimum of 99 percent passing through a No. 6 sieve and a maximum of 10 percent passing through a No. 40 sieve.

2.3 ORGANIC SOIL AMENDMENTS

- A. Compost: Well-composted, stable, and weed-free organic matter produced by composting feedstock, and bearing USCC's "Seal of Testing Assurance," and as follows:
 1. Reaction: pH of 5.5 to 8.
 2. Soluble-Salt Concentration: 5 - 10 dS/m.
 3. Moisture Content: 35 to 55 percent by weight.
 4. Organic-Matter Content: 50 to 60 percent of dry weight.
 5. Particle Size: Minimum of 98 percent passing through a 1-inch sieve.
 6. Feedstock: Agricultural, food, or industrial residuals; biosolids; yard trimmings; or source-separated or compostable mixed solid waste.
- B. Sphagnum Peat: Partially decomposed sphagnum peat moss, finely divided or of granular texture with 100 percent passing through a 1/2-inch sieve, a pH of 3.4 to 4.8, and a soluble-salt content measured by electrical conductivity of maximum 5 dS/m.
- C. Manure: Well-rotted, unleached, stable or cattle manure containing not more than 25 percent by volume of straw, sawdust, or other bedding materials; free of toxic substances, stones, sticks, soil, weed seed, debris, and material harmful to plant growth.

2.4 FERTILIZERS

- A. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:

1. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified testing agency.

PART 3 - EXECUTION

3.1 GENERAL

- A. Place planting soil and fertilizers according to requirements in other Specification Sections.
- B. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in planting soil.
- C. Proceed with placement only after unsatisfactory conditions have been corrected.

3.2 PLANTING BED AREA PREPARATION

- A. Remove existing grass and weeds from areas to receive planting bed application and legally dispose of off Owner's property. Where weeds are extensive, treat with selective herbicide.
- B. Loosen subgrade to a minimum depth of 12 inches. Remove stones larger than 1 inches in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.
- C. Mixing: Thoroughly blend planting bed area planting soil off-site or spread topsoil, apply soil amendments and fertilizer on surface, and thoroughly blend in place.
 1. Delay mixing fertilizer with planting soil if planting will not proceed within 3 days.
 2. Mix lime with dry soil before mixing fertilizer.
- D. Spread planting bed area planting soil to total depth of 12 inches, but not less than required to meet finish grades after mixing with amendments and natural settlement. Do not spread if soil or subgrade is frozen, muddy, or excessively wet.
 1. Spread approximately $\frac{1}{2}$ the thickness of unamended soil, amendments and fertilizer over loosened subgrade. Mix thoroughly into the top 4 inches of subgrade. Spread remainder of planting soil.
- E. Finish Grading: Grade planting soil to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.
- F. Application of Mycorrhizal Fungi: At time directed by Engineer, broadcast dry product uniformly over prepared soil at application rate recommended by Manufacturer.

3.3 PROTECTION

- A. Protect areas of in-place soil from additional compaction, disturbance, and contamination. Prohibit the following practices within these areas except as required to perform planting operations:
 - 1. Storage of construction materials, debris, or excavated material.
 - 2. Parking vehicles or equipment.
 - 3. Vehicle traffic.
 - 4. Foot traffic.
 - 5. Erection of sheds or structures.
 - 6. Impoundment of water.
 - 7. Excavation or other digging unless otherwise indicated.

- B. If planting soil or subgrade is overcompacted, disturbed, or contaminated by foreign or deleterious materials or liquids, remove the planting soil and contamination; restore the subgrade as directed by Engineer and replace contaminated planting soil with new planting soil.

3.4 CLEANING

- A. Protect areas adjacent to planting-soil preparation and placement areas from contamination. Keep adjacent paving and construction clean and work area in an orderly condition.

- B. Remove surplus soil and waste material including excess subsoil, unsuitable materials, trash, and debris and legally dispose of them off Owner's property unless otherwise indicated.

END OF SECTION 329113

JEFFERSON CO. US 31W m.p. 13.2
 N 38.166283, W 85.829426
 STATION 657 NORTHBOUND

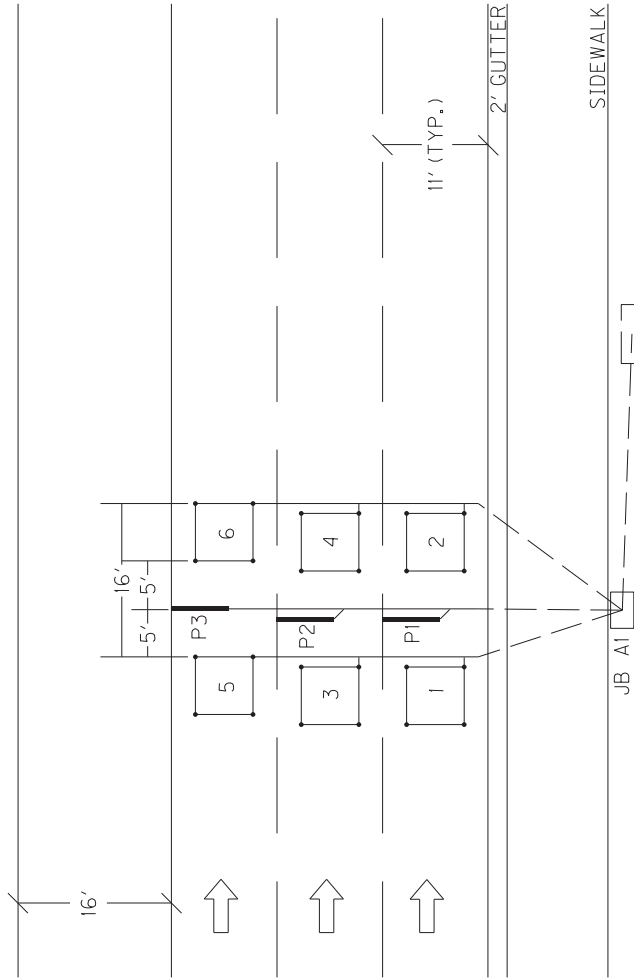
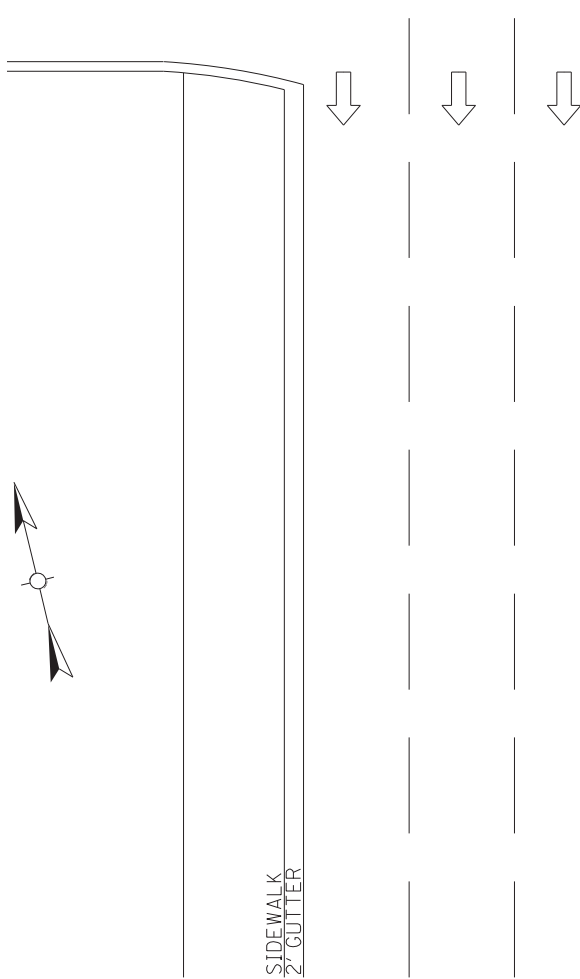
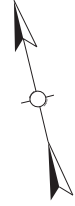
SITE LOCATION IS APPROXIMATE AND WILL BE DETERMINED IN THE FIELD AND APPROVED BY DIVISION OF PLANNING PERSONNEL PRIOR TO ANY CONSTRUCTION.

ALL LOOPS SHALL BE 6'X6' SQUARE AND SHALL BE INSTALLED 16' FROM LEADING EDGE TO LEADING EDGE AS SHOWN. PIEZOELECTRIC SENSORS (PIEZOS) SHALL BE INSTALLED 5' FROM THE EDGE OF LOOPS WITH THE EDGE OF EACH PIEZO FLUSH WITH THE EDGE OF THE CORRESPONDING DRIVING LANE. LOOPS AND PIEZOS SHALL BE INSTALLED SPLICE-FREE TO THE CABINET. BETWEEN 2' AND 3' OF WIRE FOR EACH SENSOR SHALL BE COILED AND LABELED INSIDE EACH JUNCTION BOX AND CABINET. DIVISION OF PLANNING PERSONNEL WILL CONNECT THE LOOPS AND PIEZOS INSIDE THE CABINET.

INSTALL ONE (1) TYPE A JUNCTION BOX (JB A1)

INSTALL ONE (1) 1/4" CONDUIT FROM EACH SAW SLOT TO JUNCTION BOX.

INSTALL ONE (1) 2" CONDUIT FROM JUNCTION BOX TO EX. CABINET.



EX. 20"x20"x8" CABINET
 DO NOT DISTURB

SIDEWALK
 2' GUTTER
 16'
 5'
 16'
 5'
 11' (TYP.)
 2' GUTTER
 SIDEWALK
 JB A1

JEFFERSON CO. US 31W m.p. 13.2
 N 38.166539, W 85.829732
 STATION 657 SOUTHBOUND

SITE LOCATION IS APPROXIMATE AND WILL BE DETERMINED IN THE FIELD AND APPROVED BY DIVISION OF PLANNING PERSONNEL PRIOR TO ANY CONSTRUCTION.

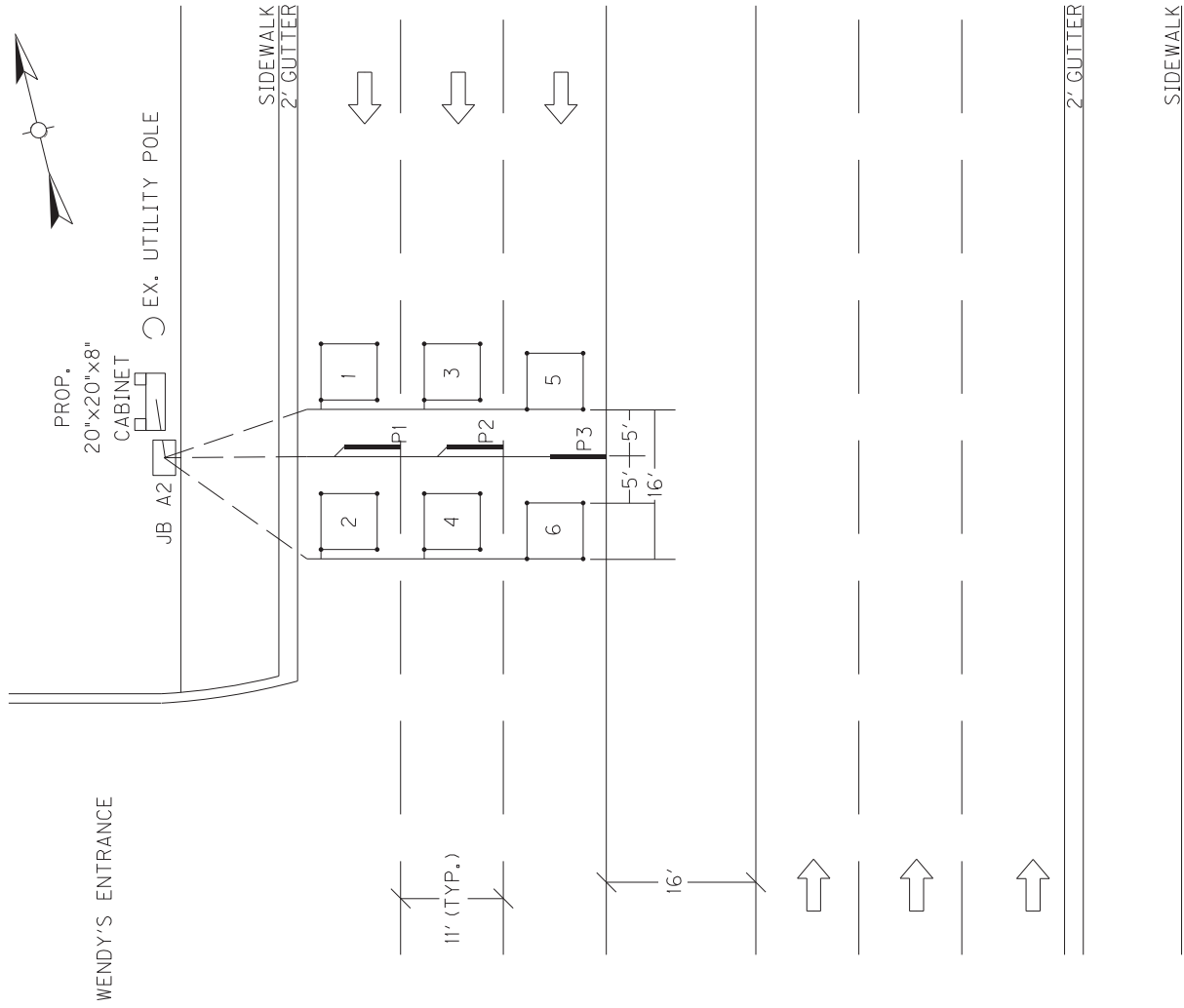
ALL LOOPS SHALL BE 6'X6' SQUARE AND SHALL BE INSTALLED 16' FROM LEADING EDGE TO LEADING EDGE AS SHOWN. PIEZOELECTRIC SENSORS (PIEZOS) SHALL BE INSTALLED 5' FROM THE EDGE OF LOOPS WITH THE EDGE OF EACH PIEZO FLUSH WITH THE EDGE OF THE CORRESPONDING DRIVING LANE. LOOPS AND PIEZOS SHALL BE INSTALLED SPICE-FREE TO THE CABINET. BETWEEN 2' AND 3' OF WIRE FOR EACH SENSOR SHALL BE COILED AND LABELED INSIDE EACH JUNCTION BOX AND CABINET. DIVISION OF PLANNING PERSONNEL WILL CONNECT THE LOOPS AND PIEZOS INSIDE THE CABINET.

INSTALL ONE (1) TYPE A JUNCTION BOX (JB A2)

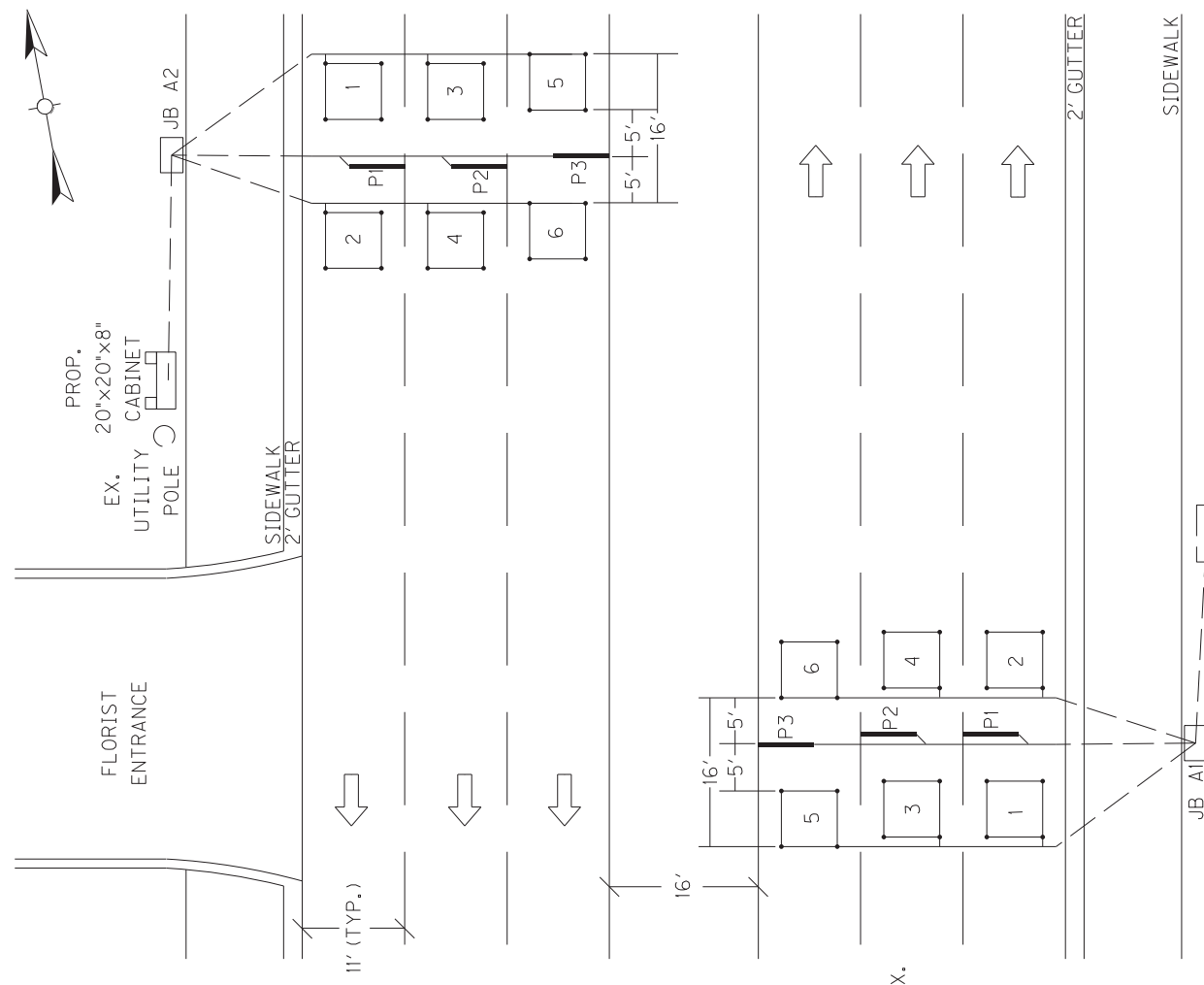
INSTALL ONE (1) 1/4" CONDUIT FROM EACH SAW SLOT TO JUNCTION BOX.

INSTALL ONE (1) 20"x20"x8" CABINET MOUNTED TO TWO (2) WOOD POSTS.

INSTALL ONE (1) 2" CONDUIT FROM JUNCTION BOX TO CABINET.



JEFFERSON CO. US 31W m.p. 14.3
N 38.179596, W 85.817392
STATION 660



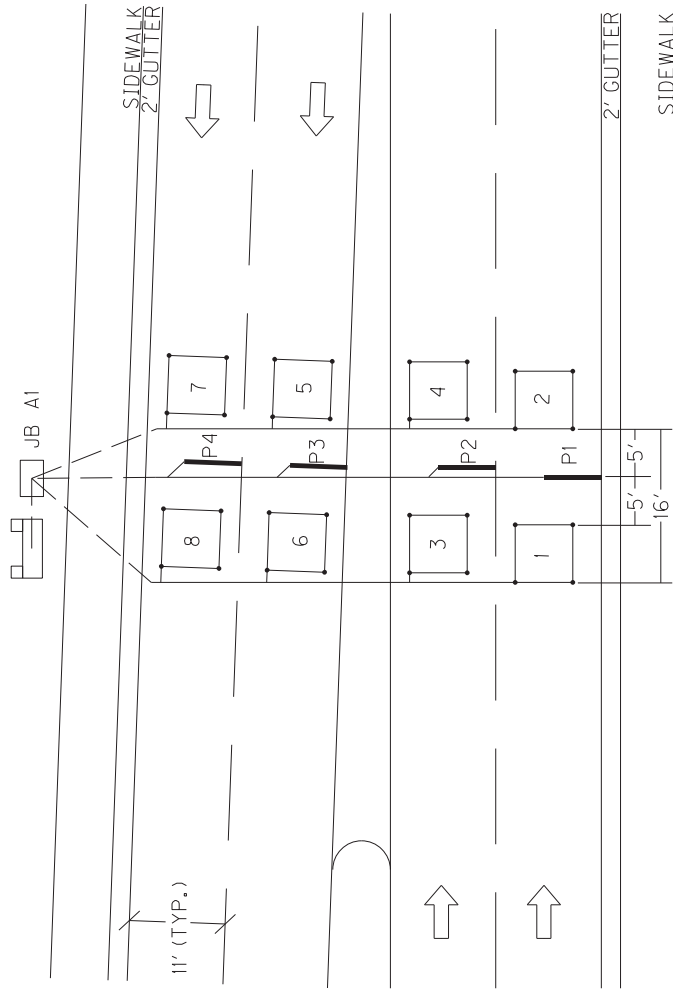
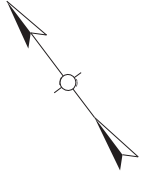
SITE LOCATION IS APPROXIMATE AND WILL BE DETERMINED IN THE FIELD AND APPROVED BY DIVISION OF PLANNING PERSONNEL PRIOR TO ANY CONSTRUCTION.

ALL LOOPS SHALL BE 6'X6' SQUARE AND SHALL BE INSTALLED 16' FROM LEADING EDGE TO LEADING EDGE AS SHOWN. PIEZOELECTRIC SENSORS (PIEZOS) SHALL BE INSTALLED 5' FROM THE EDGE OF LOOPS WITH THE EDGE OF EACH PIEZO FLUSH WITH THE EDGE OF THE CORRESPONDING DRIVING LANE. LOOPS AND PIEZOS SHALL BE INSTALLED SPLICE-FREE TO THE CABINET. BETWEEN 2' AND 3' OF WIRE FOR EACH SENSOR SHALL BE COILED AND LABELED INSIDE EACH JUNCTION BOX AND CABINET. DIVISION OF PLANNING PERSONNEL WILL CONNECT THE LOOPS AND PIEZOS INSIDE THE CABINET.

- INSTALL TWO (2) TYPE A JUNCTION BOXES (JB A1 AND A2)
- INSTALL ONE (1) 1/4" CONDUIT FROM EACH SAW SLOT TO NEAREST JUNCTION BOX.
- INSTALL ONE (1) 20"x20"x8" CABINET MOUNTED TO TWO (2) WOOD POSTS.
- INSTALL ONE (1) 2" CONDUIT FROM EACH JUNCTION BOX TO NEAREST CABINET.

EX. 20"x20"x8" CABINET
DO NOT DISTURB

JEFFERSON CO. US 31W m.p. 15.2
N 38.190319, W 85.809455
STATION 827



SITE LOCATION IS APPROXIMATE AND WILL BE DETERMINED IN THE FIELD AND APPROVED BY DIVISION OF PLANNING PERSONNEL PRIOR TO ANY CONSTRUCTION.

ALL LOOPS SHALL BE 6'X6' SQUARE AND SHALL BE INSTALLED 16' FROM LEADING EDGE TO LEADING EDGE AS SHOWN. PIEZOELECTRIC SENSORS (PIEZOS) SHALL BE INSTALLED 5' FROM THE EDGE OF LOOPS WITH THE EDGE OF EACH PIEZO FLUSH WITH THE EDGE OF THE CORRESPONDING DRIVING LANE. LOOPS AND PIEZOS SHALL BE INSTALLED SPLICE-FREE TO THE CABINET. BETWEEN 2' AND 3' OF WIRE FOR EACH SENSOR SHALL BE COILED AND LABELED INSIDE EACH JUNCTION BOX AND CABINET. DIVISION OF PLANNING PERSONNEL WILL CONNECT THE LOOPS AND PIEZOS INSIDE THE CABINET.

INSTALL ONE (1) TYPE A JUNCTION BOX (JB A1)

INSTALL ONE (1) 1/4" CONDUIT FROM EACH SAW SLOT TO JUNCTION BOX.

INSTALL ONE (1) 20"x20"x8" CABINET MOUNTED TO TWO (2) WOOD POSTS.

INSTALL ONE (1) 2" CONDUIT FROM JUNCTION BOX TO CABINET.

Permanent Traffic Data Acquisition Station
Estimate Of Quantities

Revised April, 2017

**PERMANENT TRAFFIC DATA ACQUISITION STATIONS
ESTIMATE OF QUANTITIES**

Bid Item Code	Description	Unit	657	660	827	Total
4793	CONDUIT 1 ¼ INCH	LIN FT	120	120	60	300
4795	CONDUIT 2 INCH	LIN FT	50	60	15	125
4820	TRENCHING AND BACKFILLING	LIN FT	160	170	70	340
4829	PIEZOELECTRIC SENSOR	EACH	6	6	4	16
4830	LOOP WIRE	LIN FT	2600	2750	1750	7100
4895	LOOP SAW SLOT AND FILL	LIN FT	750	750	300	1800
20359NN	GALVANIZED STEEL CABINET	EACH	1	1	1	3
20360ES818	WOOD POST	EACH	2	2	2	6
20391NS835	ELECTRICAL JUNCTION BOX TYPE A	EACH	2	2	1	5

MATERIAL, INSTALLATION, AND BID ITEM NOTES FOR PERMANENT TRAFFIC DATA ACQUISITION STATIONS

1. DESCRIPTION

Except as specified in these notes, all work shall consist of furnishing and installing all materials necessary for permanent data acquisition station equipment installation(s) and shall be performed in accordance with the current editions of:

- The Contract
- Division of Planning Standard Detail Sheets
- Kentucky Transportation Cabinet, Department of Highways, *Standard Specifications for Road and Bridge Construction*
- Kentucky Transportation Cabinet, Department of Highways, Standard Drawings
- National Fire Protection Association (NFPA) 70: *National Electrical Code*
- Institute of Electrical and Electronic Engineers (IEEE), *National Electrical Safety Code*
- Federal Highway Administration, *Manual on Uniform Traffic Control Devices*
- American Association of State Highway and Transportation Officials (AASHTO), *Roadside Design Guide*.
- Standards of the utility company serving the installation, if applicable

The permanent traffic data acquisition station layout(s) indicate the extent and general arrangement of the proposed installation and are for general guidance. Any omission or commission shown or implied shall not be cause for deviation from the intent of the plans and specifications. Information shown on the plans and in this proposal and the types and quantities of work listed are not to be taken as an accurate or complete evaluation of the material and conditions to be encountered during construction. The bidder must draw his own conclusion as to the conditions encountered. The Department of Highways (Department) does not give any guarantee as to the accuracy of the data and no claim will be considered for additional compensation if the conditions encountered are not in accordance with the information shown. If any modifications of the plans or specifications are considered necessary by the Contractor, details of such modifications and the reasons, therefore, shall be submitted in writing to the Engineer for written approval prior to beginning such modified work.

The Contractor shall contact all utility companies and the district utility agent prior to beginning construction to insure proper clearance and shielding from existing and proposed utilities. The Contractor shall use all possible care in excavating on this project so as not to disturb any existing utilities whether shown on the plans or not shown on the plans. Any utilities disturbed or damaged by the Contractor during construction shall be replaced or repaired to original condition by the Contractor at no cost to the department. If necessary, to avoid existing utilities, the Contractor shall hand dig areas where poles or conduit cross utilities.

Material, Installation, and Bid Item Notes for
Permanent Traffic Data Acquisition Stations

Revised April, 2017

The Contractor shall be responsible for all damage to public and/or private property resulting from his work.

The Contractor shall inspect the project site prior to submitting a bid and shall be thoroughly familiarized with existing conditions. Submission of a bid will be considered an affirmation of this inspection having been completed. The Department will not honor any claims resulting from site conditions.

2. MATERIALS

All proposed materials shall be approved prior to being utilized. The Contractor shall submit for material approval an electronic file of descriptive literature, drawings and any requested design data for the proposed materials. After approval, no substitutions of any approved materials may be made without the written approval of the Engineer.

Materials requiring sampling shall be made available a sufficient time in advance of their use to allow for necessary testing.

2.1. Anchoring

2.1.1. Anchor and Anchor Rod

Anchor, except rock anchor, shall be expanding type, with a minimum area of 135 square inches.

Anchor rod shall be galvanized steel, double-eye, have a minimum diameter of 5/8 inches, and a minimum length of 84 inches. Minimum holding capacity shall be 15,400 lbs.

Rock anchor shall be galvanized steel, triple-eye, expanding type, with a minimum diameter of 3/4 inch, a minimum 53 inches long, and a minimum tensile strength of 23,000 lb.

2.1.2. Guy Wire and Guy Guard

Guy wire shall be Class A, Zinc-coated, 3/8 inch diameter, high strength grade steel (minimum 10,800 lb.) and galvanized per ASTM A475. Guy guard shall be 8' long, fully-rounded, yellow, and able to be securely attached to the guy wire.

2.1.3. Strandwise for Guy Wire

Strandwise for guy wire shall be 3/8 inch and rated to hold a minimum of 90% of the rated breaking strength (RBS) of the strand used.

2.2. Asphalt

Asphalt shall be a minimum CL2 Asph Surf 0.38C PG64-22 and conform to the *Standard Specifications for Road and Bridge Construction*.

2.3. Backer Rod

Backer rod shall be 1/2 inch diameter, closed cell polyethylene foam and shall meet or exceed the following physical properties:

- Density (average): 2.0 lbs/cu.ft. (minimum): ASTM D 1622 test method
- Tensile Strength: 50 PSI (minimum): ASTM D 1623 test method
- Compression Recovery: 90% (minimum): ASTM D 5249 test method
- Water Absorption: 0.03 gm/cc (maximum): ASTM C 1016 test method

2.4. Cabinets

2.4.1. Galvanized Steel Cabinet

Galvanized Steel Cabinet shall be constructed of 16 or 14 gauge galvanized steel and shall meet or exceed the industry standards set forth by UL 50 and NEMA 3R. The finish shall be an ANSI 61 gray polyester powder finish inside and out over the galvanized steel. Cabinet shall have minimum inside dimensions of 20 inches high by 20 inches wide by 8 inches deep.

The cabinet shall be equipped with the following:

- Drip shield top
- Seam-free sides, front, and back, to provide protection in outdoor installations against rain, sleet, and snow
- Hinged cover with 16 gauge galvanized steel continuous stainless steel pin.
- Cover fastened with captive plated steel screws, knob or latch
- Hasp and staple for padlocking
- No gaskets or knockouts
- Back panel for terminal block installation
- Post mounting hardware
- Terminal Blocks

2.4.2. Anchor Bolt for Pad Mounted Cabinet

Anchor bolt for pad mounted cabinet shall be galvanized steel with minimum dimensions of 3/8 inch by 6 inches.

2.5. Concrete

Concrete shall be Class A and conform to the *Standard Specifications for Road and Bridge Construction*.

2.6. Conduit and Conduit Fittings

Conduit and conduit fittings shall be rigid steel unless otherwise specified.

Conduit shall be zinc galvanized inside and out and conform to the NEC, UL Standard 6, and ANSI C-80.1.

Rigid Steel Conduit Fittings shall be galvanized inside and out and conform to the NEC, UL Standard 514B, and ANSI C-80.4. Intermediate Metal Conduit (IMC) will not be approved as an acceptable alternative to rigid steel conduit.

2.7. Conduit sealant

Conduit sealant shall be weather-, mold-, and mildew-resistant and chemically resistant to gasoline, oil, dilute acids and bases. Conduit sealant shall be closed cell type and shall meet or exceed the following properties:

- Cure Time 20 minutes max.
- Density 64.4 kg/m³; 6 lbs/ft³
- Compressive Strength (ASTM 1691) 13.8 MPa; 330 or 300 psi

- Tensile Strength (ASTM 1623) 15.9 MPa; 270 or 250 psi
- Flexural Strength (ASTM D790) 14.5 MPa; 460 or 450 psi
- Service Temperature -20 to 200 F

2.8. Electrical Service Meter Base

Electrical service meter base shall meet or exceed all requirements of the National Electrical Code and the local utility providing the electrical service.

2.9. Electrical Service Disconnect

Electrical service disconnect shall meet or exceed all requirements of the National Electrical Code and the local utility providing the electrical service.

2.10. Flashing Arrow

Flashing Arrow shall conform to the *Standard Specifications for Road and Bridge Construction*.

2.11. Ground Fault Circuit Interrupter (GFCI) Receptacle

Ground Fault Circuit Interrupter Receptacle shall be 2-pole, 3-wire, 20 Amp, 125 Volt, 60 Hz, NEMA 5-20R configuration and meet or exceed the following standards and certifications:

- NEMA WD-1 and WD-6
- UL 498 and 943
- NOM 057
- ANSI C-73

This item shall include a UL listed, 4 inch x4 inch x 2¹/₈ inch box with ¾ inch side and end knockouts and a 1½ inches deep, single-receptacle cover to house the GFCI receptacle. Box and cover shall be hot rolled, galvanized steel with a minimum thickness of 0.62 inches.

2.12. Grounding

2.12.1. Ground Rod

Ground Rod shall be composite shaft consisting of a pure copper exterior (5 mil minimum) that has been inseparably molten welded to a steel core. Ground Rod shall have a minimum diameter of 5/8 inch, a minimum length of 8 feet and shall be manufactured for the sole purpose of providing electrical grounding.

2.12.2. Ground Rod Clamp

Ground rod shall be equipped with a one piece cast copper or bronze body with a non-ferrous hexagonal head set screw and designed to accommodate a 10 AWG solid through 2 AWG stranded grounding conductor.

2.13. Grout

2.13.1. Grout for Inductive Loop Installation

Grout for inductive loop installation shall be non-shrink, shall meet the requirements of the *Standard Specifications for Road and Bridge Construction*,

and shall be included on the KYTC Division of Materials, *List of Approved Materials*.

2.13.2. Grout for Piezoelectric Sensor Installation

Grout for piezoelectric sensor installation shall be per the piezoelectric sensor manufacturer's recommendation. Grout shall be suitable for installation in both asphalt and Portland cement pavements. Grout shall have a short curing time (tack free in ten minutes; open to traffic in forty minutes; and fully cured within sixty minutes) to prevent unnecessary lane closure time and should be of sufficient consistency to prevent running when applied on road surfaces with a drainage cross slope. Particulate matter within the grout shall not separate or settle and the grout shall not shrink during the curing process.

2.14. Hardware

Except where specified otherwise, all hardware such as nuts, bolts, washers, threaded ends of fastening devices, etc. with a diameter less than 5/8 inch shall be passivated stainless steel, alloy type 316 or type 304. Stainless steel hardware shall meet ASTM F593 and F594 for corrosion resistance. All other nuts and bolts shall meet ASTM A307 and shall be galvanized.

2.14.1. Conduit Strap

Conduit strap shall be double-hole, stainless steel, and sized to support specified conduit. Conduit strap shall attach to wood pole or post with two 2 1/4 inch wood screws.

2.14.2. Mounting Strap for Pole Mount Cabinet

Mounting strap for pole mount cabinet shall be 3/4 inch x 0.03 inch stainless steel; equipped with clips or buckles to securely hold strap.

2.14.3. Metal Framing Channel and Fittings

Metal framing channel shall be 1 5/8 inches wide galvanized steel that conforms to ASTM A1011 and ASTM A653. One side of the channel shall have a continuous slot with in-turned edges to accommodate toothed fittings.

Fittings shall be punch pressed from steel plates and conform to ASTM A575 and the physical requirements of ASTM A1011.

2.15. Junction Box

2.15.1. Junction Box Type A, B, or C

Junction Box Type A, B, or C shall meet or exceed ANSI/SCTE 77-2007, Tier 15. Box shall have an open bottom. A removable, non-slip cover marked "PLANNING" shall be equipped with a lifting slot and attached with a minimum of two 3/8 inch stainless steel hex bolts and washers. Type A Box shall have nominal inside dimensions of 13 inches wide by 24 inches long by 18 inches deep. Type B Box shall have nominal inside dimensions of 11 inches wide by 18 inches long by 12

inches deep. Type C Box shall have nominal inside dimensions of 24 inches wide by 36 inches long by 30 inches deep.

2.15.2. Aggregate for Junction Box Type A, B, or C

Aggregate for junction box type A, B, or C shall be gradation size no. 57 and conform to the *Standard Specifications for Road and Bridge Construction*.

2.15.3. Junction Box 10x8x4

Junction Box Type 10x8x4 shall be constructed of a UV-stabilized, nonmetallic material or non-rusting metal and be weatherproof in accordance with NEMA 4X. Box shall be equipped with an overhanging door with a continuous durable weatherproof gasket between the body and door. Door shall be hinged with stainless steel screws, hinge(s) and pin(s) and shall be equipped with a stainless steel padlockable latch on the side opposite the hinge(s). Junction Box 10x8x4 shall have minimum inside dimensions of 10 inches high by 8 inches wide by 4 inches deep.

2.16. Maintain and Control Traffic

Materials for the bid item Maintain and Control Traffic shall conform to the *Standard Specifications for Road and Bridge Construction*, and the KYTC Department of Highways *Standard Drawings*.

2.17. Piezoelectric Sensor

Piezoelectric sensor (piezo) shall provide a consistent level voltage output signal when a vehicle axle passes over it, shall have a shielded transmission cable attached, and shall meet the following requirements:

- Dimensions: such that sensor will fit in a ¾ inch wide by 1 inch deep saw cut. Total length shall be 6 feet unless specified otherwise.
- Output uniformity: ± 7% (maximum)
- Typical output level range: 250mV (minimum) from a wheel load of 400 lbs.
- Working temperature range: -40° to 160° F.
- Sensor life: 30 million Equivalent Single Axle Loadings (minimum)

Shielded transmission cable shall be coaxial and shall meet the following requirements:

- RG 58C/U with a high density polyethylene outer jacket rated for direct burial
- Length shall be a minimum of 100 feet. Installations may exceed 100 feet so the piezo shall be supplied with a lead-in of appropriate length so that the cable can be installed splice-free from the piezo to the cabinet.
- Soldered, water resistant connection to the sensor.

One installation bracket for every 6 inches of sensor length shall also be supplied. Piezo shall be a RoadTrax BL Class I or approved equal.

2.18. Saw Slot Sealant

Saw Slot Sealant shall be non-shrink, non-stringing, moisture cure, polyurethane

encapsulant suitable for use in both asphalt and concrete pavements. It shall provide a void-free encapsulation for detector loop cables and adequate compressive yield strength and flexibility to withstand heavy vehicular traffic and normal pavement movement.

The cured encapsulant shall meet or exceed the following:

- Hardness (Indentation): 35-65 Shore A, ASTM D2240
- Tensile Strength: 150 psi minimum, ASTM D412
- Elongation: 125% minimum 2 inch/minute pull, ASTM D412
- Tack-free Drying Time: 24 hours maximum, ASTM C679
- Complete Drying Time: 30 hours maximum, KM 64-447
- Chemical Interactions (seven day cure at room temperature, 24-hour immersion, KM 64-446):
 - Motor Oil: No effect
 - Deicing Chemicals: No effect
 - Gasoline: Slight swell
 - Hydraulic Brake Fluid: No effect
 - Calcium Chloride (5%): No effect

2.19. Seeding and Protection

Material for Seeding and Protection shall be Seed Mixture Type I and conform to the *Standard Specifications for Road and Bridge Construction*.

2.20. Signs

Materials for signs shall conform to the *Standard Specifications for Road and Bridge Construction*.

2.21. Splicing Materials

2.21.1. Electrical Tape

Electrical tape shall be a premium grade, UL-listed, all-weather, vinyl-insulating tape with a minimum thickness of 7 mil. Tape shall be flame retardant and resistant to abrasion, moisture, alkalis, acids, corrosion, and weather (including ultraviolet exposure).

2.21.2. Splice Kit

Splice kit shall be inline resin-type and rated for a minimum of 600V. Resin shall be electrical insulating-type and shall provide complete moisture and insulation resistance.

2.22. Steel Reinforcing Bar

Steel reinforcing bar shall be #5 and shall conform to the *Standard Specifications for Road and Bridge Construction*.

2.23. Terminal Block

Terminal block shall be rated for a minimum of 300 V and have a minimum of six

terminal pairs with 9/16-inch nominal spacing (center to center) for connecting loop and piezoelectric sensor wires to cable assemblies. Terminal block shall have screw type terminal strips to accommodate wire with spade-tongue ends.

2.24. Warning Tape

Warning tape shall be acid and alkali resistant formulated for direct burial. Tape shall be a minimum of 3 inches wide by 4.0 mils (nominal) thick, and shall be permanently imprinted with a minimum 1 inch black legend on a red background warning of an electric line. Tape shall meet or exceed the following industry specifications:

- American Gas Association (AGA) 72-D-56
- American Petroleum Institute (API) RP 1109
- American Public Works Association (APWA) Uniform Color Code
- Department of Transportation (DOT) Office of Pipeline Safety USAS B31.8
- Federal Gas Safety Regulations S 192-321 (e)
- General Services Administration (GSA) Public Buildings Service Guide: PBS 4-1501, Amendment 2
- National Transportation Safety Board (NTSB) PSS 73-1
- Occupational Safety and Health Administration (OSHA) 1926.956 (c) (1)

2.25. Wire and Cable

All cable and wire shall be plainly marked in accordance with the National Electrical Code (NEC).

2.25.1. Loop Wire

Loop wire shall be 14 AWG, stranded, copper, single conductor, and shall conform to the International Municipal Signal Association (IMSA) Specification No. 51-7.

2.25.2. Cable No. 14/1 Pair

Cable No. 14/1 pair loop lead-in cable shall be 14 AWG, stranded, copper paired, electrically shielded conductors, and shall conform to IMSA 19-2.

2.25.3. Grounding conductor

Grounding conductor and bonding jumper shall be solid or stranded, 4 AWG bare copper.

2.25.4. Service Entrance Conductor

Service entrance conductor shall be stranded, copper, Type USE-2, sized as required to comply with the NEC.

2.25.5. Terminal for electrical wire or cable

Terminal for electrical wires or cables shall be insulated, solderless, spade tongue terminals of correct wire and stud size. Terminal for electrical wires or cables shall be incidental to the wire or cable (including piezoelectric sensor transmission cable) to be connected to terminal strips.

2.26. Wood Post

Wood post shall be Southern Pine pretreated to conform to the American Wood Preservers' Association (AWPA) C-14 and shall have minimum dimensions of 4 inches by 4 inches by 8 feet long (for Galvanized Steel Cabinet) or 4 feet long (for Junction Box 10x8x4), sawed on all four sides with both ends square.

2.27. Wooden Pole

Wooden pole shall be a Class IV wood pole of the length specified and shall conform to the *Standard Specifications for Road and Bridge Construction* except the pole shall be treated in accordance with AWPA P9 Type A.

3. CONSTRUCTION METHODS

The plans indicate the extent and general arrangement of the installation and are for guidance. When the Contractor deems any modifications to the plans or specifications necessary, details of such changes and the reasons shall be submitted in writing to the engineer for written approval prior to beginning the modified work.

After the project has been let and awarded, the Division of Construction shall notify the Division of Planning of the scheduled date for a Pre-Construction meeting so that prior arrangements can be made to attend. This will allow the Division of Planning an opportunity to address any concerns and answer any questions that the Contractor may have before beginning the work.

The Division of Planning Equipment Management Team (502-564-7183) shall be notified a minimum of seven days before any work pertaining to these specifications begins to allow their personnel the option to be present during installation.

Unless otherwise specified, installed materials shall be new.

Construction involving the installation of loops or piezoelectric sensors shall not be performed when the temperature of the pavement is less than 38°F.

A final inspection will be performed by a member of the Central Office Division of Planning equipment staff after the installation is complete to verify that the installation is in compliance with the plans and specifications.

Any required corrective work shall be performed per the *Standard Specifications for Road and Bridge Construction*.

3.1. Anchoring

Furnish: Anchor, anchor rod, guy wire, strand vise, guy guard.

Anchor shall be installed in relatively dry and solid soil. Rock anchor shall be installed in solid rock. Excavate the hole at a 45° to 60° angle in line with the guy (hole size shall be slightly larger than the expanded anchor – see manufacturer's recommendation). Attach rod to anchor, install assembly into hole, and expand anchor. Backfill and tamp entire disturbed area. The effectiveness of the anchor is dependent upon the thoroughness of backfill tamping. Attach guy to strand vise on pole and anchor rod and tighten to required tension. Install guy guard on guy.

3.2. Bore and Jack Pipe – 2”

Furnish: Steel Encasement Pipe, 2”

Bore and jack pipe – 2” shall conform to the Section 706 of the *Standard Specifications for Road and Bridge Construction*.

3.3. Cleanup and Restoration

Furnish: Seed Mix Type 1 (as required); fertilizer (as required); agricultural limestone (as required); mulch or hydromulch (as required); tackifier (as required).

The Contractor shall be responsible for repairing any damage to public and/or private property resulting from his work. Upon completion of the work, restore all disturbed highway features in like kind design and materials. This shall include filling any ruts and leveling ground appropriately. Contractor shall dispose of all waste and debris off the project. Sow all disturbed earthen areas with Seed Mix Type 1 per Section 212 of the *Standard Specifications for Road and Bridge Construction*. All materials and labor necessary for cleanup and restoration shall be considered incidental to other bid items.

3.4. Conduit

Furnish: Conduit; conduit fittings; bushings (grounding where required); LB condulets (as required); weatherheads (as required); conduit straps; hardware; conduit sealant.

Conduit that may be subject to regular pressure from traffic shall be laid to a minimum depth of 24 inches below grade. Conduit that will not be subject to regular pressure from traffic shall be laid to a minimum depth of 18 inches below grade.

Conduit ends shall be reamed to remove burrs and sharp edges. Cuts shall be square and true so that the ends will butt together for the full circumference of the conduit. Tighten couplings until the ends of the conduit are brought together. Do not leave exposed threads. Damaged portions of the galvanized surfaces and untreated threads resulting from field cuts shall be painted with an Engineer-approved, rust inhibitive paint. Conduit bends shall have a radius of no less than 12 times the nominal diameter of the conduit, unless otherwise shown on the plans.

Contractor shall install a bushing (grounding bushing where required) on both ends of all conduits. Cap spare conduits on both ends with caps or conduit sealant.

Conduit openings in junction boxes and cabinets shall be waterproofed with a flexible, removable conduit sealant, working it around the wires, and extending it a minimum 1 inch into the end of the conduit.

After the conduit has been installed and prior to backfilling, the conduit installation shall be inspected and approved by the Engineer.

3.5. Electrical Service

Furnish: Meter base, service disconnect, wire, GFCI AC duplex receptacle with box and cover; conduit, conduit fittings, bushings (grounding where required); LB condulets (as required); weatherhead; conduit straps; hardware; conduit sealant; ground rod with clamp; grounding conductor.

Prior to any construction, the Contractor shall initiate a work order with the local power

company for the installation of electrical service to the site. A representative from the Division of Planning and the local power company shall be consulted prior to choosing an exact location for the pole. The Contractor shall clear the right-of-way for the electrical service drop.

Contractor shall obtain electrical inspections, memberships, meter base, service disconnect and any other requirements by the utility serving the installation and pay all fees as required.

Install meter-base and disconnect panel with a 30-ampere, fused, circuit breaker inside. Install a manufactured weatherproof hub connectors to connect the conduit to the top of the meter base and service disconnect.

Install a rigid $\frac{3}{4}$ inch conduit with three 8 AWG service conductors from the cabinet, through the service disconnect to the meter base and a $1\frac{1}{4}$ " conduit with three 8 AWG service conductors from the meter base to a weatherhead two feet from the top of the electrical service pole. Install conduit straps 30 inches on center and provide a drip loop where the wire enters the weatherhead. Splice electric drop with service entrance conductors at the top of the pole.

The limit of conduit incidental to "Install Electrical Service" for a pad mounted cabinet is 24 inches beyond face of service pole.

Install a 120-volt, 20-amp GFCI AC duplex receptacle with box and cover in the automatic data recorder (ADR) cabinet.

Install a ground rod with clamp. Install a grounding conductor wire from the meter base, through the disconnect panel, to the ground rod clamp. Install grounding conductor in $1\frac{3}{4}$ " conduit from service disconnect to ground rod.

After completing the installation and before the electrical service is connected, obtain a certificate of compliance from the Kentucky Department of Housing, Buildings and Construction, Electrical Inspection Division.

3.6. Flashing Arrow

Furnish: Arrow Panel

Construction of Flashing Arrow shall conform to the *Standard Specifications for Road and Bridge Construction*.

3.7. Galvanized Steel Cabinet

Furnish: Cabinet; wood posts; concrete; conduit fittings; metal framing channel; pipe clamp; terminal block(s); spade tongue wire terminals; wire labels; hardware.

Where right-of-way allows, locate the cabinet such that it is outside the clear zone in accordance with the *Roadside Design Guide*. Install Cabinet such that the door of the

cabinet faces the roadway.

Excavate as required and install wood posts to a depth of 36 inches and place concrete around posts as shown on the standard detail sheets. Install metal framing channel with pipe clamp between posts.

Install Cabinet on wood posts 38 inches above the finished grade as shown on the standard detail sheets. Install a unistrut between posts when two posts are specified.

Install the required number of terminal blocks on the cabinet back plate. Install a spade tongue terminal on each loop and piezo sensor wire entering the cabinet and connect wires to terminal block(s). Wiring shall be neat and orderly. Label all wires and cables inside cabinet.

Install conduit from ground to cabinet and attach to pipe clamp. Install locknuts to attach conduit to cabinet and install a conduit bushing as shown on the standard detail sheets.

3.8. Grounding

Furnish: Ground rod with clamp; grounding conductor.

At sites with electrical or solar service, all conduits, poles, and cabinets shall be bonded to ground rods and the electrical system ground to form a complete grounded system.

Install such that top of ground rod is a minimum of 3 inches below finished grade.

Grounding systems shall have a maximum 25 ohms resistance to ground. If the resistance to ground is greater than 25 ohms, two or more ground rods connected in parallel shall be installed. Adjacent ground rods shall be separated by a minimum of 6 feet.

3.9. Install Pad Mount Enclosure

Furnish: Concrete; anchor bolts with washers and nuts; conduit; conduit fittings; conduit grounding bushings; ground rod with clamp; grounding conductor; conduit sealant; wooden stakes (where required); wire labels; hardware.

The Contractor shall be responsible for securing the enclosure from the Central Office Division of Planning Warehouse in Frankfort and transporting it to the installation site.

Where right-of-way allows, locate the enclosure such that it is outside the clear zone in accordance with the *Roadside Design Guide*.

Excavate as required, and place concrete to construct the enclosure foundation as specified on the standard detail sheets. Install enclosure on the concrete base such that the door(s) of the enclosure opens away from traffic (hinges away from traffic). Install anchor bolts, washers, and nuts to secure the enclosure to the foundation.

Install ground rod with clamp and install one ¾ inch rigid conduit from enclosure base to

ground rod. Install a grounding conductor from ground rod to enclosure base and bond to each conduit bushing in the base.

Install one ¾ inch rigid steel conduit for electrical service from the base of the enclosure to 24 inches beyond the concrete base. Make all field wiring connections to the electrical service, as applicable.

If electrical service is not provided as a bid item in the contract, plug conduit on both ends with a cap, conduit sealant, or electrical tape. Mark the location of the buried conduit end with a wooden stake labeled “¾ in. conduit.”

Install specified rigid steel conduit(s) into the base of the enclosure for sensor wire entry. Install one spare 2 inch conduit from the enclosure base to 2 feet beyond the concrete base. Plug spare conduit on both ends with a cap, conduit sealant or electrical tape.

The limit of all conduits incidental to “Install Pad Mount Enclosure” is 24 inches beyond the edge of the concrete base.

Wiring in enclosure shall be neat and orderly. Label all wires and cables inside enclosure. KYTC personnel will furnish and install terminal blocks and connect sensors to terminal blocks.

3.10. Install Controller Cabinet

Furnish: Mounting brackets; mounting straps; conduit; LB condulets; conduit fittings; conduit grounding bushings; ground rod with clamp; grounding conductor; cable staples; conduit sealant; wooden stakes (where required); wire labels; hardware.

The Contractor shall be responsible for securing the cabinet from the Central Office Division of Planning Warehouse in Frankfort and transporting it to the installation site. Any existing holes in the cabinet not to be reused shall be covered or plugged to meet NEC requirements.

Install mounting brackets and secure cabinet to pole with mounting straps.

Install a ground rod with clamp. Install grounding conductor in 1-¾” conduit from cabinet to ground rod.

Install one ¾ inch rigid steel conduit with two lb condulets from cabinet to electrical service disconnect box. Make all field wiring connections to the electrical service, as applicable.

If electrical service is not provided as a bid item in the contract, plug conduit on both ends with cap, plumbers putty, conduit sealant, or electrical tape. Mark the location of the buried conduit end with a wooden stake labeled “¾ in. conduit”.

Install specified rigid steel conduit(s) and type LB condulet(s) into the bottom of the

cabinet for sensor wire entry. The limit of conduits incidental to "Install Controller Cabinet" is 24 inches beyond the face of the pole.

Wiring in cabinet shall be neat and orderly. Label all wires and cables inside cabinet. KYTC personnel will furnish and install terminal blocks and connect sensors to terminal blocks.

3.11. Junction Box Type 10x8x4

Furnish: Junction box; wood post; conduit fittings; wire labels; hardware.

Where right-of-way allows, locate the junction box such that it is outside the clear zone in accordance with the Roadside Design Guide.

Excavate as required and install wood post(s) to a depth of 18 inches. Install junction box on wood post such that the bottom of the box is 18 inches above the finished grade as shown on the standard detail sheets. Box shall be installed with four (4) 2½ inch wood screws and washers.

Install locknuts to attach conduit to junction box and install a conduit bushing as shown on the standard detail sheets.

Wiring inside box shall be neat and orderly. Label all wires and cables inside box.

3.12. Junction Box Type A, B, or C

Furnish: Junction box, No. 57 aggregate; grounding conductor

Excavate as required and place approximately 12 inches of No. 57 aggregate beneath the proposed junction box to allow for drainage. Install specified junction box type A, B, or C near the edge of pavement, flush with finished grade per the detail sheets. Where required, orient the box so that the dimensions comply with the National Electrical Code. Stub conduits with grounding bushings into junction box at its base to accommodate wires and connect grounding conductor to all grounding bushings. Backfill to existing grade, and restore disturbed area to the satisfaction of the Engineer.

Wiring inside box shall be neat and orderly. Label all wires and cables inside box.

3.13. Loops - Proposed

Furnish: Wire; saw slot sealant; backer rod; grout; conduit sealant.

The plans and notes specify the approximate location for loop installations. Prior to sawing slots or drilling cores, the Contractor shall meet with a representative of the Division of Planning to verify the precise layout locations on site. Avoid expansion joints and pavement sections where potholes, cracks, or other roadway flaws exist.

Upon completion of this meeting, the Contractor shall measure out and mark the proposed loop locations with spray paint or chalk such that the saw slots will be parallel

and perpendicular to the direction of traffic. Marked lines shall be straight and exact to the locations determined and sized as shown on the plans. Unless indicated otherwise, loops shall be 6 feet by 6 feet square and loops in the same lane shall be spaced 16 feet from leading edge to leading edge.

On resurfacing, rehabilitation, and new construction projects that include new asphalt pavement, the Contractor shall install loops prior to laying the final surface course. On projects with milling and texturing, the Contractor may install the loops prior to or after the milling operation; however, if installed prior to milling, the Contractor shall be responsible for ensuring that the loops are installed at a depth such that the milling operation will not disturb the newly installed loops. The Contractor shall correct damage caused by the milling operations to newly installed loops prior to placement of the final surface course at no additional cost to the Cabinet.

For projects that include the installation of new asphalt and piezoelectric sensors, the Contractor shall mark or otherwise reference all loops installed prior to the final surface course such that the loops can be accurately located when the piezoelectric sensors are installed after placement of the final surface course.

For projects that do not have asphalt surfacing, the Contractor shall install the loops in the surface of the pavement.

The Prime Contractor shall coordinate the installation of loops with the electrical sub-Contractor and the Engineer to ensure correct operation of the completed installation.

The following is a typical step by step procedure for the installation of a loop.

- Carefully mark the slot to be cut, perpendicular to the flow of traffic and centered in the lane.
- Make each saw-cut 3/8-inch wide and at a depth such that the top of the backer rod is a minimum of 2 inches below the surface of rigid (PCC/Concrete) pavement or 4 inches below the surface of asphalt pavement.
- Drill a 1½ inch core hole at each corner and use a chisel to smooth corners to prevent sharp bends in the wire.
- Clean ALL foreign and loose matter out of the slots and drilled cores and within 1 foot on all sides of the slots using a high pressure washer.
- Completely dry the slots and drilled cores and within 1 foot on all sides of the slots using oil-free forced air, torpedo heaters, electric heaters, or natural evaporation, depending on weather conditions. Be very careful not to burn the asphalt if heat is used.
- Measure 9-12 inches from the edge of the paved surface (shoulder break or face of curb) and drill a 1½ inch hole on a 45° angle to the conduit adjacent to the roadway.
- Closely inspect all cuts, cores, and slots for jagged edges or protrusions prior to the placement of the wire. All jagged edges and protrusions shall be ground or re-cut and cleaned again.

- Place the loop wire splice-free from the termination point (cabinet or junction box) to the loop, continue around the loop for four turns, and return to the termination point.
- Push the wire into the saw slot with a blunt object such as a wooden stick. Make sure that the loop wire is pushed fully to the bottom of the saw slot.
- Install conduit sealant to a minimum of 1" deep into the cored 1½ inch hole.
- Apply loop sealant from the bottom up and fully encapsulate the loop wires in the saw slot. The wire should not be able to move when the sealant has set.
- Cover the encapsulated loop wire with a continuous layer of backer rod along the entire loop and home run saw slots such that no voids are present between the loop sealant and backer rod.
- Finish filling the saw cut with non-shrinkable grout per manufacturer's instructions. Alleviate all air pockets and refill low spaces. There shall be no concave portion to the grout in the saw slot. Any excess grout shall be cleaned from the roadway to alleviate tracking.
- Clean up the site and dispose of all waste off the project.
- Ensure that the grout has completely cured prior to subjecting the loop to traffic. Curing time varies with temperature and humidity.

Exceptions to installing loop wire splice-free to the junction box or cabinet may be considered on a case-by-case basis and must be pre-approved by the Engineer. If splices are allowed, they shall be located in a junction box and shall conform to the construction note for Splicing.

If loop lead-in cable (Cable No. 14/1 Pair) is specified, cable shall be installed splice free to the cabinet ensuring that extra cable is left in each junction box or cabinet. All wires and cables shall be labeled in each junction box and cabinet.

Loop inductance readings shall be between 100 and 300 microhenries. The difference of the loop inductance between two loops in the same lane shall be ± 20 microhenries. Inductance loop conductors shall test free of shorts and grounds. Upon completion of the project, all loops must pass an insulation resistance test of a minimum of 100 million ohms to ground when tested with a 500 Volt direct current potential in a reasonably dry atmosphere between conductors and ground.

3.14. Loops – Existing

When noted on a data collection station layout sheet that there are existing inductive loops within the limits of the project, notify the Engineer in writing, a minimum of 14 calendar days prior to beginning milling operations. After milling and prior to placing asphalt inlay, conduct an operating test on the existing inductance loops at the control cabinet in the presence of the Engineer to determine if the inductance loop conductors have an insulating resistance of a minimum of 100 megohms when tested with a 500 volt direct current potential in a reasonably dry atmosphere between conductors and ground. The Department may also conduct its own tests with its own equipment.

If the tests indicate the loop resistances are above the specified limit and the Engineer determines the system is operable, proceed with the asphalt inlay. If the test indicates the loop resistance is not within the specified limits or if the Engineer determines the system is otherwise not operable, prior to placing the asphalt inlay install and test new loop detectors according to the station layout, notes, and Detail Drawings.

The Engineer will contact and maintain liaison with the District Planning Engineer and the Division of Planning in order to coordinate any necessary work.

3.15. Maintain and Control Traffic

Furnish (all as required): Drums, traffic cones, barricades used for channelization purposes, delineators, and object markers.

Maintain and Control Traffic shall conform to the plans, the Standard Specifications for Road and Bridge Construction, and the KYTC Department of Highways Standard Drawings.

3.16. Open Cut Roadway

Furnish: Concrete, reinforcing bars.

Excavate trench by sawing and chipping away roadway to dimensions as indicated on the detail sheets. After placing conduit, install concrete and steel reinforcing bars per the *Standard Specifications for Road and Bridge Construction*. Restore any disturbed sidewalk to its original condition.

3.17. Piezoelectric Sensor

Furnish: Piezoelectric sensor and cable; sensor support brackets; saw slot sealant; backer rod; grout; conduit sealant.

The plans and notes specify the approximate location for piezoelectric sensor (piezo) installations. Prior to sawing slots or drilling cores, the Contractor shall meet with a representative of the Division of Planning to verify the final layout on site. Avoid expansion joints and pavement sections where potholes, cracks, or other roadway flaws exist. Roadway ruts at the proposed piezo location shall not be in excess of 1/2 inch under a 4-foot straight edge.

Install the piezo perpendicular to traffic in the final surface course of the pavement. Locate the sensor in the lane as shown on the site layout drawing. Eleven-foot length sensors shall be centered in the lane.

The following is a typical step by step procedure for the installation of a piezo. Refer specifically to the manufacturer's instructions provided with the sensor prior to installation.

- Carefully mark the slot to be cut, perpendicular to the flow of traffic and properly positioned in the lane.

- It is strongly recommended that a ¾ inch wide diamond blade be used for cutting the slot, or that blades be ganged together to provide a single ¾ inch wide cut. The slot shall be wet cut to minimize damage to the pavement.
- Cut a slot ¾ inch wide ($\pm 1/16$ inch) by 1 inch minimum deep. The slot should be a minimum of 2 inches longer than the sensor (including the lead attachment). Drop the saw blade an extra ½ inch down on both ends of the sensor. The lead out of the passive cable should be centered on the slot.
- Cut the slot for the passive cable ¼ inch wide and at a depth so that the top of the backer rod is a minimum of 2 inches below the road surface.
- Clean ALL foreign and loose matter out of the slot and within 1 foot on all sides of the slot using a high pressure washer.
- Completely dry the slot and within 1 foot on all sides of the slot using oil-free forced air, torpedo heaters, electric heaters, or natural evaporation, depending on weather conditions. Be very careful not to burn the asphalt if heat is used.
- Measure 9-12 inches from the edge of the paved surface (shoulder break or face of curb) and drill a 1½ inch hole on a 45° angle to the conduit adjacent to the roadway.
- Place strips of 2-4 inch wide tape strips on the pavement along the lengths of both sides of the sensor slot, 1/8 inch away from the slot.
- Wear clean, protective latex (or equivalent) gloves at all times when handling sensors. Visually inspect sensor to ensure it is straight. Check lead attachment and passive cable for cuts, gaps, cracks and/or bare wire. Verify that the correct sensor type and length is being installed by checking the data sheet. Verify there is sufficient cable to reach the cabinet. Piezo lead-in cable shall not be spliced.
- Test the sensor for capacitance, dissipation factor and resistance, according to the directions enclosed with the sensor. Capacitance and dissipation should be within $\pm 20\%$ of the piezo data sheet. Resistance (using the 20M setting) should be infinite. Record the sensor serial number and the test results and label “pre-installation.” This information should be stored in the counter cabinet and/or returned to Department Planning personnel.
- Lay the sensor next to the slot and ensure that it is straight and flat.
- Clean the sensor with steel wool or an emery pad and wipe with alcohol and a clean, lint-free cloth.
- Place the installation bracket clips every 6 inches along the length of the sensor.
- Bend the tip of the sensor downward at a 30° angle. Bend the lead attachment end down at a 15° angle and then 15° back up until level (forming a lazy Z).
- Place the sensor in the slot, with the brass element 3/8 inch below the road surface along the entire length. The tip of the sensor should be a minimum of 2 inches from the end of the slot and should not touch the bottom of the slot. The top of the plastic installation bracket clips should be 1/8 inch below the surface of the road. The lead attachment should not touch the bottom or sides of the slot. Ensure the sensor ends are pushed down per the manufacturer’s instructions.
- Visually inspect the length of the sensor to ensure it is at uniform depth along its length and it is level (not twisted, canted or bent).

- On the passive cable end, block the end of the slot approximately 3-5 inches beyond the end of the lead attachment area creating an adequate “dam” so that the sensor grout does not flow out.
- Use one bucket of sensor grout per piezo installation. Overfill the slot with sensor grout and allow to cure for a minimum of 10 minutes before continuing with the installation. Ensure that sensor grout fills around and beneath the sensor completely and that there is not a trough on top.
- Remove the tape along the sides of the saw slot when the adhesive starts to cure.
- Carefully remove the dam from the end of the sensor.
- Route the lead-in cable through the saw slot
- Install conduit sealant to a minimum of 1” deep into the cored 1½ inch hole.
- Cover the lead-in cable with encapsulant, backer rod, and grout.
- If necessary, after the grout has hardened, grind with an angle grinder until the profile is a 1/16 inch mound. There shall be no concave portion to the mound.
- Clean up the site and dispose of all waste off the project.
- Ensure that the sensor grout has completely cured prior to subjecting the sensor to traffic. Curing time will vary with temperature and humidity.

Upon installation, test the sensor for capacitance, dissipation factor and resistance, according to the directions enclosed with the sensor. Capacitance and dissipation should be within $\pm 20\%$ of the piezo data sheet. Resistance (using the 20M setting) should be infinite. Perform a functional test of the piezo with an oscilloscope to ensure that the sensor is generating a proper response to the passage of vehicles.

Record the sensor serial number and the test results and label “post-installation.” This information should be stored in the counter cabinet and/or returned to Department Planning personnel.

3.18. Pole – Wooden

Furnish: Pole; anchoring equipment (as required); hardware (as required).

Excavate and install wood pole to a minimum depth of one-sixth the total pole height. Place backfill material in hole and compact until flush with existing grade. Install guy wire, guy guard, anchor, anchor rod, and strand vise, if necessary. Anchor shall be a minimum of one-third the pole height from the face of the pole. Provide temporary erosion control, seeding, protection and restoration of disturbed areas to the satisfaction of the Engineer.

3.19. Removal of Existing Equipment

The Contractor shall remove existing materials (including but not limited to: poles, anchors, cabinets, junction boxes, conduit and wire) not to be reused. Contractor shall dispose of all removed materials off the project. All materials and labor necessary for the removal of existing equipment shall be considered incidental to other bid items.

3.20. Signs

Furnish: Signs; sign standards; hardware.

Construction of signs shall conform to the *Standard Specifications for Road and Bridge Construction*.

3.21. Splicing

Furnish: Splice kit; solder.

These notes describe the splicing process (if permitted) and are not intended to grant permission to splice. Permission to splice shall be determined by the Division of Planning and the locations shall be shown on the layout sheet. If splicing is needed but not shown on the layout sheet, the Contractor shall receive prior written approval from the Division of Planning.

All splices shall conform to the provisions of the NEC.

Splices for loop and loop lead-in wire shall be twisted and soldered. Abrade the outer jacket of both wires to promote good adhesion and prevent capillary leak paths. Seal the splice with an electrical sealing resin. Spliced loop conductors shall test free of shorts and unauthorized grounds and shall have an insulating resistance of at least 100 megohms when tested with a 500 volt direct current potential in a reasonably dry atmosphere between conductors and ground.

For piezos, the same type coax cable, supplied by the manufacturer, shall be used to splice to the sensor's lead-in cable. Cables shall be soldered. Abrade the outer jacket of both cables to promote good adhesion and prevent capillary leak paths. Seal the splice with an electrical sealing resin. Spliced piezo cables shall be tested and have a minimum resistance of 20 megohms, a maximum dissipation factor of 0.03, a capacitance within the manufacturer's recommended range based upon the length of additional cable. A functional test of the piezo shall be performed to ensure that the sensor is generating a proper response to the passage of vehicles.

3.22. Trenching and Backfilling

Furnish: Warning tape; seed mix type I; cereal rye or German foxtail-millet; mulch; concrete (as required); asphalt (as required).

Excavate trench and provide required cover as shown on the standard detail sheets. After placing conduit, backfill material shall be placed and compacted in lifts of 9 inches or less. Install warning tape as shown on the detail sheet. Provide temporary erosion control, seeding, protection and restoration of disturbed areas to the satisfaction of the Engineer. This item shall include concrete, asphalt or approved replacement material for sidewalks, curbs, roadways, etc. (if required).

3.23. Wiring

Furnish: Wire; wire labels; spade tongue wire terminals (as required).

Installation of all wiring shall conform to the NEC. Permanent identification numbers shall be affixed to all wires in all junction boxes and cabinets (see Layout(s) for loop and piezo numbers).

Additional lengths of each loop and piezo sensor wire shall be neatly coiled in all cabinets and junction boxes as follows:

<u>Enclosure Type</u>	<u>Additional length of each wire</u>
Galvanized Steel Cabinet	2' - 3'
Pad Mount Cabinet (332)	6' - 8'
Pole Mount Cabinet (336)	3' - 4'
Junction Box Type 10x8x4	2' - 3'
Junction Box Type A, B, or C	2' - 3'

3.24. Wood Post

Furnish: Wood post; concrete (as required); seed mix type I; cereal rye or German foxtail-millet; mulch.

Excavate hole to specified depth and place concrete, if required. Install post, backfill to existing grade, and tamp backfill. Provide temporary erosion control, seeding, protection and restoration of disturbed areas to the satisfaction of the Engineer.

4. BID ITEM NOTES AND METHOD OF MEASUREMENT FOR PAYMENT

Only the bid items listed will be measured for payment. All other items required to complete the vehicle detection installation shall be incidental to other items of work. Payment at the contract unit price shall be full compensation for all materials, labor, equipment and incidentals to furnish and install these items.

4.1. Bore and Jack Pipe – 2”

Bore and jack pipe – 2” shall be furnished, installed, and measured for payment per the *Standard Specifications for Road and Bridge Construction*.

4.2. Conduit

Conduit shall include furnishing and installing specified conduit in accordance with the specifications. This item shall include conduit fittings, bodies, boxes, weatherheads, expansion joints, couplings, caps, conduit sealant, electrical tape, clamps, bonding straps and any other necessary hardware. Conduit will be measured in linear feet.

4.3. Electrical Service

Electrical Service shall include furnishing and installing all necessary materials and payment of all fees toward the complete installation of an electrical service which has passed all required inspections. Incidental to this item shall be furnishing and installing:

- Meter-base per utility company’s specifications
- Service disconnect panel per utility company’s specifications
- Meter base and service disconnect entrance hubs, waterproof
- Service entrance conductors
- Rigid steel conduit
- Rigid steel conduit fittings
- Conduit straps
- Weatherhead
- Duplex GFCI receptacle, 120-volt, 20-amp
- Ground rod with clamp
- Grounding conductor

Also incidental to this item shall be any necessary clearing of right of way for the electrical service drop.

Electrical service will be measured in individual units each.

4.4. Flashing Arrow

Flashing Arrow shall be furnished, installed, and measured for payment per the *Standard Specifications for Road and Bridge Construction*.

4.5. Galvanized Steel Cabinet

Galvanized Steel Cabinet shall include furnishing and installing galvanized steel cabinet on post as specified. Incidental to this item shall be furnishing and installing grounding hardware, and any necessary post/pole mounting hardware. Also incidental to this item shall be furnishing and installing the required number of terminal blocks and connection of all

sensors to the terminal blocks. Galvanized Steel Cabinet will be measured in individual units each.

4.6. Install Pad Mount Enclosure

Install Pad Mount Enclosure shall include installing a Department-furnished enclosure as specified on the detail sheets.

This item shall include obtaining the enclosure from KYTC and transporting it to the installation site and furnishing and installing the following:

- Concrete foundation (including any excavation necessary)
- Anchor bolts, lock washers, and nuts
- Conduit
- Conduit fittings (including grounding bushings)
- Weatherhead
- Terminal Strip(s)
- Ground rod with clamp
- Grounding conductor

Install Pad Mount Enclosure will be measured in individual units each.

4.7. Install Controller Cabinet

Install Controller Cabinet shall include installing a Department-furnished cabinet as specified on the detail sheets.

This item shall include obtaining the cabinet from KYTC and transporting it to the installation site and furnishing and installing the following:

- Conduit
- Conduit Fittings
- Terminal Strip(s)
- Ground rod with clamp
- Grounding conductor

Install Controller Cabinet will be measured in individual units each.

4.8. Junction Box Type 10" x 8" x 4"

Junction Box Type 10"x8"x4" shall include furnishing and installing specified junction box in accordance with the specifications. This item shall include connectors, splice sleeves, conduit fittings, mounting materials and any other items required to complete the installation. Incidental to this item shall be furnishing and installing specified post (wood, channel, metal, etc.) as required for the installation. Junction Box Type 10"x8"x4" will be measured in individual units each.

4.9. Junction Box Type A, B, or C

Junction Box Type A, B, or C shall include furnishing and installing specified junction box in accordance with the specifications. This item shall include excavation, furnishing and installing #57 aggregate, backfilling around the box, and restoration of disturbed areas to the satisfaction of the Engineer. Incidental to this item shall be furnishing and installing a

grounding conductor bonding all conduit grounding bushings in the box. Junction Box Type A, B, or C will be measured in individual units each.

4.10. Loop Saw Slot and Fill

Loop Saw Slot and Fill shall include sawing and cleaning saw slots and furnishing and installing conduit sealant, loop sealant, backer rod, grout, or other specified material. Loop Saw Slot and Fill will be measured in linear feet of sawed slot.

4.11. Maintain and Control Traffic

Maintain and Control Traffic shall be measured for payment per the *Standard Specifications for Road and Bridge Construction*.

4.12. Open Cut Roadway

Open Cut Roadway shall include excavating trench (sawing and chipping roadway) to dimensions as indicated on the detail sheets and furnishing and placing concrete, steel reinforcing bars, and asphalt. This item also includes restoring any disturbed sidewalk to its original condition. Open Cut Roadway will be measured in linear feet.

4.13. Piezoelectric Sensor

Piezoelectric sensor (piezo) shall include sawing and cleaning saw slots and furnishing and installing piezo in accordance with the specifications. This item shall include furnishing and installing lead-in wire, conduit sealant, encapsulation material, backer rod, grout, testing, and accessories. Piezo will be measured in individual units each.

4.14. Pole – 35' Wooden

Pole – 35' Wooden shall include excavation, furnishing and installing specified wood pole, backfilling and restoring disturbed areas to the satisfaction of the Engineer. Incidental to this item shall be furnishing and installing guy wire, anchor and anchor rod, strand vise, and guy guard, if specified.

Pole – 35' Wooden will be measured in individual units each.

4.15. Signs

Signs shall be furnished, installed, and measured for payment per the *Standard Specifications for Road and Bridge Construction*.

4.16. Trenching and Backfilling

Trenching and Backfilling shall include excavation, warning tape, backfilling, temporary erosion control, seeding, protection and restoration of disturbed areas to original condition. This item shall include concrete, asphalt or approved replacement material for sidewalks, curbs, roadways, etc. (if required). Trenching and backfilling will be measured in linear feet.

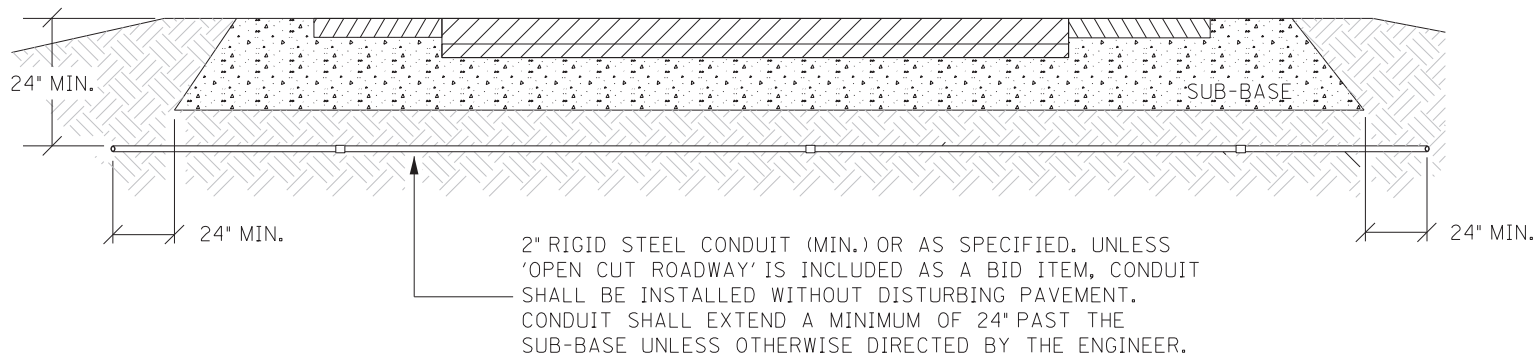
4.17. Wire or Cable

Wire or cable shall include furnishing and installing specified wire or cable within saw slot, conduit, junction box, cabinet, or overhead as indicated on the detail sheets. Incidental to this item shall be the labeling of all wires and cables in each junction box, cabinet and splice

box, and furnishing and installing other hardware required for installing cable. Wire or Cable will be measured in linear feet.

4.18. Wood Post

Wood Post shall include furnishing and installing wood post as specified. This item shall include excavation, furnishing and placing concrete (if required), backfilling around the post, and restoration of disturbed areas to the satisfaction of the engineer. Wood Post will be measured in individual units each.

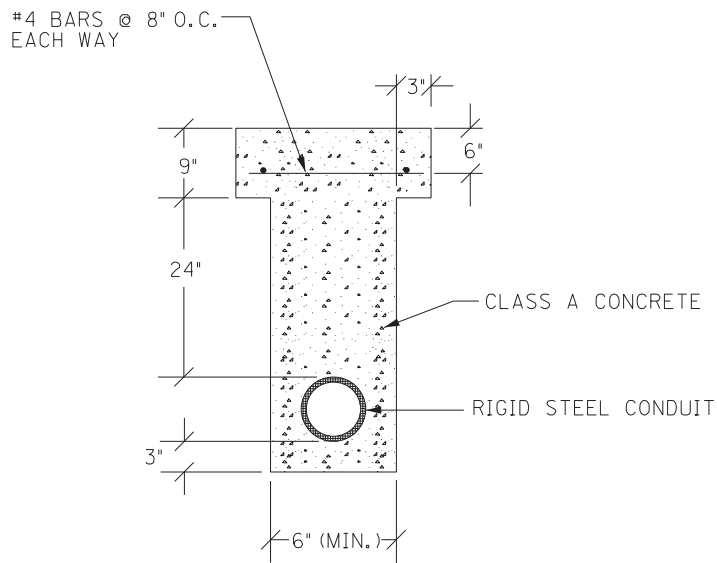
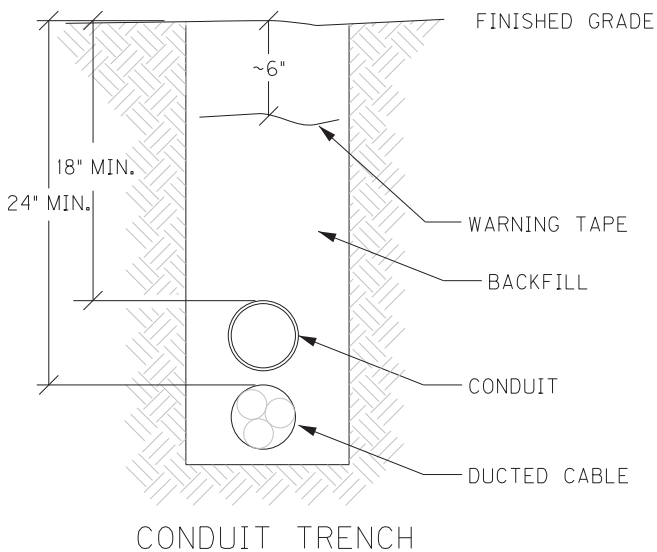


CONDUIT UNDER PAVEMENT

TOTAL TRENCH WIDTH SHALL BE 3" (NOM.) WIDER THAN THE SUM OF THE OUTSIDE DIAMETER(S) OF THE CONDUIT(S) INSTALLED. CONDUIT(S) SHALL BE CENTERED IN TRENCH.

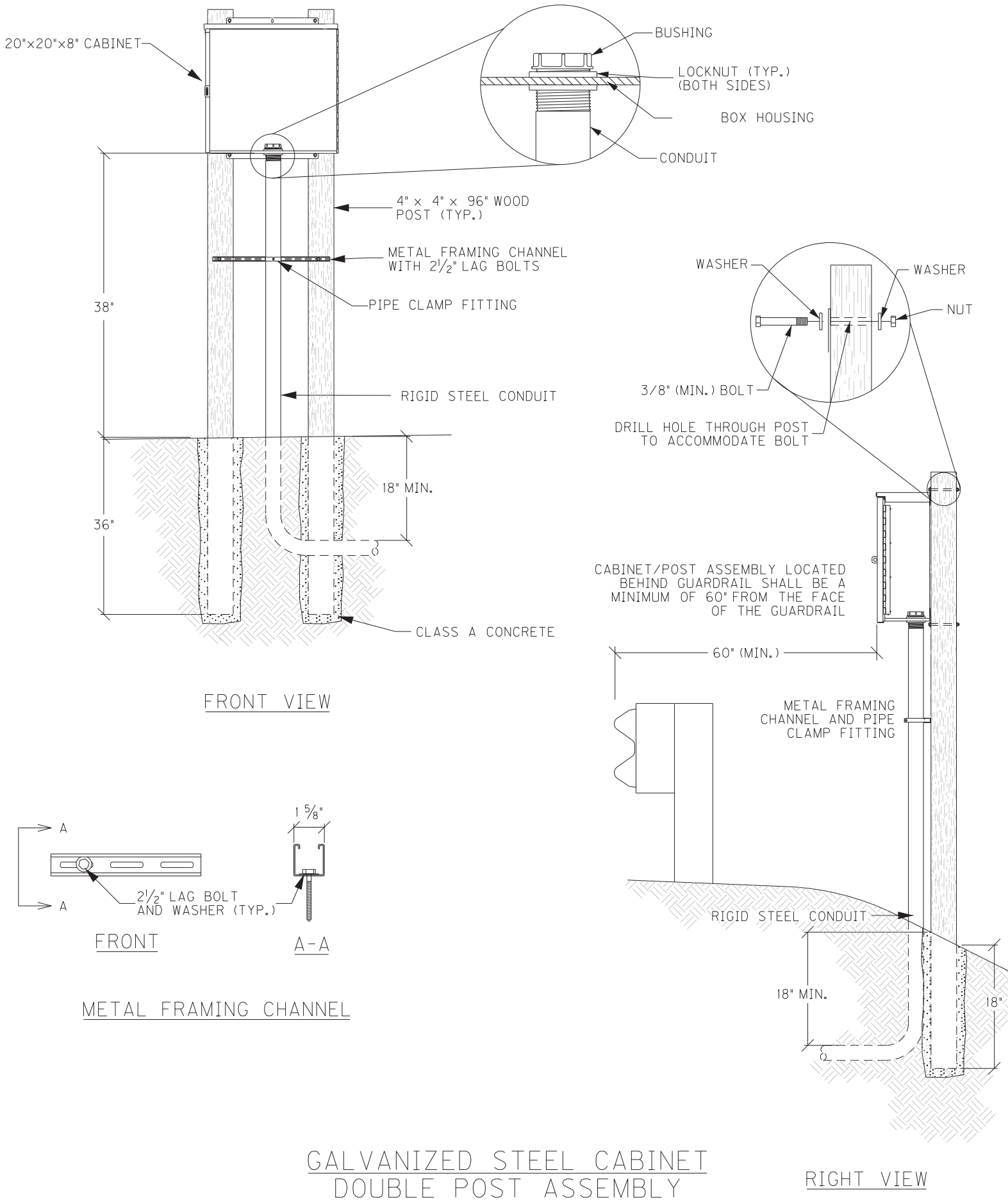
CONTRACTOR SHALL PLACE BACKFILL IN LIFTS (9" MAX.) COMPACT BACKFILL, AND RESTORE DISTURBED AREA TO THE SATISFACTION OF THE ENGINEER

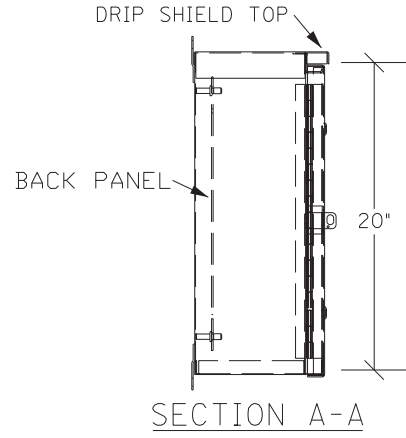
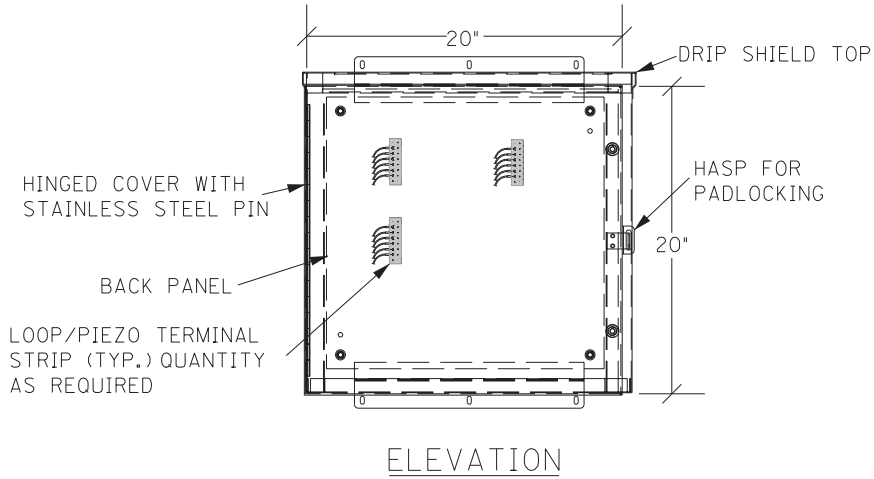
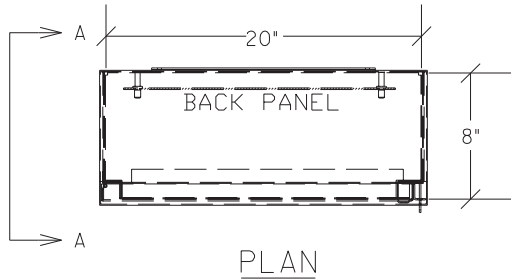
CONTRACTOR SHALL INSTALL UNDERGROUND UTILITY WARNING TAPE ABOVE CONDUIT AS SHOWN.



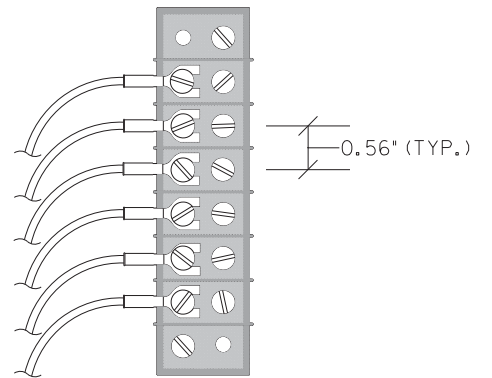
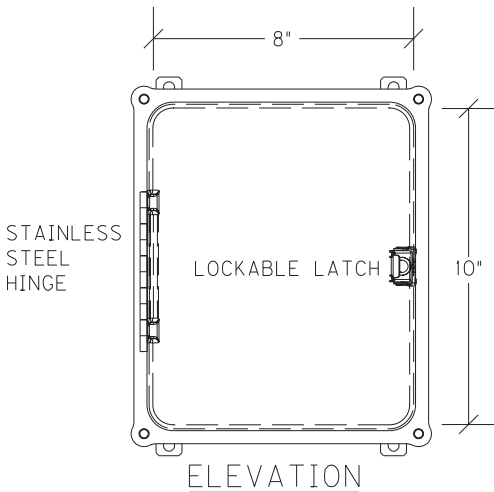
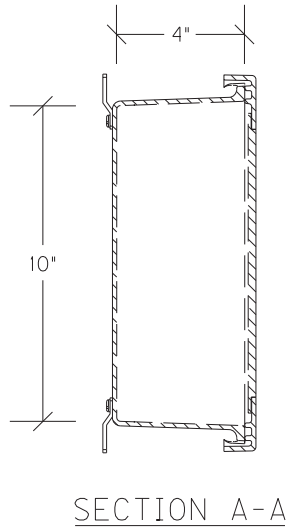
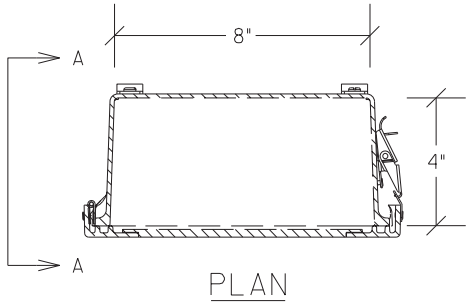
OPEN CUT PAVEMENT DETAIL

CONDUIT INSTALLATION

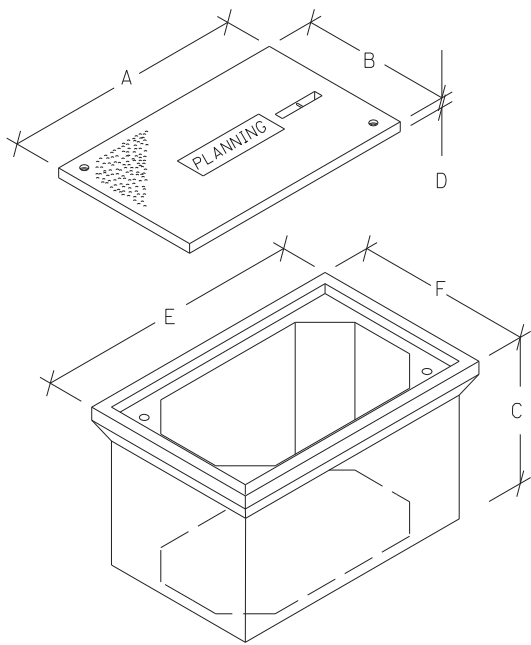




GALVANIZED STEEL CABINET

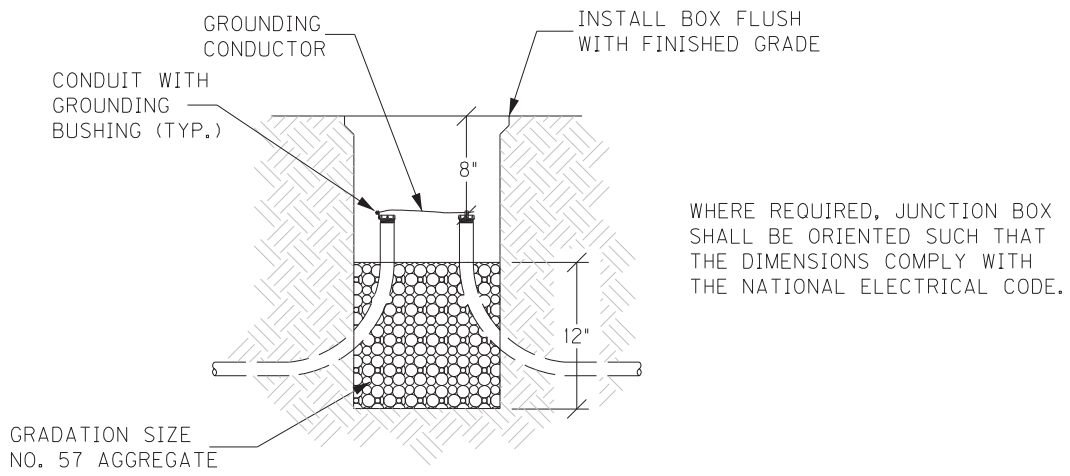


JUNCTION BOX 10"X8"X4"



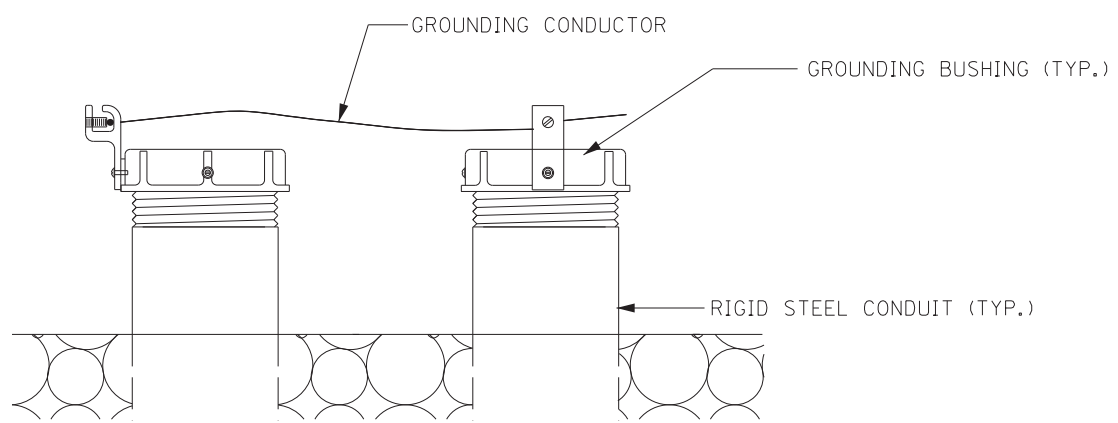
JUNCTION BOX DIMENSIONS (NOMINAL)						
	A	B	C	D*	E	F
TYPE A	23"	14"	18"	2"	25"	16"
TYPE B	18"	11"	12"	1¾"	20"	13"
TYPE C	36"	24"	30"	3"	38"	26"

* MINIMUM
STACKABLE BOXES ARE PERMITTED



ELEVATION

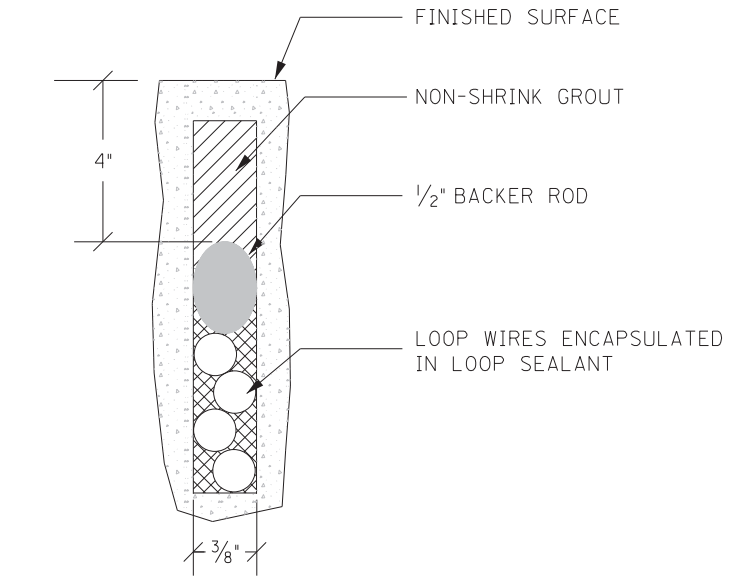
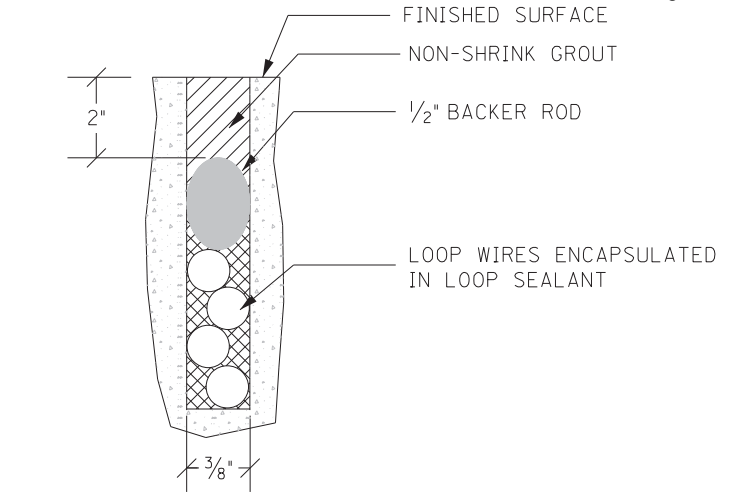
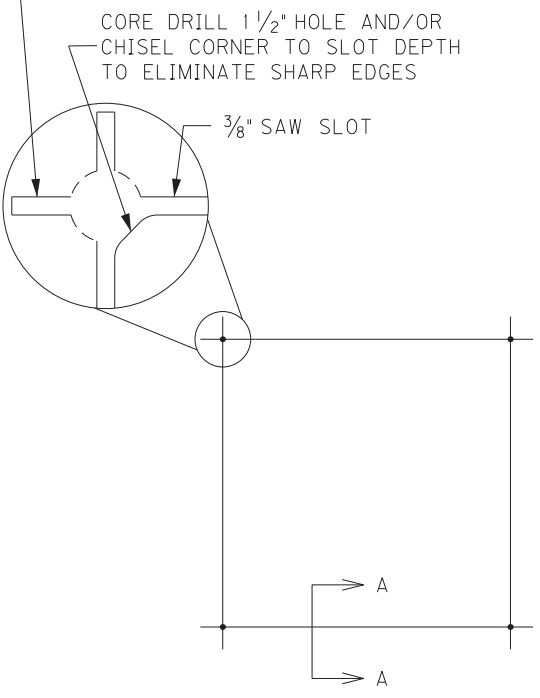
WHERE REQUIRED, JUNCTION BOX SHALL BE ORIENTED SUCH THAT THE DIMENSIONS COMPLY WITH THE NATIONAL ELECTRICAL CODE.



GROUNDING DETAIL

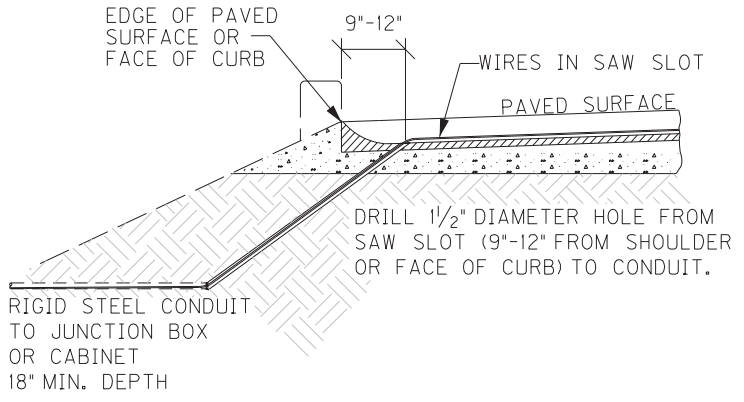
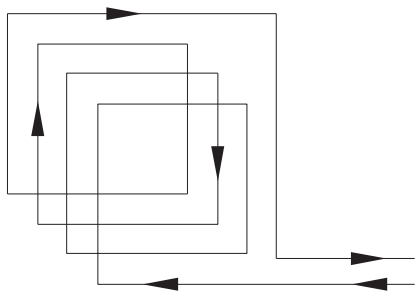
JUNCTION BOX - TYPE A, TYPE B, TYPE C

JEFFERSON COUNTY CUT BEYOND CORNER
TGR 0311 034 ACHIEVE FULL DEPTH

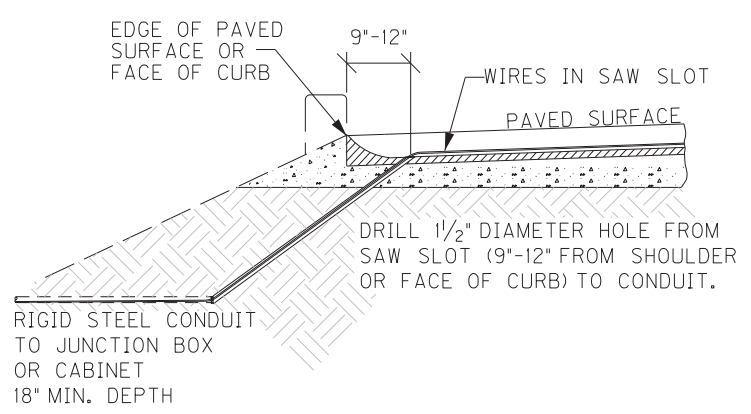
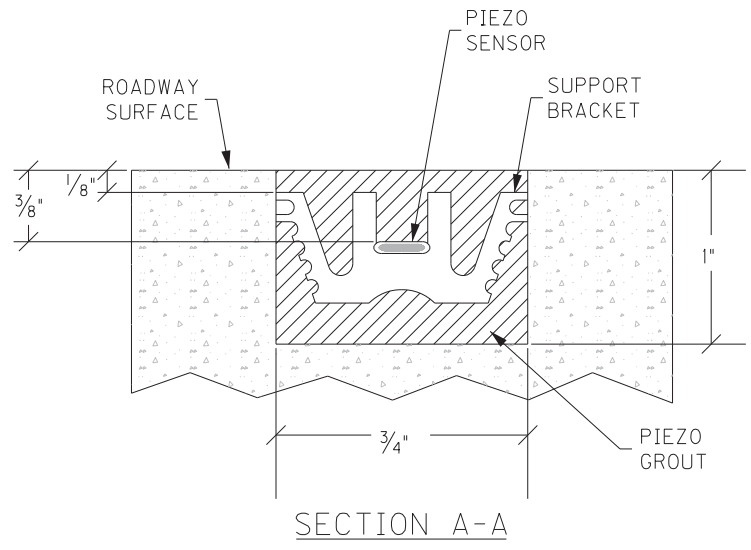
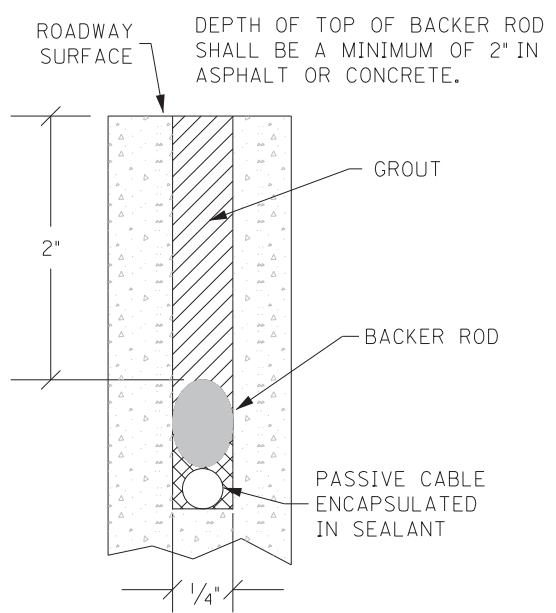
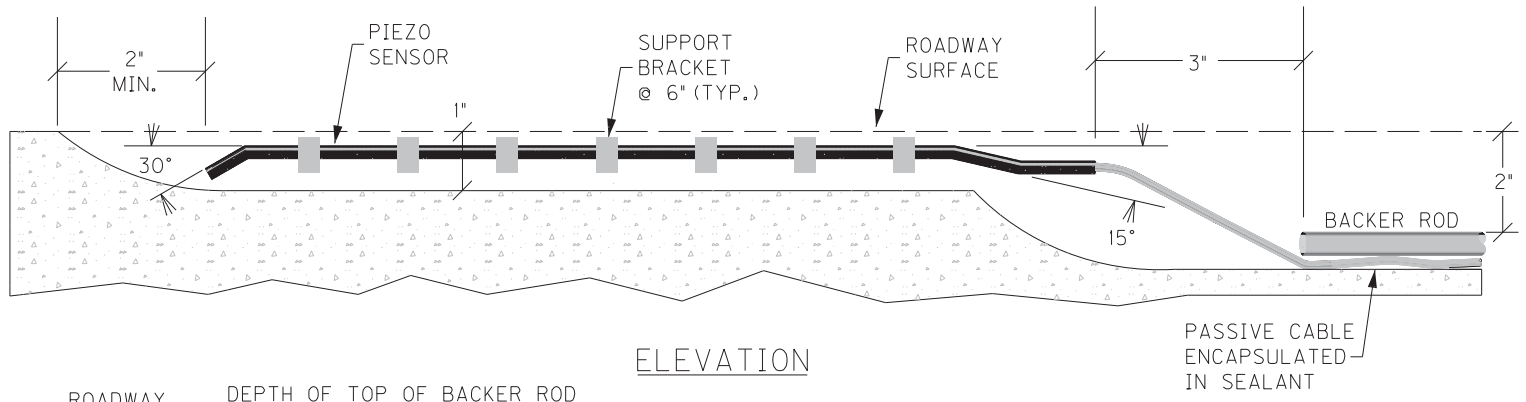
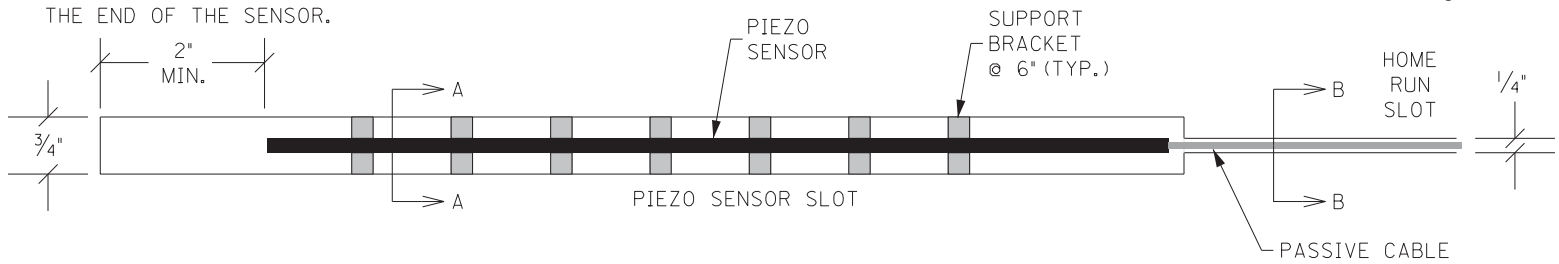


UNLESS SPECIFIED OTHERWISE, ALL LOOPS SHALL BE 6' x 6' SQUARE, CENTERED IN EACH LANE, WITH FOUR TURNS OF 14 AWG LOOP WIRE.

ADJACENT SAW SLOTS SHALL BE A MINIMUM OF 12" APART.



INDUCTIVE LOOP DETECTOR



PIEZOELECTRIC SENSOR INSTALLATION

KYTC
Transforming Dixie Highway
Item 5-478.7

Special Note for Storm Sewer Construction

1. Verify Existing Conditions Before Ordering Precast Products

The existing storm sewer system depicted on the plans is based on the construction record plans and the available as-built information. The existing storm sewer shown on the plans are approximate and may vary from the actual conditions. If precast products are used, the contractor will first need to field verify the actual conditions at each location prior to ordering any pre-cast structures.

2. Open Excavations

All excavations will be located within designated work zones and not in traffic; however, the excavations will need to be covered with steel plates during all periods where no activity is occurring.

KYTC
Transforming Dixie Highway
Item 5-478.7

Special Note for BRT Station Sign Pylons

PART 1 - GENERAL

1.1 SUMMARY

- A. Furnish labor, materials, tools, equipment, and services required for fabrication and installation of Sign Pylons as indicated in the drawings. Sign Pylons will be designed to meet TARC requirements. See the attached drawings for the design specification for the Sign Pylons. Each pylon will include one LCD monitor on the side facing traffic. The pylon will include lighted elements that will illuminate graphics, such as TARC Logo, BRT Branding and an illuminated station name on the street side. An audible device will be mounted to the side of the totem with push button activation. In addition, a small Real Time Passenger Information Controller/Computer (see the individual specifications for the IT equipment) shall be mounted inside the totem, unless otherwise specified. The minimum specifications for passenger waiting shelters wind-load strength must meet the Kentucky Building Code and be certified by a Kentucky licensed Architect or Engineer to meet the wind requirement. Totem must meet or exceed NEC 600 and UL 48 and be certified by the manufacture with a certification label and serial number. The sign body shall be properly bonded and grounded.
- B. Work includes design, engineering, fabrication, testing, finishing, all factory preparation, and system erection by manufacturer as a single source provider.
- C. Completely coordinate with work of other trades.

1.2 QUALITY ASSURANCE

- A. Codes and Standards: comply with provisions of following, except as otherwise indicated:
 - 1. AISC "Code of Standard Practice for Steel Buildings and Bridges."
 - 2. Paragraph 4.2.1 of the above code is hereby modified by deletion of the following sentence: "This approval constitutes the owner's acceptance of all responsibility for the design adequacy of any connections designed by the fabricator as a part of his preparation of these shop drawings."
 - 3. AISC "Specifications for Structural Steel Buildings," including "Commentary" and Supplements thereto as issued.
 - 4. AISC "Specifications for Architecturally Exposed Structural Steel."
 - 5. AISC "Specifications for Structural Joints using ASTM A 325 or A 490 Bolts" approved by the Research Council on Riveted and Bolted Structural Joints of the Engineering Foundation.
 - 6. American Welding Society (AWS) D1.1 "Structural Welding Code- Steel."
 - 7. ASTM A 6 "General Requirements for Delivery of Rolled Steel Plates, Shapes, Sheet Piling and Bars for Structural Use.
 - 8. NEC 600 – add detail
 - 9. UL 48 – add detail
- B. Qualifications for Welding Work: Qualify welding processes and welding operators in accordance with AWS "Standard Qualification Procedure."
 - 1. Provide certification that welders to be employed in Work have satisfactorily passed AWS qualification tests within the past 12 months.
 - 2. If re-certification of welders is required, retesting will be Manufacturer's responsibility.
- C. Material Handling
 - 1. Deliver materials at such intervals to insure uninterrupted progress of Work.
 - 2. Store materials to permit easy access for inspections and identification. Keep steel members off

- ground, using pallets, platforms, or other supports. Protect steel members and packaged materials from erosion and deterioration.
3. Do not store materials on structure in a manner that might cause distortion or damage to members or supporting structures. Repair or replace damaged materials or structures as directed.
 - D. Engage an independent testing and inspection agency to inspect welded connections and to perform tests and prepare test reports. Manufacturer to coordinate inspection schedules so that inspection takes place prior to installation of decking. Costs of testing are included as part of Work of this section.
 - E. Testing agency shall conduct and interpret tests and state in each report whether test specimens comply with requirements, and specifically state any deviations there from.
 - F. Provide access for testing agency to places where structural steel work is being fabricated or produced so that required inspection and testing can be accomplished.
 - G. Testing agency may inspect structural steel at plant before shipment; however, Construction Manager reserves right, at any item before final acceptance, to reject material not complying with specified requirements.
 - H. Correct deficiencies in structural steel work which inspections and laboratory test reports have indicated to be not in compliance with requirements. Perform additional tests, at Manufacturer's expense, as may be necessary to reconfirm any non-compliance of original work, and as may be necessary to show compliance of corrected work.
 - I. The manufacturer can provide his own testing if the Quality Assurance Program has been accepted by the American Institute of Steel Construction instead of an independent testing agency.
 - J. Shop Bolted Connections: Inspect in accordance with ASIC specifications.
 - K. Shop Welding: Inspect and test during fabrication of structural steel assemblies, as follows:
 1. Certify welders and conduct inspections and tests as required. Record types and locations of defects found in work. Record work required and performed to correct deficiencies.
 2. Perform visual inspection of all welds. 10% of all load bearing welds need to be tested with the mag particle inspection.
 3. Perform tests of all full and partial penetration welds as follows: (Inspection procedures listed are to be used at Manufacturer's option.)
 4. Liquid Penetrant Inspection: ASTM E 165.
 5. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration are not acceptable.
 6. Radiographic Inspection: ASTM E 94 & ASTM E 142; min quality level "2-2T".
 7. Ultrasonic inspection: ASTM E 164.
 - L. Field Bolted Connections: Inspect in accordance with AISC specifications.

1.3 SUBMITTALS

- A. Shop Drawings:
 1. Submit shop drawings, including complete details and schedules for fabrication and assembly of structural steel members, procedures and diagrams as signed and sealed by a registered engineer.
 2. Include details of cuts, connections, camber, holes, splices and other pertinent data. Indicate welds by standard AWS A2.1 and A2.4 symbols and show size, length and type of each weld.
 3. Provide setting drawings, templates and directions for installation of anchor bolts and other anchorages to be installed as Work of other sections.
 4. Provide drawings of locking mechanisms, door gaskets and cabinet sealing.
 5. Provide drawings showing graphics, lighting and color palate.
 6. Provide drawings detailing the IT equipment and electrical selected by the new Dixie Highway contractor, and how the IT equipment will be placed, wired, access and maintained.
 7. Provide colored, scaled plans of approved TARC branding scheme including paint colors, lettering and logos to be applied to the sign pylon. A representative drawing of the approved TARC branding scheme is attached to this document in Appendix A. The associated image files to be delivered to winning bidder upon contract award.

- B. Test Reports:
 - 1. Submit copies of reports of tests conducted on shop welded and field bolted connections as indicated on shop drawings by Engineer. Include data on type(s) of tests conducted and test results.
- C. Samples:
 - 1. Manufacturer's standard line of paint or coating finish colors for selection.
 - 2. Provide test samples of approved finish colors (to be determined) on actual metal surface sample of 5" by 5" minimum
- D. Product Data:
 - 1. Manufacturer shall submit product data for the paint system including Manufacturer's specifications and application instructions for each type of paint or coating used.
- E. Field Modifications: Details to make field modifications shall be submitted for review prior to making corrections.
- F. Project Information:
 - 1. Erection Drawings: Submit manufacturer's instructions and drawings, and develop erection procedures to enable field installation and repair.
 - 2. Manufacturer's Project References: Submit list of completed projects including project name and location and type of signs manufactured.
 - 3. Certification of installer qualifications.
- G. Contract Closeout Information:
 - 1. Warranty.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name, manufacturer, and location of installation with detailed written instructions for installation.
- B. Storage: Store materials in a clean, dry area indoors in accordance with manufacturer's instructions.

1.5 WARRANTY

- A. The contractor shall provide a one year maintenance / warranty period for all devices installed within the project limits. It shall be the responsibility of the contractor to provide all parts and labor to correct any failures or deficiencies at no cost to TARC during the one year maintenance / warranty period. The maintenance / warranty period shall commence after the successful completion of the 30 Day Burn-In period.
- B. All installed devices and ancillary components shall be warranted against all defects and/or failure in design, materials and workmanship for a minimum of one year from successful completion of the 30 Day Burn-In period.
- C. The warranty shall provide that, in the event of a malfunction during the warranty period, the defective device or ancillary component shall be replaced with a new device or ancillary component of same make and model within seven calendar days.
- D. Any device or ancillary component that, in the opinion of the TARC, fails three times prior to the expiration of the warranty shall be judged as unsuitable and shall be replaced by the Contractor with a new device or ancillary component of the same make and model at no cost to TARC. The unsuitable device or ancillary component shall be permanently removed from the project by the Contractor.

1.6 MAINTENANCE AND OPERATIONS MANUALS

- A. The Contractor shall submit to TARC, for review and approval prior to the commencement of the 30 Day Burn-In period, operations and maintenance manuals on all devices and ancillary components of the TARC Dixie Highway BRT project.
- B. The Contractor shall submit to the TARC six hard copies and six compact disk copy (CD-ROM in a maintainable and editable format) of complete sets of the operations and maintenance manuals. The manuals, as a minimum, shall include the following:
 - 1. Complete description of TARC Dixie Highway BRT Project operations.

2. Complete and accurate schematic diagrams of the TARC Dixie Highway BRT project as a whole.
 3. Complete installation procedures.
 4. Complete performance specifications (functional, electrical, mechanical and environmental) on every device and ancillary component.
 5. Complete maintenance and troubleshooting procedures.
 6. Complete stage-by-stage explanation of circuit theory and operation.
- C. The Contractor shall submit to TARC six compact disk copies (CD-ROM in a maintainable and editable format) of complete set of As-Built documentation for the TARC Dixie Highway BRT project. The As-Built documentation shall consist of complete detailed information on how each bus shelter site has been built which shall include as a minimum:
1. Conduit installation route with depths and offsets every 10'
 2. GPS location of new pull box installation
 3. Exact routing of all cables at each bus shelter from the Ethernet switch to the field devices
 4. Fiber port assignment at the Ethernet switch and the patch panel
 5. IP address of each field device
 6. Access Point mount heights

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Able to demonstrate successful performance on comparable size and design complexity projects for other U.S. transit authorities within the past ten (10) years.
- B. Responsible for all components, including structural design, transit IT, electrical and graphics.

2.2 COMPONENTS

- A. Pylon Configuration and Dimensions: As indicated on Drawings.
- B. ITS Box / Cabinet
 1. General: A NEMA 3R rated screw top enclosure with dimensions of 16" x 16" x 24" with louvered vents should be included in the Totem design to contain all non property rated components per NEC 600 and UL 48 unless the Totem itself can be rated as a NEMA 4 enclosure.
 - a. Enclosure Class: NEMA 3R
 - b. Dimensions: 16"x16"x24"
 - c. Door type: Screw top
 - d. Additional requirements: Cooling fan installed at two vents opening with a filtered vented area.
- C. LCD Monitor

The LCD monitor shall meet the specification of the real-time system selected by the real-time providers in accordance with Project specification "PASSENGER INFORMATION SYSTEM."
- D. Audible Device
 1. General: Each totem shall have one audible device with push button activation with that meets the specifications of "ANNUNCIATOR SYSTEM."
- E. Computer System
 1. General: Each totem shall have one display unit. This unit will be defined by the real-time system procurement in accordance with Project specification "PASSENGER INFORMATION SYSTEM."
- F. Fans:
 1. General: The NEMA 3R enclosure shall be equipped with two (2) thermostatically controlled UL Listed exhaust fans located inside the enclosure. Ensure that the electric fan motor has a ball or roller bearings. The fan shall be rated for continuous duty and has a service life of at least five years. Vent the exhaust air from openings in the enclosure. The fans shall be complete with thermostat that activate the fans and is user adjustable to allow temperature settings ranging from a minimum of 70° Fahrenheit (F) to a maximum of 160° F. The thermostat shall activate the fan within ±3 degrees of

the set temperature, initial install on temperature setting shall be 90° F.

G. Ethernet Switch

1. The Contractor shall install Network Layer 2 Ethernet switch meet the specifications defined in “LAYER 2 ETHERNET SWITCH FIELD MOUNT, BY PORT COUNT.”
2. Contractor shall provide all necessary ancillary equipment to support installation. network.

H. Patch Panel

1. The Contractor shall install a compatible Fiber Patch Panel that meets the Project specification as defined in “CABINET FIBER TERMINATION PANEL.”

I. Uninterruptable Power Supply

1. The Contractor shall install an On-Line Double Conversion Uninterruptible Power Supply (UPS) within each kiosk that meets the Project specifications in “EXTERNAL UPS SYSTEM CABINET.”
2. Each UPS shall provide power for a minimum of two (2) hours in the event of commercial power loss.

J. Surge Protection

1. All CCTV and Broadband Radio components shall be provided with surge and lightning protection. Provide UL listed multi-stage protection on all low voltage and signal transmission lines.
2. All ITS cabinet 120 VAC surge suppression devices shall be the Emerson/ EDCO HSP121BT-1RU or an approved equal.
3. For low voltage connections provide FAS-1 surge suppressors manufactured by Emerson/ EDCO or an approved equal.
4. For network cabling provide Cat6-at least 5 PoE protector manufactured by Emerson/ EDCO or an approved equal. Minimum protection should be below
 - a. Operating Voltage 60 VDC
 - b. Clamping Voltage 65 VDC
 - c. Operating Current 300 mA
 - d. Peak Surge Current 60 A (10 x 1000 μs)

K. Conduit

1. All conduits, fittings, elbows, gaskets and accessories utilized on the project shall be UL Listed and shall be manufactured in accordance with the latest ASTM specifications.
2. All cables not in a NEMA 3R or greater enclosure must be in a conduit.
3. All conduits that are installed on the exterior of the bus shelter canopies shall be painted to match the existing canopy structure color.
4. Provide duct seal on all conduits after completion of cable installation.
5. Replace all concrete and landscaping that was damaged during the installation of the conduit infrastructure. All new concrete and landscaping that are replaced shall match existing.

L. Cables

1. Audio/Video Cable: Each totem shall have audio cables connecting audible device to computer system and video cables connecting to computer system to the displays. The following cables will be required:
 - a. Two RS-232A - six feet in length
 - b. 3.5mm audio cable – six feet in length
2. Power Cable: In addition to the video cables, power cables will be required to connect all devices.
 - a. All cables not in a NEMA 3R or greater enclosure must be in a conduit.
 - b. All proposed wire and cable shall meet or exceed the recommendations established by the equipment manufacturers, and shall comply with all state and local codes
 - c. All installations and wiring shall meet the requirements of the National Electrical Code (NEC) and the National Electrical Safety Code (NESC meeting or exceeding NEC 600 and UL 65.).
 - d. Visually inspect all wire and cables for damaged insulation prior to installation. Protect cable ends at all times with acceptable end caps.
 - e. Provide grommets and strain relief materials where necessary to avoid abrasion and excess tension on wire and cable.
 - f. Cables of similar signal level shall be bundled together and kept physically separate from power cords, plug strips or other circuits with different potential. All cables shall be neatly secured with self-clinching nylon "TY-Raps" (Thomas & Betts or equal). Lacing of cables shall not be

- permitted.
- g. All cables shall be clearly identified with a permanent legible, weatherproof tag that is securely attached to each end of the cable. Place a label on all cables that are routed thru new and existing pull boxes. The cable tags shall indicate the function of the cable and the ports in which the cable is connected to. The contractor shall ensure that all lettering is non-rubbing off.
3. Network Cable
 - a. All network Category 6 cabling required to support the system between the active network electronics and cameras / access point shall be provided under this scope of work. The Category 6 cable shall be shielded and rated for exterior use.
 - b. Installation of Category 6 cable shall be in accordance with EIA/TIA guidelines.
 - The maximum pulling tension shall not exceed 25 pounds to avoid stretching the conductors.
 - The minimum bending radius of the cable shall not be less than 4x the outside diameter of the cable.
 - The cable shall be installed without kinks or twists and the application of cable ties shall not deform the cable bundle.
 - Strip back only as much cable jacket as is required to terminate the cable and the amount of untwisting in a pair as a result of the termination shall not exceed 0.5 in.

2.3 FABRICATION

A. Materials

1. Metal Surfaces, General: For fabrication or Work which will be exposed to view, use only materials which are smooth and free of surface blemishes including pitting, rust and scale, seam marks, roller marks, rolled trade names and roughness. Remove such blemishes by grinding, or by welding and grinding, prior to cleaning, treating and application of surface finishes.
2. Structural Steel Shapes, Plates and Bars: ASTM A 36.
3. Cold-Formed Steel Tubing: ASTM A 500, Grade B.
4. Steel Pipe: ASTM A 53, Type E or S, Grade B; or ASTM A 501.
5. Finish: The Manufacturer shall submit specifications and samples of paint system for approval by TARC prior to commencement of metal fabrication. See Paint Specification section for performance criteria.
6. Steel Casings: ASTM A 27, Grade 65-35, medium-strength carbon steel.
7. Unfinished Threaded Fasteners: ASTM A 307, Grade A, regular stainless steel bolts and nuts.
 - a. Provide socket head cap screws for all connections.
8. High-strength Threaded Fasteners: Heavy hexagon structural bolts, heavy hexagon nuts, and hardened washers, as follows:
 - a. Quenched and tempered stainless steel bolts, nuts and washers, complying with ASTM A 325. Bearing type connection except where noted to be slip critical (SC).
9. Electrodes for Welding: Comply with AWS Code.
10. Structural Steel Primer Paint: Unless otherwise noted - SSPC- Colar 2.1 PR-P epoxy primer 4-5 mils OFT.

- B. Shop fabrication and assembly: Fabricate and assemble structural assemblies in shop to greatest extent possible. Fabricate items of structural steel in accordance with AISC Specifications and as indicated on final shop drawings. Provide camber in structural members where indicated.
 1. Properly mark and match-mark materials for field assembly. Fabricate for delivery sequence which will expedite erection and minimize field handling of materials.
 2. Where finishing is required, complete assembly, including welding of units, before start of finishing operations. Provide finish surfaces of members exposed in final structure free of markings, burrs, and other defects.
- C. Connections: Bolt shop connections, as indicated on shop drawings.
 1. Bolt field connections as indicated.
 - a. Provide A 325, bearing type high-strength stainless steel threaded fasteners for all bolted connections, except where slip critical (SC) connections are indicated.
- D. Welded Construction: Comply with AWS Code for procedures, appearance and quality of welds, and methods used in correcting welding work. Assemble and weld built-up sections by methods which will produce true alignment of axes without warp.
- E. Cut, drill, or punch holes perpendicular to metal surfaces. Do not flame cut holes or enlarge holes by burning except as noted. Drill holes in bearing plates.

2.4 PAINTING

A. Shop Painting: Shop paint structural steel

1. Surface Preparation: After inspection and before shipping, clean steelwork to be painted. Remove loose rust, loose mill scale, and spatter, slag or flux deposits. Clean steel in accordance with Steel Structures Painting Council (SSPC) as follows:
 - a. All grease, oil, dirt and other surface contaminants shall be removed by solvent or detergent cleaning.
 - b. SSPC- SP10 "Near White Blast" for surface preparation.
2. Painting: Shop paint shall be compatible with finish paint. Use standard primer immediately after surface preparation. Apply organic zinc rich structural steel primer paint with 90% by weight of zinc dust pigment in the dried film in accordance with manufacturer's instructions and at a rate to provide a dry film thickness of not less than 3.3 mils per coat. Use painting methods which result in full coverage of joints, corners, edges and exposed surfaces.
3. Touch-up paint to match specific type used to provide basic protection, i.e., normal or corrosive protection. All damaged areas shall be prepared by hand tool and power tool cleaning in accordance with the SSPC Standard SP-2/SP-3 to remove welding slag, rust and surface contamination. Loose paint edges shall be feathered by power sanding and damaged areas shall be brought to bare metal. One gallon of each color shall be supplied to TARC for field touch-up.
4. Normal Protection: Apply touch-up paint by brush or spray to provide a minimum dry film thickness of 2.0 mils.

B. Preparation

1. Clean and prepare surfaces for paint per SSPC guidelines

C. Codes and Standards: Comply with provisions of the following codes, specifications and standards:

1. ASTM D 4060 - "Abrasion"
2. ASTM 0 3359- "Adhesion"
3. ASTM 3363 - "Hardness"
4. ASTM D 4585- "Humidity"

D. Paint Materials

1. Surface Preparation: Abrasive blast clean per SSPC-SP10 (Near White Blast).
2. Primer: Colar 2.1 PR-P High solid Epoxy primer or equal applied at 4.0- 5.0 mils dry film thickness (d.f.t.). C. Finish Coat: Imron 3.5 HG 2.0 or equal applied 2.0-3.0 mils d.f.t.

E. Application

1. Coatings may be applied by either air spray application (follow manufacturer's recommendations). Paint shall be applied smoothly and evenly with the finish surface free of dirt, runs, orange peel, drips, overspray, brush marks, blistering, cracking or other surface irregularities. Paint method shall result in full, even coverage of all joints, corners, edges and exposed surfaces. Special attention should be placed on the perforated metal seat in order to ensure proper coverage of all surfaces.
2. Dry film thickness shall be in accordance with the paint manufacturer's recommendations. The Manufacturer shall certify that all steel preparation chemicals and primers are compatible with the top coat system being utilized.
3. The Manufacturer shall also provide documentation from the paint supplier that all paint prep operations are in accordance with the paint system manufacturer's recommendations. All finish colors shall be approved by TARC and the Engineer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas to receive marker pylon(s). Notify Engineer of conditions that would adversely affect installation. Do not proceed with installation until unsatisfactory conditions are corrected.

3.2 INSPECTION

- A. Start of work constitutes acceptance of conditions.

3.3 PREPARATION

- A. Ensure location to receive sign pylon is clean, flat, level, plumb, square, accurately aligned, and correctly located.
- B. Correct unsatisfactory substrates prior to start of work.

3.4 SIGN PYLON FOUNDATION

- A. This section shall include all of the labor, materials and equipment required to construct a reinforced concrete footing and pedestal as shown in these plans the unit cost of this item shall include all labor, materials and equipment required to:
 - 1. Excavate for the proposed footing in accordance with section 603.03.03 – footing excavation
 - 2. Furnish and place reinforcing steel in accordance with section 602 - steel reinforcement. All reinforcing steel shall be grade 60 black steel.
 - 3. Form and place class “a” concrete as per plan in accordance with section 601 – concrete. Curing shall be method b membrane curing and pedestal surface finish shall be a rubbed finish. Form all exposed edges with a ¼” chamfer.
 - 4. Furnish and install ground wire, ground rods and conduit as per plan. Anchorage shall be designed and configured as determined by the marker fabricator and approved by the engineer. The furnishing and installing the marker anchors shall be considered incidental to this item with no additional compensation to be provided for furnishing and installing the anchors.
 - 5. Backfilling shall be in accordance with section 716.
 - 6. Temporary shoring of excavations shall not be paid separately, but incidental to the work and included in the unit price of the foundation. The contractor shall locate and protect utilities adjacent to the excavation as necessary.
 - 7. The unit cost for this item shall be for each pylon foundation installed complete and in place.

3.5 INSTALLATION

- A. The manufacturer shall provide installation instructions complete with diagrams.
- B. Installation shall be performed by the installer approved by manufacturer.
- C. The manufacturer shall guarantee the installation for a period of one (1) year from the date of acceptance.
- D. IT equipment shall be installed and tested in the shop before shipping to site. The manufacture shall remove IT items that will not ship safely (as defined by the manufacture) and re-packaged for shipping and reinstalled on-site by the manufacture.

3.6 CLEANING

- A. Clean sign pylons in accordance with manufacturer's instructions.
- B. Do not use harsh cleaning materials or methods that would damage the metal finish or glazing.

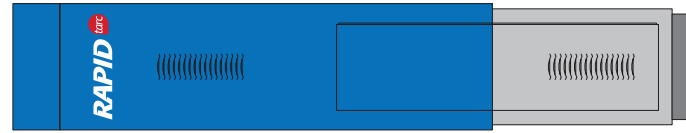
3.7 BASIS OF PAYMENT

- A. Sign Pylon will be paid for at the contract price for Sign Pylon. This item shall be fabricated, furnished, installed, and tested in accordance with these plans and the specifications provided in the special provisions. Fabricator shall design and coordinate with the contractor the method of anchorage to the proposed pylon foundation. The anchors shall be furnished and installed by the contractor with all related costs included in this item for payment. All internal components and incidentals shall be provided and installed by the contractor prior to delivery to the site and erection by the contractor. The basis of payment shall be for each complete marker pylon fabricated, furnished, installed, tested, and accepted in place.

END OF SECTION

APPENDIX A

BRANDING
DETAILS



KYTC
Transforming Dixie Highway
Item 5-478.7

Special Note for BRT Shelters

PART 1 - GENERAL

1.1 SUMMARY

- A. Furnish labor, materials, tools, equipment, and services required for fabrication and installation of BRT Shelters as indicated in the drawings.
 - 1. Work includes design, engineering, fabrication, testing, finishing, all factory preparation, and system erection by canopy manufacturer as a single source provider.
- B. Completely coordinate with work of other trades.

1.2 QUALITY ASSURANCE

- A. Manufacturer's Qualifications:
 - 1. Continuously engaged in translucent insulated daylighting Shelter manufacturing with a minimum of ten (10) years' successful experience. Glass skylight and greenhouse manufacturers using translucent panels as alternate infill panels in-place of glass are not acceptable.
 - 2. Able to demonstrate manufacturer's successful completion of own system design of canopy construction and substructure.
 - 3. Able to demonstrate successful performance on comparable size and design complexity projects for other U.S. transit authorities within the past ten (10) years.
 - 4. Responsible for all components, including structural design.
- B. Installer's Qualifications:
 - 1. Authorized by manufacturer to install Shelters.
 - 2. Trained by manufacturer' standard training methods and policies.
- C. Provide BRT Shelters engineered to support dead, live, and lateral, wind or seismic, loads indicated.

1.3 SUBMITTALS

- A. Shop Drawings:
 - 1. Detailed for entire system including structural components. Submit manufacturer's shop drawings, including plans, elevations, sections and details, dimensions, anchorage, fasteners and locations, flashing and seal details if applicable, finish, and options.
 - 2. Colored, scaled plans of branding images for glass and metal shelter components in compliance with TARC approved branding scheme. Include paint colors and proposed materials. A representative drawing of the approved branding is attached to this document in Appendix A. The associated image files to be delivered to winning bidder upon contract award.
- B. Samples:
 - 1. Manufacturer's standard line of powder coat paint finish colors for selection.
- C. Product Data:
 - 1. Submit manufacturer's product data, including materials, components, finish and all accessories and equipment furnished.
- D. Project Information:
 - 1. Structural calculations for the pre-engineered BRT Shelters indicating design conforms to specified design criteria, sealed by a professional engineer who has an active license to practice structural engineering in the Commonwealth of Kentucky.
 - a. Submit concurrent with Shop Drawings.

2. Erection Drawings: Submit manufacturer's instructions and drawings, and develop erection procedures to enable field installation and repair.
3. Manufacturer's Project References: Submit list of completed projects including project name and location and type of shelters manufactured.
4. Certification of installer qualifications.

E. Contract Closeout Information:

1. Warranty.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name, manufacturer, and location of installation with detailed written instructions for installation.

B. Storage: Store materials in a clean, dry area indoors in accordance with manufacturer's instructions.

1.5 WARRANTY

A. Warranty Period: One (1) year starting on date of substantial completion.

B. Warranty signed jointly by manufacturer, installer and Contractor.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. BRT Shelters:

1. Basis of Design: Brasco International, Inc., model EC0516 "Eclipse" Flat roof-Series, or approved equal in compliance with the contract documents.

B. Other manufacturers desiring approval shall submit an equivalent design to the Engineer for consideration in compliance with the contract documents.

2.2 DESIGN CRITERIA

A. Basic Wind Speed: 105 mph.

B. Exposure Category: B.

C. Basic Snow Load: 15 psf ground snow load.

D. Deflection Values: Deflection values: Use the most restrictive of the following:

1. Limit deflection to values specified for "Uniform Design Load Test".
2. Limit deflection to comply with Building Code as locally adopted and amended.
3. Limit deflection to L/175 or 3/4 IN maximum.

2.3 FABRICATION

A. Shelter Configuration and Dimensions: As indicated on Drawings.

B. Columns:

1. Rear columns shall be minimum 4.5" diameter X .250" wall thickness with four integral glazing pockets.
2. Front columns shall be minimum 4.5" diameter X .250" wall thickness with four integral glazing pockets.
3. Columns pockets contain gasket for wall glazing, and are trimmed with flush snap-in covers to conceal structural

C. Beams:

1. Header Beams shall be minimum 4.5" diameter x .250 wall thickness with four integral glazing pockets.
2. Header beam shall be continuous welded to attachment sleeves
3. Horizontal lower sill beams shall be 2.5" dia. x .125 wall thickness with two integral glazing pockets.

Sills:

- D. Glazing:
 - 1. Roof Panels:
 - a. Roof shall be fully factory assembled with solar lighting components (if included), and require no field assembly.
 - b. Roof assembly will be field attached to columns with concealed fasteners.
 - c. Rafters shall be sloped flat design, minimum 3/8" thick aluminum with welded keyway for attachment to beam.
 - d. Roof glazing shall be 3/8" acrylic, color to be selected from manufacturer's standard colors.
 - 2. Wall Panels:
 - a. Wall panels shall be 3/8" Clear Tempered Safety Glass. Glass shall be fully contained at bottom and top, into special round extruded frames with integral pockets
 - 3. The shelter glazing trim and other components shall be fabricated using 6063-T5 extruded aluminum members Fed. Spec. QQ-A-200/9C(1).
- E. Fasteners
 - 1. All fasteners shall be stainless steel, aluminum, or a combination of both. Zinc plated fasteners will not be accepted.
 - 2. Ground attachment anchors shall be sized to meet wind load requirements, and shall be stainless steel.
 - 3. High strength bolts and nuts: ASTM A325 or A490.
 - 4. Unfinished bolts and nuts: ASTM A307 Grade A (to be unexposed in completed product, or finished in field).
- F. Finishes
 - 1. All aluminum surfaces shall be polyester powder coat with a minimum 4-stage pretreatment, and a finish coat 4 – 5 mil thickness.
 - 2. Color: to be selected from manufacturers standard colors
- G. Options
 - 1. LED Backlit Advertising Display Box
 - 2. Customer Signage Area with Display Case
 - 3. Bench –Brasco Interlude bench with seat dividers, color to be selected from manufacturer's standard, installed with stainless steel wedge anchors per manufacturer's specifications.
 - 4. Trash Receptacle – Round steel, color to be selected from manufacturer's standard colors, Victor Stanley model # NSDC-36 (36 gallon), installed per manufacturer's specifications
- H. BRT Shelter shall be engineered to provide a framework of adequate structural integrity to satisfy the International Building Code (IBC), and to meet the requirements for snow, wind and seismic loading for the location(s) being considered.
- I. PE Stamped drawings from a licensed engineer in the state which the project is located are required to prove structural capability.
- J. BRT Shelter framing components, and the method of fastening them to the supporting foundations, shall be capable of withstanding lateral loads per ANSI A58.1, IBC, or applicable local building codes.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas to receive shelter(s). Notify Engineer of conditions that would adversely affect installation. Do not proceed with installation until unsatisfactory conditions are corrected.

3.2 INSPECTION

- A. Start of work constitutes acceptance of conditions.

3.3 PREPARATION

- A. Ensure location to receive shelter is clean, flat, level, plumb, square, accurately aligned, and correctly

located.

B. Correct unsatisfactory substrates prior to start of work.

3.4 CONCRETE SHELTER PAD, 8"

A. This section shall include furnishing and installing the thickened shelter pad as shown in the plans. Contraction joints shall be ¼" wide, 1 1/2" deep sawed joints with a maximum spacing of 8'-0" in each direction, as indicated in the shelter pad plan sheets.

3.5 INSTALLATION

A. The manufacturer shall provide installation instructions complete with diagrams.

B. Installation shall be performed by the installer approved by manufacturer.

1. Install to walls with secure fasteners to withstand design loading.
2. Install posts in sleeves with non-shrink grout and sealant.
3. Attach polycarbonate to frame using aluminum extrusions.
4. Tighten securely.

C. The manufacturer shall guarantee the installation for a period of one (1) year from the date of acceptance.

3.6 CLEANING

A. Clean shelters in accordance with manufacturer's instructions.

B. Clean inside and outside of shelters immediately after installation.

C. Do not use harsh cleaning materials or methods that would damage the metal finish or glazing.

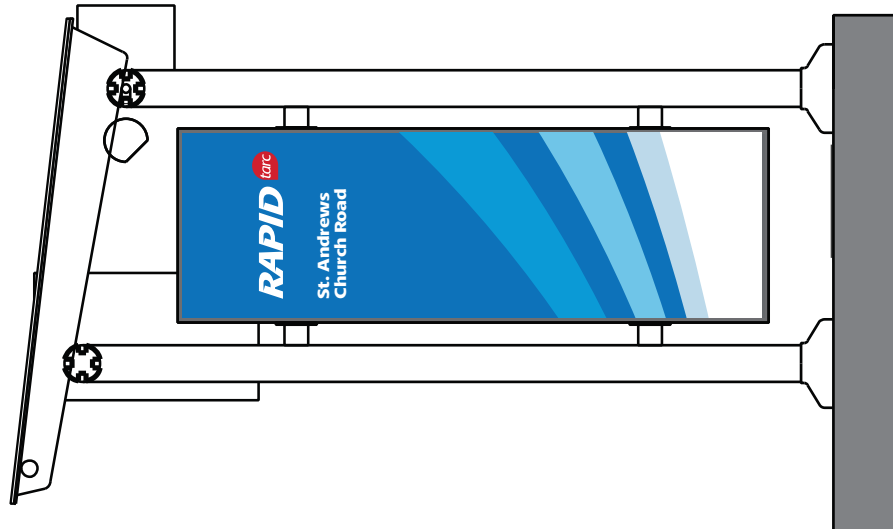
4 BASIS OF PAYMENT

A. BRT Shelters will be paid for at the contract price for BRT Shelters Type 1, Type 2 and Type 3. These items shall be fabricated, furnished, installed, and tested in accordance with these plans and the specifications provided in the special provisions. Fabricator shall design and coordinate with the contractor the method of anchorage to the shelter pad. The anchors shall be furnished and installed by the contractor with all related costs included in this item for payment. All internal components and incidentals shall be provided and installed by the contractor prior to delivery to the site and erection by the contractor. The basis of payment shall be for each complete BRT Shelter (Type 1, Type 2 and Type 3 as indicated on the drawings) fabricated, furnished, installed, tested, and accepted in place.

END OF SECTION

APPENDIX A

BRANDING DETAILS



KYTC

Transforming Dixie Highway

Item 5-478.7

Special Note for Concrete Median Paint

PART 1 GENERAL

1.1 OVERVIEW

- A. The existing concrete median, from approximately Heaton Road and a point just north of I-264, the exact limits being defined on the contract plans, shall be painted to resemble a more natural concrete color.

1.2 SUBMITTALS

- A. Product Data: For each paint system indicated, including.
 - 1. Product characteristics.
 - 2. Surface preparation instructions and recommendations.
 - 3. Primer requirements and finish specification.
 - 4. Storage and handling requirements and recommendations.
 - 5. Application methods.
 - 6. Cautions for storage, handling and installation.
- B. Selection Samples: Submit a complete set of color chips that represent the full range of manufacturer's colors (in the "concrete grey" family) and sheens available.
- C. Verification Samples: For each finish product specified, submit samples that represent actual product, color, and sheen.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: A firm or individual experienced in applying paints and coatings similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.
- B. Paint exposed surfaces. If a color of finish, or a surface is not specifically mentioned, Engineer will select from standard products, colors and sheens available.
- C. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
 - 1. Finish surfaces for verification of products, colors and sheens.
 - 2. Finish area designated by Engineer.
 - 3. Provide samples that designate primer and finish coats.
 - 4. Do not proceed with remaining work until the Engineer approves the mock-up.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver manufacturer's unopened containers to the work site. Packaging shall bear the manufacturer's name, label, and the following list of information.

1. Product name, and type (description).
 2. Application and use instructions.
 3. Surface preparation.
 4. VOC content.
 5. Environmental handling.
 6. Batch date.
 7. Color number.
- B. Storage: Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.
- C. Store materials in an area that is within the acceptable temperature range, per manufacturer's instructions. Protect from freezing.
- D. Handling: Maintain a clean, dry storage area, to prevent contamination or damage to the coatings.

1.5 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

PART 2 PRODUCTS

2.1 PAINT MATERIALS - GENERAL

- A. Product shall be Coolwall Re-COTE Primer, or approved equal.
- B. Paints and Coatings:
1. Unless otherwise indicated, provide factory-mixed coatings. When required, mix coatings to correct consistency in accordance with manufacturer's instructions before application. Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions.
 2. For opaque finishes, tint each coat including primer coat and intermediate coats, one-half shade lighter than succeeding coat, with final finish coat as base color. Or follow manufacturer's product instructions for optimal color conformance.
- C. Primers: Where the manufacturer offers options on primers for a particular substrate, use primer categorized as "best" by the manufacturer.
- D. Coating Application Accessories: Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials required, per manufacturer's specifications.
- E. Color: Refer to Finish Schedule for paint colors, and as selected. Final color shall be chosen by the Engineer.
- F. The finished paint to have a clear coat sealant applied. Sealant shall be submitted for approval by the Engineer and applied per manufacturer's directions.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared; notify Engineer of

unsatisfactory conditions before proceeding.

- B. Proceed with work only after conditions have been corrected and approved by all parties, otherwise application of coatings will be considered as an acceptance of surface conditions.
- C. Previously Painted Surfaces: Verify that existing painted surfaces do not contain lead based paints, notify Engineer immediately if lead based paints are encountered.

3.2 SURFACE PREPARATION

- A. General: Surfaces shall be dry and in sound condition. Remove oil, dust, dirt, loose rust, peeling paint or other contamination to ensure good adhesion.
 - 1. Prior to attempting to remove mildew, it is recommended to test any cleaner on a small, inconspicuous area prior to use. Bleach and bleaching type cleaners may damage or discolor existing paint films. Bleach alternative cleaning solutions are advised.
 - 2. Remove mildew before painting by washing with a solution of 1 part liquid household bleach and 3 parts of warm water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes. Rinse thoroughly with clean water and allow the surface to dry before painting. Wear protective glasses or goggles, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.
 - 3. No exterior painting should be done immediately after a rain, during foggy weather, when rain is predicted, or when the temperature is below 50 degrees F (10 degrees C), unless products are designed specifically for these conditions. On large expanses of metal siding, the air, surface and material temperatures must be 50 degrees F (10 degrees F) or higher to use low temperature products.
- B. Concrete, Steel Structures Painting Council (SSPC) SSPC-SP13 or NACE 6: This standard gives requirements for surface preparation of concrete by mechanical, chemical, or thermal methods prior to the application of bonded protective coating or lining systems. The requirements of this standard are applicable to all types of cementitious surfaces including cast-in-place concrete floors and walls, precast slabs, masonry walls, and shotcrete surfaces. An acceptable prepared concrete surface should be free of contaminants, laitance, loosely adhering concrete, and dust, and should provide a sound, uniform substrate suitable for the application of protective coating or lining systems.

3.3 INSTALLATION

- A. Apply all coatings and materials with the manufacturer's specifications in mind. Mix and thin coatings according to manufacturer's recommendations.
- B. Do not apply to wet or damp surfaces. Wait at least 30 days before applying to new concrete or masonry. Or follow manufacturer's procedures to apply appropriate coatings prior to 30 days. Test new concrete for moisture content.
- C. Apply coatings using methods recommended by manufacturer.
- D. Uniformly apply coatings without runs, drips, or sags, without brush marks, and with consistent sheen.
- E. Apply coatings at spreading rate required to achieve the manufacturers recommended dry film thickness.
- F. Regardless of number of coats specified, apply as many coats as necessary for complete hide, and uniform appearance.

- G. Inspection: The coated surface must be inspected and approved by the Engineer just prior to the application of each coat.

3.4 PROTECTION

- A. Protect finished coatings from damage until completion of project.
- B. Touch-up damaged coatings after substantial completion, following manufacturer's recommendation for touch up or repair of damaged coatings. Repair any defects that will hinder the performance of the coatings.

END OF SECTION

KYTC

Transforming Dixie Highway

Item 5-478.7

Special Note for ITS

Table of Contents

SECTION 1 - GENERAL REQUIREMENTS	4
SUMMARY OF WORK	4
ACRONYMS & ABBREVIATIONS.....	6
SECTION 2 - PROJECT OVERVIEW.....	10
GENERAL REQUIREMENTS	10
APPLICATIONS STANDARDS	10
NEW EQUIPMENT	10
REMOVE SIGNAL EQUIPMENT	10
ELECTRICAL MATERIALS.....	11
VERIFICATION OF SITE CONDITIONS.....	11
WIRING AND CONNECTIONS.....	11
BASIS OF PAYMENT.....	11
CABINET DIAGRAMS	11
WARRANTIES.....	12
SECTION 3 - SPECIFICATIONS	14
EXISTING CONDUIT CLEANED	14
CONDUIT REPAIR.....	15
JUNCTION BOX REPAIRED	16
JUNCTION BOX (CONCRETE 32").....	17
TRACER WIRE	18
CAT 6 CABLE	19
MICROTRENCHING.....	20
FIBER OPTIC CABLE, 144 STRAND FIBER OPTIC DROP CABLE, 12 STRAND	21
FIBER OPTIC CABLE (AIRBLOWN/PUSHABLE, 144 STRAND); FIBER OPTIC CABLE (AIRBLOWN/PUSHABLE, 48 STRAND);	33
MICRO-DUCT PATHWAY-2 CELL; MICRO-DUCT PATHWAY-3 CELL	38
FIBER OPTIC SPLICE ENCLOSURE GENERAL.....	39
CABINET FIBER TERMINATION PANEL.....	40
INTERIOR FIBER OPTIC PATCH PANEL.....	41
LAYER 2 ETHERNET SWITCH – FIELD MOUNT, BY PORT COUNT.....	43
LAYER 2 ETHERNET SWITCH– RACK MOUNT; FIREWALL UNIT-RACK MOUNT	46
FIBER OPTIC ETHERNET TRANSCEIVER, SHORT RANGE	48
TRANSIT SIGNAL, 3 SECTION 12 IN.....	49

EXTERNAL UPS SYSTEM CABINET..... 49

CONTROLLER UNIT..... 50

SYSTEM INTEGRATION 50

FIBER OPTIC PATCH CORD, 2 FIBER..... 55

FIBER OPTIC CABLE, FAN-OUT KIT, 12 FIBER..... 56

PASSENGER INFORMATION SYSTEM 57

~~TEXT TO SPEAK ANNUNCIATOR SYSTEM..... 58~~

PASSENGER INFORMATION SYSTEM SOFTWARE AND INTEGRATION..... 60

UNINTERRUPTED POWER SUPPLY 62

ENVIRONMENTAL MONITOR 63

SHELF MOUNT MULTIMODE PHASE SELECTOR; GPS POLE MOUNTED ANTENNA W/ RECEIVER..... 63

General..... 63

Materials 64

Construction Requirements 64

METHOD OF MEASUREMENT 66

APPENDIX A – CITY OF COLUMBUS STANDARD CONSTRUCTION DRAWINGS FOR JUNCTION BOXES

APPENDIX B – LOUISVILLE METRO PUBLIC WORKS & ASSETS UTILITY POLICY

SECTION 1 -GENERAL REQUIREMENTS

SUMMARY OF WORK

These Special Notes for ITS detail the materials and construction techniques required for construction of Bus Rapid Transit Stations, traffic signal, communications infrastructure, equipment, and software for Louisville Metropolitan Government (City/Metro), Kentucky Transportation Cabinet (KYTC), and Transit Authority of River City (TARC).

Throughout this document and the plan set, the designation "Engineer" refers to the State Highway Engineer of the Department, or a duly authorized representative for engineering supervision of the Contract. The term "Owner" refers to the Louisville Metro Government and the Transit Authority of River City (TARC). The designation "KYTC" refers to the Kentucky Transportation Cabinet. The designation "Contractor" refers to the general Contractor for this project and any designated sub-Contractors(s).

The purpose of these Special Notes for ITS is to set forth the Intelligent Transportation System (ITS), communications infrastructure, equipment, and software installation and testing requirements for the installation of the infrastructure, communication, hardware and software elements as specified in the Contract Documents and as shown on the Plans.

The applicable sections of the KYTC Specifications, including all construction supplements thereto, shall govern all construction items that are not specifically covered in these Special Notes for ITS. In the event of conflicting information between these Special Notes for ITS and Construction and Materials Specifications, the Engineer shall provide direction to the Contractor. In the event of conflicting information between these Special Notes for ITS and the Plans, these Special Notes for ITS are the controlling document.

These Special Notes for ITS and Plans are for materials and equipment to construct parts of the proposed Louisville Metro communications network; however, every fitting, minor detail or feature is not shown or described. The Contractor is assumed to be an expert in the trade, capable of understanding the intent of the Plans and Special Notes for ITS, and capable of constructing the project in accordance with the best practices of the trade.

The price for items of work or materials shown or provided for in the Contract Documents for which no separate line item unit price is given shall be distributed among the various Bid items. Submission of a Proposal shall be considered evidence and acknowledgement that the Contractor is satisfied with the Contract Documents and the conditions as shown therein. No additional compensation shall be paid or time given to the Contractor for compliance with the Contract Documents, except as and into the extent expressly provided by the Contract Documents.

The construction of this project also includes the following tasks:

- Install, configure, and provide an operational communications network to all the intersections in the Plans to the satisfaction of the Engineer and bring each intersection and BRT station online with the Metro central signal system and TARC system, respectively
- Conducting all required tests and submitting test results to the Engineer
- Providing all incidental equipment and performing all necessary tasks to provide a smooth and continuous integration of all the field and central equipment as one system
- Providing warranties for workmanship, equipment, and maintenance for all furnished equipment for a specified time period per item after final system acceptance
- Providing all necessary documentation

ACRONYMS & ABBREVIATIONS

AASHTO	American Association of State Highway & Transportation Officials
ANSI	American National Standards Institute
APC	Angle Physical Contact
APWA	American Public Works Association
ASTM	American Society of Testing and Materials
ATMS	Advanced Transportation Management System
AVL	Automatic Vehicle Location
AWS	American Welding Society
BER	Bit Error Rate
BRT	Bus Rapid Transit
Caltrans	California Department of Transportation
C2C	Center to Center
CCD	Charge-Coupled Device
CCTV	Closed Circuit Television
COTS	Commercial off the Shelf
CDF	Controlled Density Fill
CLSM	Controlled Low Strength Materials
CSS	Central System Software
dB	Decibel
DMS	Dynamic Message Sign
DOW	Day of Week
E&M	Engineering and Maintenance
EIA	Electronic Industries Association
ETL	Electrical Testing Laboratories
FCC	Federal Communication Commission
FDP	Fiber Distribution Panel
FMS	Freeway Management System
FTP	File Transfer Protocol
Gb	Gigabit
GbE	Gigabit Ethernet
GBIC	Gigabit Ethernet Interface Converter
GFI	Ground Fault Interrupter
GHz	Gigahertz (1 x 10 ⁹ cycles per second)
GIS	Geographic Information System
GRS	Galvanized Rigid Steel Conduit
GUI	Graphic Use Interface

GPS	Global Positioning System
H.264	MPEG-4, Part 10
HDMI	High-Definition Multimedia Interface
HDPE	High Density Polyethylene
HMWPE	High Molecular Weight Polyethylene
HTTP	Hypertext Transfer Protocol
ICEA	Insulated Cable Engineers Association
IGMP	Internet Group Management Protocol
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronic Engineers
ISO	International Standards Organization
IP	Internet Protocol
IT	Information Technology
ITS	Intelligent Transportation System
JPEG	Joint Pictures Expert Group
KB	Kilobyte (1 x 10 ³ Bytes/Characters)
Kb/s	Kilobits per second
KYTC	Kentucky Transportation Cabinet
LAN	Local Area Network
LPD	Louisville Police Department
LCD	Liquid Crystal Display
LED	Light Emitting Diode
LFC	Local Field Controller
MAC	Media Access Control
MAN	Metropolitan Area Network
MB	Megabyte (1 x 10 ⁶ Bytes/Characters)
Mb/s	Megabits per second
MHz	Megahertz (1 x 10 ⁶ cycles per second)
MIB	Management Information Base
mm	millimeter (1 x 10 ⁻³ meter)
MJPEG	Motion JPEG
MMU	Malfunction Management Unit
MOE	Measure of Effectiveness
MPEG-4	Motion Pictures Expert Group IV
MTBF	Mean Time Between Failures
MTP	Multi-fiber Termination Push-on
MTTR	Mean Time To Repair

MUTCD	Manual of Uniform Traffic Control Devices
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Association
NETA	National Electrical Testing Association
NFPA	National Fire Protection Association
NFR	National Fire Rating
NMS	Network Management System
NPT	National Pipe Thread
NTCIP	National Transportation Communications for ITS Protocol
OAM&P	Operations, Administration, Maintenance and Provisioning
OFDM	Orthogonal Frequency-Division Multiplexing
OSP	Outside Plant
OSPF	Open Shortest Path First
OTDR	Optical Time Domain Reflectometer
PC	Personal Computer
PDF	Portable Document Format
PTZ	Pan-Tilt-Zoom
PVC	Polyvinyl Chloride
PoE	Power over Ethernet
QoS	Quality of Service
QPL	Qualified Product List
QPSK	Quadrature Phase Shift Keying
RADIUS	Remote Authentication Dial In User Service
RF	Radio Frequency
RFI	Radio Frequency Interference
RSTP	Rapid Spanning Tree Protocol
RTP	Real-time Transport Protocol
RTS	Rapid Transit System
RUS	Rural Utilities Service
SCD	Standard Construction Drawing
SFP	Small Form-Factor Pluggable
SLP	Signal Layout Plan
SMA	Software Maintenance Agreement
SMA	SubMiniature version A (Connector)
SMF	Single Mode Fiber
S/N	Serial Number
SNMP	Simple Network Management Protocol

SS	Standard Specifications (for Road and Bridge Construction, KYTC)
SSH	Secure Shell
SSL	Secure Sockets Layer
TARC	Transit Authority of River City
TCP	Transmission Control Protocol
TCPIP	Transmission Control Protocol/Internet Protocol
TEES	Transportation Electrical Equipment Specifications (Caltrans)
TIA	Telecommunications Industry Association
TMC	Traffic Management Center
TMDD	Traffic Management Data Dictionary
TOD	Time of Day
TOD/DOW	Time of Day/Day of Week
TRIMARC	Traffic Response and Incident Management Assisting the River City
UDP	User Datagram Protocol
UL	Underwriters Laboratory
UPC	Ultra Physical Contact
UPS	Uninterruptable Power Supply
UV	Ultraviolet
VAC	Volt Alternating Current
VESA	Video Electronics Standards Association
VLAN	Virtual Local Area Network
WAN	Wide Area Network
WPA	Wi-Fi Protected Access
WPA2	Wi-Fi Protected Access II

SECTION 2 - PROJECT OVERVIEW

This section provides a general overview of additional requirements for the Project.

GENERAL REQUIREMENTS

The Contractor shall be fully responsible for complete construction and testing of the communications infrastructure, sites, hardware and software as detailed in these Special Notes for ITS and in the Plans. The systems include, but are not limited to, the furnishing and installation of cabinets, foundations, conduit, electrical power service and communications cables. The system includes the installation of traffic signal system hardware, traffic signal priority equipment, integration with the communications infrastructure, system acceptance testing, and training on the system operation.

The Contractor shall obtain an IP addressing scheme from Metro and TARC and configure Ethernet network equipment for installation. The Contractor shall provide electronic image backup configuration files for each device to be turned over to the City.

The new fiber network will be constructed in parallel to the existing communication system (copper and wireless). The entire fiber optic network will be installed and tested prior to any traffic controllers being connected to the network. Each intersection will be connected, tested, and commissioned before moving on to the next intersection.

APPLICATIONS STANDARDS

All materials and installation procedures shall conform to the Plans, the Louisville Metro Public Works 2016 Standard Specifications for Road and Bridge Construction, KYTC Standard Specifications 2012, the latest edition of the Louisville Metro Public Works & Assets Utility Policy (included in Appendix B of these Special Notes for ITS), the latest edition of the KYTC Standard Roadway Drawings, the latest edition of the Manual of Uniform Traffic Control Devices (MUTCD). All electrical work shall conform to the standards of the National Electrical Manufacturers Association (NEMA), the Underwriters' Laboratories Inc. (UL), the Electrical Testing Laboratories (ETL), the National Electrical Testing Association (NETA), or the Electronic Industries Association (EIA)/Telecommunications Industries Association (TIA) wherever applicable. In addition to the requirements of the approved shop drawings, to be prepared by the Contractor, and these Special Notes for ITS, all materials and workmanship shall conform to the requirements of the National Electrical Code (NEC) and the National Electric Safety Code (NEC). All communication work shall conform to the standards of the Federal Communication Commission (FCC) and Institute of Electrical and Electronics Engineers (IEEE).

NEW EQUIPMENT

All components, parts, interconnecting cable, messenger cable, computers, and all other items used in the manufacture and installation of equipment under these Special Notes for ITS and Plans shall be new and unused. No used or re-furnished items shall be accepted. All parts, components, software, and firmware shall be the latest proven model in current production.

REMOVE SIGNAL EQUIPMENT

Where controller cabinets are to be reused as specified in the plans, upon completion of the fiber optic network installation and testing, the Contractor shall replace the existing traffic signal controller and connect to the new network. Once communication to the new controller is confirmed, the following items (where applicable) shall be disconnected and remove from the traffic signal cabinet for salvage:

- Controller
- Spread Spectrum Radio

- Spread Spectrum Data Transceiver
- Modem
- Associated Cables and Connectors

The removed items shall be returned to:

Louisville Metro, Public Works & Assets
601 W. Jefferson St., RM 2
Louisville, KY 40202
502.574.3930

Unless itemized as individual pay items, removal of Items shall be incidental to the installation or adjustment of the new equipment. Also refer to the requirements of the KYTC Standard Specification 723.04.22 – Remove Signal Equipment.

ELECTRICAL MATERIALS

Electrical materials and fittings shall conform to the requirements of the National Electrical Code. Electrical fittings shall be watertight and weatherproof. Dissimilar metals shall be separated by an inert dielectric material.

VERIFICATION OF SITE CONDITIONS

It shall be the Contractor's responsibility to check the environmental, electrical, and physical conditions at the equipment installation sites to ensure that the system equipment furnished and installed will operate as specified. In such cases where a potential problem may exist, the Contractor shall notify the Engineer and further direction will be provided to the Contractor.

WIRING AND CONNECTIONS

The Contractor shall furnish and install all wiring, conduit and connections required for complete operation of the system. All wiring shall be measured and installed to fit each location. Excessive slack will not be allowed. Pre-made cables from the manufacturer are the preferred product and any field-made cables shall be retested in the field in the presence of the Engineer. All wiring, conduit, and connections shall conform to accepted industry standards.

BASIS OF PAYMENT

The Contractor will only be paid for pay items as stated in these Special Notes for ITS, Contract Documents, and Plan Set. The Contractor shall perform all items of work called for in the Plans. For which no specific method of payment is provided, the cost of these items shall be included in the various unit prices bid for the project improvement.

CABINET DIAGRAMS

The Contractor shall provide cabinet wiring diagrams and final circuit drawings for all components being furnished, and for any changes to existing components or equipment as required by the Contract documents. The Contractor shall be solely responsible for the correctness of the wiring diagrams and final circuit drawings being installed, and for the correctness of any existing drawings being reused as part of a complete working system. The correctness shall be determined solely by the Engineer if disputed.

The Contractor shall check drawings and final tracings (see cabinet layout details in plans) for both form and content prior to submittal. Points to be checked shall include:

- Conformance to the specifications
- Logical grouping and arrangement of subject matter
- Accuracy
- Legibility
- Neatness
- Line quality
- Lettering quality
- Reproduction quality
- Inclusion of Contract specified interfaces with related contacts

Drawings shall be submitted for review as intersection/controller upgrades are completed (communications activated) and the Contractor shall not wait to submit all of the drawings once the entire project is complete. Approval of drawings and tracings will be at the discretion of the Engineer. The Engineer will consider the same points listed above, with the basic criteria for obtaining approval being that the drawings are easy to read, understand, and use.

Final copies of the drawings shall be furnished to the Engineer in both reproducible form and in MicroStation (current version as recognized by KYTC). AutoCad drawings may be acceptable only if approved by the Project Engineer.

All work included under this section shall be incidental to the installation of the new equipment and traffic signal cabinets.

WARRANTIES

The guarantee period extends for three (3) years from the date of Final Acceptance of the Project.

Year One of the Guarantee Period

The Contractor shall provide two contact persons during normal Metro business hours to receive calls. If entrance into a controller cabinet is required to perform the repair or other action, the Contractor shall contact the Construction Engineer to schedule a time with the Metro to gain entry into the cabinet. No entry into a controller cabinet is permitted unless a qualified Metro representative is at the location.

A log shall be maintained by the Contractor of the warranty work completed and supplied to the Metro upon the expiration of year one of the guarantee period. The log shall document repair(s) made by the Contractor or representative to the unit(s) identifying when any are sent back for repair. This documentation shall include an explanation of the exact repairs made and identification of parts repaired or replaced by part number, associated parts' serial numbers, location, and circuit number.

Years Two and Three of the Guarantee Period

Specific material and equipment must have a guarantee period that extends for three years from the date of Final Acceptance. This includes material and equipment furnished which are integral to network data communication. The material and equipment that must be covered by this guarantee are listed in Table 1: Three Year Guarantee.

Table 1: Three Year Guarantee

ITEM # DESCRIPTION

LAYER 2 ETHERNET SWITCH – FIELD MOUNT, BY PORT COUNT

LAYER 2 ETHERNET SWITCH – RACK MOUNT

FIBER OPTIC ETHERNET TRANSCEIVER, SHORT RANGE

The Owners will maintain the infrastructure and make the necessary repairs. If the Owners determines the existing equipment is found to be defective and needs to be replaced, it will be sent back to the manufacturer. A temporary or permanent replacement of an identical item must be received by the Owners from the manufacturer within (5) business days of receipt of defective part. Any warranty repairs of returned components shall be completed and returned to the City within thirty days of receipt of the equipment by the manufacturer. All cost of shipping and return of items shall be borne by the manufacturer.

Any component that, determined by the Owners, fails three (3) times within the three year guarantee period will be judged as defective and shall be replaced by the manufacturer with new equipment of the same type at no cost to the Owners. The defective equipment shall be permanently removed.

SECTION 3 - SPECIFICATIONS

EXISTING CONDUIT CLEANED

DESCRIPTION

The conduit on the project is critical and shall be cleaned by the Contractor prior to installing cables. The Contractor shall proof and clean all existing buried conduit to obtain a clean, usable pathway.

Typical junction box cleaning - including the removal of sediment and trash buildup but not caused by structural defect of the junction box - shall be considered incidental to the cost of this item.

At the direction of the Engineer, damaged junction boxes requiring significant repair or adjustment to grade shall be paid for under "Junction Box Repaired".

In the event of a junction box failure resulting in the immediate or potential inability to properly access conduit pathway, the Contractor shall notify the Engineer and request direction to either repair, or, remove and replace, the existing junction box.

For conduit blockages, the Contractor shall rod (or other method approved by Engineer), to clear the conduit from dirt and debris. Conduit requiring repair shall be identified in writing by the Contractor. Once the Engineer provides approval for the repair, the Contractor shall repair the conduit per "Conduit Repair" at the contracted bid price. These repairs shall be conducted in the presence of the Engineer.

NOTES

In advance of installing cable within the existing conduit, the Contractor shall verify continuity and clean the required conduit as directed by the Engineer.

This work shall include cleaning junction boxes and dressing existing conduit within these junction boxes in a manner that can be utilized in the future.

Junction box cleaning will include pressurized water and vacuum for debris removal. After cleaning, damaged junction boxes will be repaired with mortar and voids filled. Cleaning shall be planned so that items cleaned by one operation are not contaminated by another. Conduit opening shall be secured in a manner approved by Engineer prior to work. Aggregate (#57 gravel) may be required at some locations and shall be installed in base of junction box as directed by the Engineer.

The Contractor shall not remove or damage any cables currently in the existing conduit unless identified in the Plans, specifications, or at the direction of the Engineer.

In instances where cleaning conduit with existing cable in it, provide additional methods of cleaning to carefully secure the existing cable. For example; water flushing with vacuum, forced air with vacuum, or other method approved by Engineer.

At some roadway locations, existing junction boxes may have asphalt overlay on them, these shall be uncovered so as to not damage surrounding pavement and shall be adjusted to grade by using an extension ring to raise manholes. The extension ring shall be solid cast iron with mastic or adjustable steel. A tolerance of minus 1/2" will be the acceptable tolerance. Known locations where this occurs are identified in the plans. Asphalt shall be placed back on the junction box at the end of the shift to provide a smooth surface to drive. Asphalt work on a junction box lid is incidental to the bid item.

The Contractor shall plan the work in advance to prevent any delay in construction. The Contractor will not be allowed any additional time due to the replacing or repairing of damaged conduit or adjusting junction boxes.

When multiple conduit ducts existing in conduit runs to be used for installation of proposed fiber optic cable, conduit shall be investigated to be cleaned in the following order of priority:

- Empty inner-ducts
- Empty conduits
- Conduits with existing interconnect cable
- Conduits with existing signal cable
- Conduits with existing power cable with prior approval of the Engineer

LOCATIONS WITH EXISTING INTERCONNECT OR SIGNAL CABLE

The Contractor shall notify the Engineer and coordinate with Louisville Metro when a clear conduit path cannot be established or where existing cable(s) in the conduit is preventing a clear conduit path.

The Contractor shall protect the existing interconnect, detector loops, lead-in cable, homerun cable, and intersections power cable that may be in portions of the conduit. The Contractor is responsible for repair of any damage of the power cable or loop detector or cables at their own expense.

The Contractor is to notify the Engineer two weeks before any work begins that will or has the potential to disturb existing interconnect in a project segment or zone so that the appropriate actions can be taken to keep the system coordinated.

METHOD OF MEASUREMENT

The work as described will be measured as the number of linear feet of the specified duct in the Plans of conduit cleaned. Measurement will be by length along or across roadway; regardless if multiple inner-ducts or conduits over a distance are investigated and cleaned to obtain a clear a path.

BASIS OF PAYMENT

Conduit cleaning will be paid for per linear foot, and will include furnishing all materials, equipment, labor and incidentals necessary to complete the work specified.

<u>Unit</u>	<u>Description</u>
Linear Foot	Existing Conduit Cleaned

CONDUIT REPAIR

This project includes an estimated quantity of this contingency item for use as directed by the Engineer.

DESCRIPTION

Conduit shall be repaired by the Contractor prior to installing cables. In the event that conduit must be repaired, the following guidelines shall be followed unless otherwise directed by the Engineer.

Type 1 - Open Cut

Cracked or broken conduit sections with existing cables shall be repaired using a split conduit sleeve specifically designed for this purpose. The nominal size of the sleeve shall be one half inch larger than the nominal size of the conduit being repaired and shall meet ASTM D-635 specifications. The duct shall have a positive locking channel running lengthwise so that the two halves can be snapped together

while gluing. When the existing conduit is shattered or broken such that sharp edges or points are evident, the conduit shall be cut so that both ends are flush. The split duct sleeve shall then be placed over the existing duct after all debris and any sharp edges have been removed from around the conduit openings. The sleeves shall overlap the existing conduit by a minimum of 6 inches. PVC duct cement shall be used to glue both conduit sleeve halves together. The sleeve shall also be glued to the existing conduit. Clamps shall be used to secure the split duct halves after gluing has been performed. Stainless Steel clamps shall be placed at either end and at a minimum of 3 foot spacing.

When conduit not containing an existing cable or conduit, which extends into a junction box, must be repaired, a non-split duct and coupling shall be used. Two inches of conduit shall be left extending into the junction box and a "bell end" or anti-chaff bushing shall be installed. The bushing shall be glued to the conduit. Any opening around the ducts in the junction box shall be re-grouted with mortar. Any excavation, trenching, and backfill shall be incidental to this item. Care shall be taken to not further damage the conduit. Backfill per SS 716.03.06.

Any excavation, trenching, backfill, roadway repair, and pavement marking repair shall be incidental to this item.

Type 2 - Force Open with Inner-duct

Collapsed pathways shall be reamed open and cleaned for insertion of HDPE inner-duct (size and type approved by Engineer) from access to access point. Any damage to access points, roadway, or any other item shall be repaired to as equal or better condition.

METHOD OF MEASUREMENT

The work as described will be measured as the number of linear feet of the specified duct by location in the plans of conduit repaired and tracer wire installed. Measurement will be by overall duct bank length, regardless if multiple inner-ducts or conduits over a distance are repaired to obtain a clear a path. Any other restoration or repairs are considered incidental to this item.

BASIS OF PAYMENT

Conduit repair will be paid for per linear foot, and will include furnishing all materials, equipment, labor and incidentals necessary to complete the work specified.

<u>Unit</u>	<u>Description</u>
Linear Foot	Conduit Repair

JUNCTION BOX REPAIRED

This project includes an estimated quantity of this contingency item for use as directed by the Engineer.

DESCRIPTION

At the direction of the Engineer, existing junction box shall be repaired by the Contractor prior to installing cables. The intent of this pay item is to refurbish an existing junction box to a condition, which will result in the ability of the Contractor to install cable(s) through the junction box without incurring damages to the cable(s) or junction box. In the event that a junction box must be repaired, the following guidelines shall be followed unless otherwise directed by the Engineer:

Openings around the ducts within the junction box wall shall be re-grouted with mortar.

Voids in the surrounding fill or pavement material due to erosion shall be refilled with like material.

If directed by the Engineer, adjust junction box to proper grade and backfill the excavated spaces around the junction box with suitable material placed and thoroughly tamped in thin layers, and restore the pavement base and paving to match the surround.

Seal large cracks in concrete or mortar.

Verify that the junction box lid frame structure is free of cracks or other defects, securely fastened to the junction box, and that a seal is present between the two materials.

Verify that the junction box lid is in good condition and is properly seated within lid frame upon closing of junction box lid.

METHOD OF MEASUREMENT

All labor, materials, and equipment required to remedy items as described will be measured as one complete unit.

BASIS OF PAYMENT

Upon acceptance by the Engineer, Junction Box Repair will be paid for as one unit per junction box site repaired.

<u>Unit</u>	<u>Description</u>
Each	Junction Box, Repaired

JUNCTION BOX (CONCRETE 32")

DESCRIPTION

Where identified on the plans, the Contractor shall furnish and install concrete junction boxes in accordance with SS 716.04, 834.08, and City of Columbus (Ohio) SCD 4022 (32" Junction Box, Sheets 1 and 2) as provided in Appendix A of these Special Notes for ITS, unless otherwise specified below.

All junction boxes shall have "Signal" embossed on the lid. Separate or bonded tags will not be permitted.

MATERIALS

Frames and lids shall be Neenah R-1792-HL, Jordan 1475A, or approved equal for 32" junction boxes.

32" junction boxes shall be of pre-cast construction. In high traffic areas, work and restoration shall be planned to minimize roadway/sidewalk closure duration and expedite steel plate removal.

One coat of Hydrozo Enviroseal 40, Rainstopper 140, or Chemtrete BSM40 shall be applied to the inside and outside of the junction box.

Concrete shall have air entrapment of 6% +/-2% and shall have 4,500 psi strength at 28 days. Concrete materials shall meet KYTC Specifications.

Lid ring load transfer is to be distributed by use of a preformed mastic joint material.

Cut off conduits so they extend no more than three inches beyond the junction box wall and provide bushings.

Whenever possible, conduits should enter the junction box via a knockout. When approved by the Engineer, conduits may enter the junction box through its wall only if the opening is sawn or core drilled.

The wedge anchor assembly shall be omitted whenever the entire area above the knockout (1/4 of the casting) is encased in either concrete or asphalt. The encasement shall be centered around the knockout.

Aver the conduits have been installed, any opening in the junction box wall shall be totally filled with mortar or concrete and finished flush with the inside junction box wall (no voids).

Junction box bearing capacity to exceed 40,000 pounds.

Enlarging the knockout area, if required, shall be done by saw cutting the concrete. No other method is allowed. The contractor shall replace the concrete housing, if damaged, at their expense.

Standard placement for wire mesh and rebar shall be used.

The lid shall have a lip for lifting.

Any slack or excess cable to be coiled in the junction box shall be placed around the inside box perimeter.

All coiled cables shall be tie wrapped and clearly identified within the junction box.

METHOD OF MEASUREMENT

The work as described will be measured as the number of junction boxes furnished and installed, complete in place, including sawcutting, paver removal and storage, excavation, forms, concrete, frame and cover, reinforcing steel, grouting fittings, strainer/cesspool, aggregate, 1/2 inch (13 mm) expansion joint, backfilling and restoration of the immediate area (including pavement restoration).

BASIS OF PAYMENT

<u>Unit</u>	<u>Description</u>
Each	Junction Box (Concrete 32")

TRACER WIRE

DESCRIPTION

Where not otherwise provided as part of micro-duct pathway system, tracer wire shall be installed in parallel with fiber optic cable in conduit. Tracer wire shall be no smaller than #14 AWG wire. The wire shall be HDPE insulated, with an orange jacket color, and constructed of copper clad steel. Approximately 10 feet of slack of the tracer wire shall be left inside the adjacent junction boxes connecting the conduit runs. In situations where a Type 2 fiber optic cable marker is to be installed in conjunction with the tracer wire, the tracer wire shall be run through the marker and connected to terminals at the top of the marker.

CONSTRUCTION

Label and terminate tracer wire to at above-ground access box test stations terminal blocks to be located inside junction boxes approximately every 1000 ft. (max)., per manufacturer requirements, that shall be used as test station connection points.

Moisture displacement connectors shall be used at all connection points. 3M DBR connectors, Copperhead Snakebite connectors, or approved equal shall be used. After all connections are completed the Contractor shall contact the Engineer for a locate or conductivity test.

The tracer wire shall enter a junction box on one side and be routed around the inside perimeter of the junction box to the other side and then exit the opposing side. The tracer wire shall be continuously run between junction boxes (absolutely no splices except in a junction box). Conduit that branches off the main conduit run shall have its tracer wire terminated in a junction box or controller cabinet. The wire shall be tagged as "Tracer Wire", coiled (10 feet in length) and terminated at each end (open circuit) jumper.

Furnish and install tracer wire test stations to include an above-ground access box at each test location (Copperhead Cobra or equal). Test station shall be orange colored polypropylene housing with 3 terminal test jumpers, 3/4" NPT threaded conduit connection. Furnish a threaded nylon cord connector (underground feeder connector) with neoprene bushing for each test station 3/4" NPT connection for wire pull-out protection. Cord connector neoprene bushing shall be slotted / sized for (3) #14 AWG wires. Test station locations and quantities shall be per manufacturer recommendations. Test stations installed in street junction boxes shall be fastened to the upper corner of the junction box using a PVC-coated one hole pipe strap sized for the outer diameter of the test station. Each test station jumper shall be labeled to indicate street name and direction of the connected tracer wire. Jumper labels shall be engraved phenolic nameplates, white background with black lettering.

If rigid galvanized steel conduit is used to jack under a roadway, tracer wire shall be connected to each end of the conduit using a heavy duty wire lug bushing approved by Engineer so the conduit will act as a conductor completing the tracer wire circuit.

Furnish an As-Built overview drawing upon completion of construction of the project area showing routing of tracer wire and locations of test points.

BASIS OF PAYMENT

Payment for all tracer wire shall be included in the bid item for the fiber optic cable pay item.

CAT 6 CABLE

DESCRIPTION

The Contractor shall install outdoor rated Category 6 cable for all outdoor applications susceptible to water or moisture penetration. Outdoor rated Category 6 cable shall be used to provide interconnection between the Ethernet switches and field devices (located outside switch/control cabinetry). Outdoor rated cable shall be aluminum armored. Indoor rated Category 6 cable shall be used for all other Ethernet switch connections.

MATERIALS

The specifications for the outdoor rated Category 6 cables shall meet the following specifications:

- Shield
- Bare (aka pure) Copper Conductors
- CM PVC Jacket
- Jacket Color per ANSI/TIA/EIA-606
- 24 AWG

- Solid conductor
- TIA/EIA-568A,ISO/IEC11801,YD/T1019-2001

All complete cables (including cable and connectors) shall be CAT 6 certified and tested. Cables shall include RJ45 connectors, pre-wired and terminated on both ends, with lever protecting boot. The Contractor shall test and certify each CAT 6 cable (excluding patch cables 10 feet or less). Each cable end shall be labeled with a thermal printed, self-laminating adhesive wire marker noting the device type.

CONSTRUCTION

All cabling shall be cut to proper length before assembly. Cables shall be neatly lashed to the messenger wire cable where shown in the plans.

METHOD OF MEASUREMENT

Category 6 cable will be measured to the cabinet, or device, plus an allowance of five (5) feet on each end.

BASIS OF PAYMENT

Payment for all CAT 6 cable shall be incidental to the pay item for the device that it connects.

MICROTRENCHING

DESCRIPTION

Microtrenching involves the placement of shallow depth micro-duct systems in street and sidewalk applications. This process includes the saw cutting of sidewalks and/or streets, installation of micro-duct systems and fiber optic wiring (installation of fiber optic line paid as a separate bid item), restoration of sidewalks and/or streets and disposal of all unused debris.

CONSTRUCTION

All microtrenching activities, associated micro-ducts, and all restoration activities must be constructed as outlined in the Louisville Metro Public Works & Assets Utility Policy 2016, (Revised may 17, 2017), included in Appendix B of these Special Notes for ITS.

The depth of microtrenching shall be a minimum of 12” below the existing finished grade. The number of micro-ducts to install shall be as shown on the plans.

METHOD OF MEASUREMENT

Microtrenching, measured by linear foot as specified, will be measured to the center of foundation or junction box.

BASIS OF PAYMENT

Microtrenching will be paid as indicated below, and will include furnishing all materials, equipment, labor and incidentals necessary to complete the trenching and pavement restoration work as specified.

<u>Unit</u>	<u>Description</u>
Linear Foot	Microtrenching

FIBER OPTIC CABLE, 144 STRAND FIBER OPTIC DROP CABLE, 12 STRAND

DESCRIPTION

The work specified in this section shall include the furnishing and installation of communication system cables of the type specified and associated components in accordance with the plans. This specification defines the type of communication system cables, splicing, and interface equipment that shall be implemented for this project.

MATERIALS

The Contractor shall provide all materials required for the installation, connection, and splicing of the specified communications cables. All materials, cables, fiber, and hardware shall be fabricated from the same manufacturer.

COMMUNICATIONS CABLES

Fiber optic cable shall be loose tube, single mode dielectric cable. The cable shall be listed in the latest edition of the Rural Utilities Service (RUS) list of materials acceptable for use on telecommunications systems of RUS borrowers, category OC-D-F and shall be 9/125 μm , single-mode, OS2, loose buffer optical fiber cables, Corning SMF-28e+, type II, that meets the following specifications:

- ITU-T G.652 (CATEGORIES A, B, C & D)
- IEC SPECIFICATION 60793-2-50 TYPE B1.3
- TIA/EIA 492-CAAB
- TELECORDIA'S GR-20

The Contractor shall provide manufacturer's certification that the offered cable shall comply with all optical and/or electrical, and mechanical requirements set forth in this specification. Any deviation of the offered cable from the requirements set forth herein shall be conspicuously noted in the Contractor's material submittal.

The Contractor shall provide a warranty on all installed cable for a period of one (1) year following final project acceptance.

All fibers in the cable shall be usable fibers and shall be free of surface imperfections material and inclusions in order to meet or exceed one hundred percent (100%) of the optical, mechanical, and environmental requirements contained in this specification. If 100% useable fibers are not achievable, the cable shall be replaced by the Contractor at the Contractor's expense.

All cables shall be free of material or manufacturing defects and dimensional non-uniformity that would:

- Interfere with the cable installation using accepted cable installation practices.
- Degrade the transmission performance and environmental resistance after installation.
- Inhibit proper connection to interfacing elements.
- Otherwise yield an inferior product.

APPLICABLE DOCUMENTS

All work described in this section shall meet or exceed the applicable provisions of the following documents:

- U.S. Department of Agriculture, Rural Electrification Administration specification for totally filled optical fiber cable, pe-90

- EIA/TIA-455-A, standard test procedure for fiber optic fibers, cables, transducers, sensors, connecting and terminating devices, and other fiber optic components
- EIA/TIA-455-25A, repeated impact testing of fiber optic cables and cable assemblies
- EIA-455-28B, method for measuring dynamic tensile strength of optical fibers
- EIA-455-33A, fiber optic cable tensile loading and bending test
- ELA-455-34, interconnection device insertion loss test
- EIA-455-41, compressive loading resistance of fiber optic cables
- EIA/TIA-455-81A, compound flow (drip) test for filled fiber optic cable
- EIA/TIA-455-82B, fluid penetration test for fluid-blocked fiber optic cable
- ELA-455-89A, fiber optic cable jacket elongation and tensile strength
- EIA-455-95, absolute optical power test for optical fibers and cables
- EIA-455-104, fiber optic cable cyclic flexing test
- EIA/TIA-598, color coding of fiber optic cables
- EIA/ANSI-472 generic requirement for optical fiber and optical fiber cables
- ANSI/ICEA S-87-640
- ANSI/TIA/EIA-526-7: OFSTP-7 measurement of optical power loss of installed single-mode fiber cable plant.

MECHANICAL AND PERFORMANCE REQUIREMENTS

The cable shall be a rugged all dielectric outdoor cable containing color coded buffer tubes with 12 single mode color-coded fibers per-buffer tube, dual window (1310 nm and 1550 nm) fibers with UV acrylate coating in color coded, gel-free, loose buffer tubes with the maximum outer diameter as shown in the chart below based on cable strand count. Fiber cables shall not exceed a minimum bend radius of 10 times the cable outside diameter with no applied load, and 20 times the cable outside diameter with the rated load applied.

Optical Fiber Optic Cable Physical Requirements (trunk/backbone)

Strand Count	Maximum Outside Diameter (inches)
48 or less	0.45
144	0.65

The loose buffer tubes shall be stranded around an all-dielectric center strength element using a reverse oscillation lay, wrapped by water blocking core separator or functional equivalent. The maximum allowable attenuation of the fiber is .35 db/km for 1310 nm and .25 db/km for 1550 nm.

Each buffer tube shall contain a water blocking element for water-blocking protection. No water blocking yarns are permitted to avoid accidentally cutting fibers. The water blocking elements shall be non-nutritive to fungus, electrically non-conductive, and homogeneous. It shall also be free from dirt or foreign matter. This water blocking element will preclude the need for other water-blocking material; the buffer-tube shall be gel-free.

Water-swellaable tape shall be applied longitudinally around the outside of the stranded tubes/fillers. The water-swellaable tape shall be non-nutritive to fungus, electrically non-conductive, and homogenous. It shall also be free from dirt and foreign matter.

All optical fiber cable on this project shall be from a manufacturer who is regularly engaged in the production of fiber optic cables and all optical fiber cable of the same type shall be from the same manufacturer.

The cable manufacturer shall be TL 9000 registered.

The optical fiber cable shall withstand water penetration when tested with a one-meter static head or equivalent continuous pressure applied at one end of a one-meter length of filled cable for one hour. No water shall leak through the open cable end. Testing shall be done in accordance with EIA-455-82B.

OUTER JACKET

Cables shall be all dielectric cable (with no armoring) and shall be jacketed (sheathed) with medium density polyethylene as defined by ASTM D1248, Type II, Class C, Category 4 and Grades J4, E7 and E8. Jacketing material shall be applied directly over the tensile strength members to provide mechanical protection, and to serve as the primary moisture barrier. This cable sheath shall be designed to meet or exceed the tensile criteria defined in EIA-455-89A. Each jacketed fiber shall have a tensile strength in excess of 50 lbs. The polyethylene shall contain carbon black to provide ultra-violet light protection, and it shall not promote the growth of fungus.

The jacket or sheath shall be free of any holes, splits, or blisters.

The cable jacket shall contain no metal elements and shall be of a consistent thickness.

The cable shall contain at least one ripcord under the sheath for easy sheath removal.

CRUSH RESISTANCE

The non-armored optical fiber cables shall withstand a compressive load of 220 n/cm applied uniformly over the length of the cable. The average increase in attenuation for the fibers shall be ≤ 0.10 db at 1550 nm for a cable subjected to this load. The cable shall not exhibit any measurable increase in attenuation after load removal. Testing shall be in accordance with EIA-455-41, "compressive loading resistance of fiber optic cable," except that the load shall be applied at the rate of 3 mm to 20 mm per minute and maintained for 10 minutes.

The Contractor shall submit manufacturer's certification for approval of Engineer.

CYCLIC FLEXING

The cable shall be capable of withstanding 25 cycles of mechanical flexing at a rate of 30 ± 1 cycles/minute. The average increase in attenuation for the fibers shall be ≤ 0.10 db at 1550 nm at the completion of the test. Outer cable jacket cracking or splitting observed under 10x magnification shall constitute failure. The test shall be conducted in accordance with EIA-455-104, except that the sheave diameter shall be a maximum diameter of 20 times the cable outer diameter (O.D.). The cable shall be tested in accordance with test conditions I and III of EIA-455-104.

The cable shall withstand 25 impact cycles. The average increase in attenuation for the fibers shall be ≤ 0.20 db at 1550 nm (single-mode). The cable jacket shall not exhibit evidence of cracking or splitting. The test shall be conducted in accordance with EIA/TIA-455-25A.

The Contractor will be allowed to submit manufacturer's certification for approval.

CABLE MARKING

The optical fiber cable outer jacket shall be marked with manufacturer's name, the year of manufacture, Fiber Count, type of Fiber and sequential linear foot marks. The markings shall be repeated every 3 feet. The marking shall be in a contrasting color to the cable jacket. The marking shall be 2.5 mm in height and must be permanent weatherproof and shall not wear off during the installation in the underground conduit system.

TENSILE STRENGTH

Tensile strength shall be provided by high tensile strength aramid yarns and fiberglass, which shall be helically stranded evenly around the cable core.

The cable shall withstand a tensile load of 2700 Newtons (N) [600 lbs.] without exhibiting an average increase in attenuation of greater than 0.10 db. The test shall be conducted in accordance with EIA-455-33A, using a maximum mandrel and sheave diameter of 560 mm. The load shall be applied for one hour in test condition ii of EIA-455-33A.

The optical fiber cable shall withstand a maximum pulling tension of 2700 N (600 lbs.) during installation (short term) with no damage and 845 n (190 lbs.) installed (long term).

The Contractor will be allowed to submit manufacturer's certification for approval.

TEMPERATURE

The storage and operating temperature range of the cable shall meet or exceed min. -20 °F to max. +155 °F (-29 °C to +68 °C). Installation temperature range of the cable shall meet or exceed min. 15 °F to 138 °F (-8 °C to 58 °C).

LOOSE BUFFER TUBE

Single-mode fibers shall be contained in a loose buffer tube. The configuration shall be dimensionally sized to minimize local stresses and microbend losses. Buffer tubes shall be 2.5mm in outer diameter. The optical fiber cable shall be an approved product of the department of agriculture, rural electrification administration in accordance with the requirements of REA-PE-90, or as otherwise indicated, and shall conform to EIA/TIA-598. Each optical fiber shall consist of a doped silica core surrounded by a concentric silica cladding.

Buffer tubes shall be constructed of polypropylene.

Fillers shall be included in the cable core to lend symmetry to the cable cross section where needed.

The central anti-buckling member shall consist of a glass reinforced plastic rod. The purpose of the central member is to prevent buckling of the cable. This and other items necessary to comply with the maximum flexibility requirements may be omitted, if pre-approved by the engineer.

COLORS

All optical fibers shall be identifiable by standard color codes as defined in EIA/TIA-598. Each fiber shall be distinguishable, as determined by the owning agency, from others by means of color coding and shall conform to the following EIA/TIA sequence of colors:

- | | |
|-----------|------------|
| 1. Blue | 7. Red |
| 2. Orange | 8. Black |
| 3. Green | 9. Yellow |
| 4. Brown | 10. Violet |
| 5. Slate | 11. Rose |
| 6. White | 12. Aqua |

The colors shall be in accordance with the Munsell color shades.

The fiber coloring shall be an ultraviolet (UV) curable ink which is applied to the outside of the optical fiber protective coating layer and shall not be an integral component of the coating layer itself in order to produce more distinguishable colored fiber.

Buffer tubes containing fibers shall also be color-coded with distinct and recognizable colors according to the following sequence of colors:

- | | |
|-----------|------------|
| 1. Blue | 7. Red |
| 2. Orange | 8. Black |
| 3. Green | 9. Yellow |
| 4. Brown | 10. Violet |
| 5. Slate | 11. Rose |
| 6. White | 12. Aqua |

The color formulation shall be compatible with the fiber coating and be heat stable. It shall not fade or smear or be susceptible to migration and it shall not affect the transmission characteristics of the optical fibers and shall not cause fibers to stick together.

QUALITY ASSURANCE PROVISION

The optical fiber cable shall meet or exceed the requirements of this specification when measured in accordance with the methods of the individual requirements or the following methods as defined in EIA-455-A:

- Fiber dimensions
- Attenuation
- Numerical aperture
- Fiber proof test
- Crush resistance
- Cable bending
- Tensile load
- Impact resistance
- Attenuation vs. Temperature

TESTING

OPTICAL FIBER CABLE FACTORY AND REEL TEST

The Contractor shall obtain a factory test data sheets for each reel of optical fiber cable delivered. The tests shall be performed by the factory at 1310 nm and 1550 nm and shall include directional Optical Time Domain Reflectometer (OTDR) traces and test data for each fiber in the cable. The Contractor shall test each reel at 1550 nm prior to installation to ensure no damage occurs to the fiber in transit and that the length of cable is correct. The Contractor shall provide the OTDR manufacturer, model number, and serial number of each unit used during the test along with the name of the person(s) performing the test. These two test results shall be provided to the City prior to installation as part of final acceptance of the section of cable for payment.

All cabled optical fibers > 3500 feet (1000 m) in length shall be attenuation tested. The attenuation of each fiber shall be provided with each cable reel.

The Contractor shall supply the City with the factory, and pre-installation test results documenting that the cables meet all relevant EIA specifications as stipulated in these Special Notes for ITS.

Single-mode fibers utilized in the cables specified herein shall be subjected to and successfully pass a tensile proof stress test equivalent to 100 kpsi (0.70 gn/m²) for 1.0 second.

Fibers shall contain no factory splices.

POST-INSTALLATION TESTING

The Contractor shall test all continuous fiber with a light source utilizing procedures as stated in ANSI/TIA/EIA-526-7: OFSTP-7 measurement of optical power loss of installed single-mode fiber cable plant. Testing procedures shall utilize one jumper reference. Bi-directional testing of optical fibers will be required.

The Contractor shall coordinate with Metro Traffic or specific locations for the testing. The Contractor shall provide Metro Traffic written notification a minimum 14 calendar days before testing the fiber optic cable. Testing shall not begin unless receiving written authorization and fiber locations and test points from Metro Traffic. The Contractor shall provide the OTDR manufacturer, model number, and serial number of each unit used during the test along with the name of the person(s) performing the test.

NOTE: Prior to the testing of a segment of installed fiber optic cable, all terminations and patch panels connected to that specific cable segment must be installed in their final position within the controller cabinet and/or equipment rack as indicated in the plans. Failure to test the cable system and its components in their final installed placement will result in nullification of test results and will require the retesting of those cable segments.

All single mode fiber cables shall be tested at both 1310 nm and 1550 nm after installation. Fibers will be considered acceptable if the OTDR trace for that fiber shows an end to end loss of less than $xx\text{db} + yy(0.05)\text{db} + zz(0.2)\text{db}$ (where yy is the number of splices (a number to be provided by the engineer), zz is the number of connector pairs and xx is calculated using the following formula: $xx = \text{distance} \times \text{fiber attenuation/unit distance @ } \lambda$). In addition, no splice may show a loss of greater than 0.05 db and no connector pairs may show a loss of greater than 0.2 db, regardless of the total accumulated end-to-end loss. Any additional tests required by the ANSI/TIA/EIA standard shall also be performed and also included in the written test report.

The Contractor shall test each fiber strand from both ends of the fiber utilizing an OTDR at the wavelengths specified above. Overall, the OTDR test results shall be made up of the wavelength of the conducted test, the link length, attenuation, cable identification, and the locations of the near end, the far end and each splice point or points of discontinuity.

Electronic format results for each fiber strand shall be submitted as part of "as-built" documentation. All test results shall be turned over to the engineer and Metro in electronic format provided by the manufacturer of the test equipment used by the Contractor to perform the tests. Those results must be provided such that they can be viewable by and Metro without the use of special software or additional equipment. If the test results cannot be view on a standard PC without requiring the need for additional software or equipment, that software or equipment must also be delivered to the Metro Traffic. If software is provided a separate document showing all fiber test results must be submitted to Metro to be placed in the project file. Any software or equipment so delivered will become the permanent property of and Metro Traffic and will not be returned.

If the cable fails to meet the above requirements, it shall be replaced by the Contractor at the Contractor's expense.

Test results shall include a record of wavelength, fiber type, fiber and bundle number, test equipment and model number, date, reference setup, and operator (crew members). The Contractor shall document the start/end locations of all fibers.

The Contractor shall provide hard copy and electronic format reports of all test data to the engineer. In the event that test results are not satisfactory, the Contractor shall make adjustments, replacements, and changes as necessary and shall then repeat the test or tests that disclosed faulty or defective material, equipment, or installation method, and shall perform additional tests as the engineer deems necessary.

Tests related to connected equipment of others shall only be done with the permission and presence of the agency representative involved. The Contractor shall perform only that testing as required to prove the fiber connections are correct.

Fiber connection as-built diagrams and documentation shall be placed in sealed plastic pouches in each cabinet.

PACKAGING AND SHIPPING

The completed cable shall be packaged for shipment on non-returnable wooden reels. The cable and reel shall be wrapped in a water resistant covering.

Each end of the cable shall be securely fastened to the reel to prevent the cable from coming loose during transit. At least six feet of cable length on each end of the cable shall be accessible for testing. Both ends of the cable shall be sealed to prevent the ingress of moisture.

Each cable reel shall have a durable weatherproof label or tag showing the manufacturer's name, the cable type, and the actual length of cable on the reel, the Contractor's name, the contract number, and the reel number. A shipping record shall also be included in a weatherproof envelope showing the above information and also include the date of manufacture, cable characteristics (size, attenuation, etc.), cable identification number and any other pertinent information.

The minimum diameter of the reel shall be at least thirty times the diameter of the cable. The optical fiber cable shall be in one continuous length per reel with no factory splices in the fiber. Each reel shall be marked to indicate the direction the reel shall be rolled to prevent loosening of the cable.

Installation procedures and technical support information shall be furnished by the manufacturer and shared with the Engineer for review at the time of delivery.

CABLE INSTALLATION

Upon receipt of cable reels, the Contractor shall test each fiber on the reel separately with an Optical Time Domain Reflectometer (OTDR) to verify fiber length, attenuation, and continuity. Furnish documentation of test results for each fiber optic cable.

The Contractor shall coil 75' of fiber optic cable slack per cable entering/exiting a (overhead or underground) splice enclosure. Where physical space in junction box does not permit noted slack requirements, Contractor shall provide enough cable slack length to accommodate street-located vehicle splice closure maintenance. Additional slack locations are identified in the plans. For instances where a junction box does not contain adequate space to neatly coil the required fiber optic cable slack, as much slack as possible shall be installed at the box and the remaining slack shall be installed at an adjacent junction box so that the proper cable slack length amount is installed for the cable run and may be made available to perform future maintenance of the cable.

When ordering optical fiber cable, the Contractor shall exercise extreme caution so as to ensure that no additional splicing, beyond that indicated in the Plans, permitted in this pay item, or from points as determined by the Engineer shall be required. Should the Contractor believe additional splices are required beyond what is permitted; this matter shall be immediately brought to the attention the Engineer for resolution.

For the purpose of easing construction efforts and reducing risk of damage to cables during installation, the Contractor may, at their discretion, at locations where the breakout of select buffer tubes occurs, instead elect to fully cut the cable and splice all fibers back together rather than maintaining a continuous buffer tubes through the breakout splice location. This will allow a single continuous cable segment to be broken into smaller segments. The Contractor may perform this operation at up to three (3) locations on the project. These proposed locations must be submitted in writing to the Engineer by sheet number and station number and must be approved by the Engineer in advanced of the work. All additional splicing is included in this bid item.

The Contractor is permitted up to two (2) additional fiber optic splice locations not identified in the Plans. The proposed locations must be submitted by sheet number, intersection number, and identified as overhead or underground and approved by the Engineer in advanced of the work. The additional splice enclosures required to perform this work shall be identical to the splice enclosures as described in "*Fiber Optic Splice Enclosure*" and shall be furnished and installed at the Contractor's expense. All additional splicing is included with this bid item.

Should any locations contain additional splice enclosures or splices not approved in advanced by the Engineer, the Contractor shall be required to replace the entire run of fiber from splice enclosure to splice enclosure where the cable installed can match the splicing details as shown on the Plans. The Contractor will not be compensated to and no additional time will be allotted to perform this corrective work.

The Contractor shall be certified to perform installation with the cable manufacturers recommended procedures including, but not limited to the following:

- Proper attachment to the cable strength elements for pulling during installation.
- Cable tensile limitations and the tension monitoring procedures.
- Cable bending radius limitations.

The Contractor shall comply with the cable manufacturer's specifications at all times.

To accommodate long continuous installation lengths, bi-directional pulling of the optical fiber cable is permissible and shall be implemented as follows:

- From the midpoint of a pull station, pull the optical fiber cable into the conduit from the shipping reel in accordance with the manufacturer's specifications.
- When this portion of the pull is complete, the remainder of the cable must be removed from the reel to make the inside end available for pulling in the opposite direction.
- This is accomplished by hand pulling the cable from the reel and laying it into large "figure eight" loops on the ground, or truck/trailer rack designed for this purpose. The purpose of the figure eight pattern is to avoid cable tangling and kinking.
- The figure eight loops shall be laid carefully one upon the other (to prevent subsequent tangling) and shall be in a protected area.
- The inside reel end of the cable shall be available for installation.
- Should it be necessary to set up a winch at an intermediate manhole or junction box, the required length of cable shall be pulled to that point and brought out of the manhole and coiled into a figure eight.
- The figure eight is then turned over to gain access to the free cable end. This can then be reinserted into the duct system for installation into the next section.

The Contractor shall ensure that the minimum bending radius of the optical fiber cable is not compromised when preparing this stored cable slack.

Installation shall involve the placement of optical fiber cables in a micro-duct (direct burial or in existing or new conduit – see *"Fiber Optic Cable, Airblown/Pushable"*), overlashed to existing interconnect/fiber, or attached to messenger wire. The Contractor shall ensure that micro-ducts, where used, are secured to prevent movement during the cable installation process.

The pulling eye/sheath termination hardware on the optical fiber cables shall not be pulled over any sheave blocks.

When power equipment is used to install optical fiber cabling, the pulling speed shall not exceed 100 feet per minute. The pulling tension and bending radii limitation for optical fiber cables shall not be exceeded under any circumstances. The Contractor shall adhere to the bending radii limitation for the specified optical fiber cable as stated within.

Large diameter wheels, pulling sheaves, and cable guides shall be used to maintain the appropriate bending radius. Tension monitoring shall be provided at all times during installation.

The Contractor shall monitor cable pull tensions at all times during pull using a remote sensing puller, strain gauge, or running line tensiometer and shall record the maximum pulling tension for each cable pull.

As cable is pulled into ducts, a water-based lubricant shall be applied at a rate to provide a continuous 10-mil coating. Lubricant shall be approved by the cable manufacturer, and shall be Polywater F(r) manufactured by American Polywater, or equal.

The pulling operation and shall be accomplished using commercial dynamometers, load-cell instruments, or shearing pins (2700N Max.).

DROP CABLE

Drop cables are used to connect the fiber trunk cable to termination point. Leave unused drop cable fibers for future use. Place spare drop cable fibers at the splice enclosure end inside of the enclosure with sufficient excess to provide two service loops.

Insert spare drop cable fibers at the device end into the fan-out kit, connectorized and inserted in the termination panel. Provide drop cables routed down through a pole from aerial interconnect with strain relief (cable support assembly).

Cost of the cable support assembly shall be incidental to the bid item price of the drop cable.

Provide a minimum of 15 feet slack drop cable in each device cabinet or termination panel location. Coil slack drop cable and bind to the cabinet or wall via tie wrap or other approved means.

Any means of securing the slack cable shall NOT apply stress to the drop cable. Loosely wrap tie wraps around the cable.

Where installed in micro-duct, at locations shown in the plans, the drop cable may be of traditional or airblown/pushable construction as long as the Contractor has reasonable means of installing the cable, but under no circumstances shall the cable pulling strength limits be exceeded as specified by the manufacturer.

Factory pre-terminated drop cable/patch panel systems are permitted with approval of the engineer.

FIBER OPTIC SPLICING

All permanent optical splices shall be of the core alignment fusion type method.

Splicing shall occur only at locations identified in the Plans or approved by the Engineer. The Contractor shall submit notification to the Engineer at least 14 days in advance of anticipated work and receive approval by the Engineer prior to performing the work.

All splicing equipment shall be in good working order, properly calibrated, and meeting all industry standards and safety regulations. Cable preparation, closure installation, and splicing shall be accomplished in accordance with accepted and approved industry standards.

Upon completion of the splicing operation, all waste material shall be deposited in suitable containers, removed from the job site, and disposed of in an environmentally acceptable manner.

The average splice loss of each fiber shall be 0.05 db or less per splice. The average splice loss is defined as the summation of the attenuation as measured in both directions through the splice, divided in half.

No individual splice loss measured in a single direction shall exceed 0.05 db.

All fiber optic splices as shown in the Plans are to be considered incidental to the cost of fiber optic cable.

MINIMUM SKILLS REQUIREMENT

The contractor shall show verifiable knowledge and experience of having satisfactorily performed the work or have on their staff a person or persons who have verifiable knowledge and experience of being in responsible charge of the work. The Contractor shall show the ability to provide all equipment necessary to perform the work.

The Contractor must demonstrate successful experience in the splicing of at least 200 single-mode and/or multimode fiber.

The Contractor must furnish a Supervising Fiber Optic Technician (SFOT) who has successfully completed a comprehensive training course for inside or outside plant installation, splicing, termination, and performance testing of single mode and multimode fiber optic cable. The course must be a minimum of 32 hours total of instruction of which a minimum of 16 hours must be hands-on instruction. The Contractor must demonstrate that the course curriculum included, at a minimum, the following topics:

- Fiber optic theory and principles
- Fiber types
- Cable types
- Panels and enclosures
- Design
- Safety
- Inside and outside plant installation
- Cable preparation
- Connectors and connectorization
- Splicing and terminations
- OTDR and test equipment theory, setup, measurement, and documentation
- Restoration and repair

In addition, the SFOT must have a minimum of one (1) year of work experience in the installation, splicing, and termination of fiber optic cable and in the testing of fiber optic cable using an optical time domain reflectometer (OTDR) and a power meter as primary job responsibilities.

The Contractor's installers performing any type of fiber optic work shall have successfully completed a minimum 16 hours total of instruction of which a minimum of 8 hours must be hands-on instruction. The Contractor must demonstrate that the course curriculum included, at a minimum, the following topics:

- Fiber optic theory and principles
- Fiber types
- Cable types
- Safety
- Cable preparation
- Connectors and connectorization
- Splicing and terminations
- ODTR operation
- Restoration and repair

Detailed course curricula showing topics, total hours of instruction and hours of hands-on instruction along with a copy of a certificate of completion of the courses must be submitted for evaluation purposes.

OPTICAL FIBER CONNECTIONS

All optical fiber connectors shall be LC/UPC style unless otherwise noted. All optical fiber termination components shall meet or exceed the applicable provisions of EIA/TIA-455-A.

All optical fiber connectors shall be of industry standard and of type determined by the Engineer for single-mode optical fiber and shall meet or exceed the applicable provisions of EIA/TIA-455-2B, EIA/TIA-455-5A, and EIA-455-34. Optical fiber connectors shall satisfy all of the interface parameters of equipment components as may be defined by the transmission equipment specifications.

Single-mode pigtails shall be provided with factory pre-connectorized single-mode connectors. Connectors shall have a maximum loss of 0.5 db through each mated pair of single-mode fibers. Each connector shall be capable of 500 repeated matings with maximum increase in splice loss limited to 0.2 db.

The Contractor shall provide single mode fiber optic pigtails with color coded buffer tubes. Optical fiber cable used for pigtails shall be of the tight buffered type protected by aramid fibers.

CABLE IDENTIFICATION

CABLE MARKING

The fiber optic cable outer jacket shall be marked with manufacturer's name, the year of manufacture, the words "optical fiber cable", fiber count, type of fiber, owner name "TRAFFIC", and sequential linear foot markings. Repeat the markings every 3 feet. The actual length of the cable shall be within -0/+1% of the length marking. The marking shall be in a contrasting color to the cable jacket. The marking shall be 2.5 mm in height and must be permanent weatherproof and shall not wear off during the installation in the underground conduit system.

WRAPS

The Contractor is required to place a UV-resistant cable owner identification wrap on every installed cable, at every pole, junction box, median junction box, and cabinet location. These pre-coiled, snap-on wrap-around markers will be four (4) inches in horizontal length for underground installations. They shall be made of 0.015 mil solid color throughout vinyl with black heat-sealed ink printing. The wording shall include no advertising logo or message. Color and text shall be as follows:

Orange background with black print text "TRAFFIC". The cable wraps shall also include the fiber count of the appropriate fiber it is placed upon.

The manufacturer and specified product will be approved by the Project Engineer before any markers are ordered.

METHOD OF MEASUREMENT

Fiber optic cable, of each type, measured by linear foot as specified, will be measured to the center of foundation or junction box, plus an allowance for cable coiled at junction boxes, splices, and structures. This measurement shall be compared with footage markings of the cable jacket. All storage slack locations will be identified on the plan sheets and provided to the Engineer as an "as-built" record along with a spreadsheet detailing the information. The Contractor shall obtain approval of the formatting of

the spreadsheet prior to its implementation. All fiber optic markers, splices, tracer wire, training, testing, support equipment and miscellaneous items shall be incidental to the cost of the fiber optic pay items. Drop cable will be measured by linear foot, measured between the splice enclosure and the center of the termination panel location, plus an allowance for cable coiled at junction boxes, splices and structures.

BASIS OF PAYMENT

Fiber optic cable will be paid as indicated below, and will include furnishing all materials, installation, splicing, equipment, labor and incidentals necessary to complete the work specified.

<u>Unit</u>	<u>Description</u>
Linear Foot	Fiber Optic Cable, 144 Strand
Linear Foot	Fiber Optic Drop Cable, 12 Strand

**FIBER OPTIC CABLE (AIRBLOWN/PUSHABLE, 144 STRAND);
FIBER OPTIC CABLE (AIRBLOWN/PUSHABLE, 48 STRAND);**

Furnish bend-insensitive G.657.A1 or G.657.A2, single-mode, step-index dielectric cable, manufactured in the United States. Airblown/pushable fiber optic cable is only permitted for installation in micro-duct. Airblown/pushable fiber optic cable shall not be unprotected. Only one cable shall be installed per micro-duct.

Unless otherwise specified herein, any applicable requirements of "Fiber Optic Cable", including but not limited to testing, splicing, connections, packaging/shipping, and minimum skills shall apply.

Cable shall be 8.1-8.3/125 um single-mode, bend-insensitive optical fiber cable containing glass of type, Corning SMF-28e, AFL SR-15e, or approved equal, and that meets the following specifications:

ITU-T G.652 (Categories A, B, C and D)
IEC Specification 60793-2-50 Type B1.3
TIA/EIA 492-CAAB
Telecordia GR-20

All cables shall be free of material or manufacturing defects and dimensional non-uniformity that would:

- Interfere with the cable installation using manufacturer recommended cable installation methods.
- Degrade the transmission performance and environmental resistance after installation. Inhibit proper connection to interfacing elements.
- Otherwise yield an inferior product.

the spreadsheet prior to its implementation. All fiber optic markers, splices, tracer wire, training, testing, support equipment and miscellaneous items shall be incidental to the cost of the fiber optic pay items. Drop cable will be measured by the number of each installed between the splice enclosure and termination panel location, and will include all costs for material, equipment, slack, tools and labor to provide and install the drop cable.

BASIS OF PAYMENT

Fiber optic cable will be paid as indicated below, and will include furnishing all materials, installation, splicing, equipment, labor and incidentals necessary to complete the work specified.

<u>Unit</u>	<u>Description</u>
Linear Foot	Fiber Optic Cable, 144 Strand
Each	Fiber Optic Drop Cable, 12 Strand

**FIBER OPTIC CABLE (AIRBLOWN/PUSHABLE, 144 STRAND);
FIBER OPTIC CABLE (AIRBLOWN/PUSHABLE, 48 STRAND);**

Furnish bend-insensitive G.657.A1 or G.657.A2, single-mode, step-index dielectric cable, manufactured in the United States. Airblown/pushable fiber optic cable is only permitted for installation in micro-duct. Airblown/pushable fiber optic cable shall not be unprotected. Only one cable shall be installed per micro-duct.

Unless otherwise specified herein, any applicable requirements of “Fiber Optic Cable”, including but not limited to testing, splicing, connections, packaging/shipping, and minimum skills shall apply.

Cable shall be 8.1-8.3/125 um single-mode, bend-insensitive optical fiber cable containing glass of type, Corning SMF-28e, AFL SR-15e, or approved equal, and that meets the following specifications:

ITU-T G.652 (Categories A, B, C and D)
IEC Specification 60793-2-50 Type B1.3
TIA/EIA 492-CAAB
Telecordia GR-20

All cables shall be free of material or manufacturing defects and dimensional non-uniformity that would:

- Interfere with the cable installation using manufacturer recommended cable installation methods.
- Degrade the transmission performance and environmental resistance after installation. Inhibit proper connection to interfacing elements.
- Otherwise yield an inferior product.

MECHANICAL AND PERFORMANCE REQUIREMENTS

The cable shall be a rugged all dielectric outdoor cable containing color coded buffer tubes / binders with 12 single mode color-coded fibers per binder, dual window (1310 nm and 1550 nm) fibers with UV acrylate coating in color coded, buffer tubes or binders with the maximum outer diameter as shown in the chart below based on cable strand count.

Fiber Count	Maximum Outside Diameter (Inches)
6	0.125
12	0.3
24	0.3
48	0.3
72	0.3
144	0.33
288	0.41
432	0.5

The buffer tubes / binders shall be stranded around an all-dielectric center strength element using a reverse oscillation lay, wrapped by water blocking core separator or functional equivalent. The maximum allowable attenuation of the fiber is .35 dB/km for 1310 nm and .25 dB/km for 1550 nm.

No water blocking yarns are permitted to avoid accidentally cutting fibers.

The water blocking elements shall be non-nutritive to fungus, electrically non-conductive, and homogeneous; it shall also be free from dirt or foreign matter.

This water blocking element will preclude the need for other water-blocking material.

The cables shall include GR-20 compliant water-blocked cable core and buffer tubes / binders.

The cable components shall be non-nutritive to fungus, electrically non-conductive, and homogenous.

It shall also be free from dirt and foreign matter. The cable manufacturer shall be TL 9000 registered.

The optical fiber cable shall withstand water penetration when tested with a one-meter static head or equivalent continuous pressure applied at one end of a one-meter length of filled cable for one hour.

No water shall leak through the open cable end. Perform testing in accordance with EIA-455-82B.

OUTER JACKET

Cables shall be all dielectric cable (with no armoring) and shall be jacketed (sheathed) with Polybutylene Terephthalate or High-Density Polyethylene.

Jacketing material shall be applied directly over the tensile strength members to provide mechanical protection, and to serve as the primary moisture barrier.

This cable sheath shall be designed to meet or exceed the tensile criteria defined in EIA-455- 89a.

Each jacketed fiber shall have a tensile strength in excess of 50 lbs.

The jacketing shall contain carbon black to provide ultra-violet light protection, and it shall not promote the growth of fungus.

The jacket or sheath shall be free of any holes, splits, or blisters.

The cable jacket shall contain no metal elements and shall be of a consistent thickness. The cable shall contain at least one ripcord under the sheath for easy sheath removal.

CRUSH RESISTANCE

The non-armored optical fiber cables shall withstand a compressive load of 220 N/cm applied uniformly over the length of the cable.

The average increase in attenuation for the fibers shall be \leq 0.10 dB at 1550 nm for a cable subjected to this load.

The cable shall not exhibit any measurable increase in attenuation after load removal.

Perform testing in accordance with EIA-455-41, "compressive loading resistance of fiber optic cable," except that the load shall be applied at the rate of 3 mm to 20 mm per minute and maintained for 10 minutes.

Submit the manufacturer's certification for approval.

CYCLIC FLEXING

The cable shall be capable of withstanding 25 cycles of mechanical flexing at a rate of 30 +/- 1 cycles/minute.

The average increase in attenuation for the fibers shall be less than or equal to 0.10dB at 1550 nm at the completion of the test.

Outer cable jacket cracking or splitting observed under 10x magnification shall constitute failure.

Conduct the test in accordance with EIA-455-104, except that the sheave diameter shall be a maximum diameter of 20 times the cable outer diameter (O.D.).

Test the cable in accordance with test conditions I and III of EIA-455-104. The cable shall withstand 25 impact cycles.

The average increase in attenuation for the fibers shall be 0.20dB at 1550 nm (single-mode).

The cable jacket shall not exhibit evidence of cracking or splitting. The test shall be conducted in accordance with EIA/TIA-455-25A.

Submit the manufacturer's certification for approval.

TENSILE STRENGTH

Tensile strength shall be provided by high tensile strength aramid yarns and fiberglass, which shall be helically stranded evenly around the cable core.

The cable shall withstand a tensile load of 1334 Newtons (N) [300 lbs.] without exhibiting an average increase in attenuation of greater than 0.10dB.

Apply the load for one hour in test condition II of EIA-455-33A.

The optical fiber cable shall withstand a maximum pulling tension of 1334N (300 lbs.) during installation (short term) with no damage and 400N (90 lbs.) installed (long term).

Submit the manufacturer’s certification for approval.

TEMPERATURE

The shipping, storage, installation, and operating temperature range of the cable shall meet or exceed 14 °F to +158 °F (-10°C to +70°C).

BEND-INSENSITIVE

Single-mode fibers shall be contained in color-coded binders.

The configuration shall be dimensionally sized to minimize local stresses and microbend losses.

The optical fiber cable shall be an approved product of the U.S. Department of Agriculture, Rural Electrification Administration in accordance with the requirements of REA-PE-90, or as otherwise indicated, and shall conform to EIA/TIA-598.

Each optical fiber shall consist of a doped silica core surrounded by a concentric silica cladding.

The central anti-buckling member shall consist of a glass reinforced plastic rod; the purpose of the central member is to prevent buckling of the cable.

COLORS

All optical fibers shall be identifiable by standard color codes as defined in EIA/TIA-

598. Each fiber shall be distinguishable, as determined by the maintaining agency, from others by means of color coding and shall conform to the following EIA/TIA sequence of colors:

1. Blue	7. Red
2. Orange	8. Black
3. Green	9. Yellow
4. Brown	10. Violet
5. Slate	11. Rose
6. White	12. Aqua

The colors shall be in accordance with the Munsell color shades.

The fiber coloring shall be an ultraviolet (UV) curable ink, which is applied to the outside of the optical fiber protective coating layer and shall not be an integral component of the coating layer itself in order to produce more distinguishable colored fiber.

Buffer tubes containing fibers shall also be color-coded with distinct and recognizable colors according to the following sequence of colors:

1. Blue	13. Blue with black tracer
2. Orange	14. Orange with black tracer
3. Green	15. Green with black tracer

4. Brown	16. Brown with black tracer
5. Slate	17. Slate with black tracer
6. White	18. White with black tracer
7. Red	19. Red with black tracer
8. Black	20. Black with white tracer or black with yellow tracer
9. Yellow	21. Yellow with black tracer
10. Violet	22. Violet with black tracer
11. Rose	23. Rose with black tracer
12. Aqua	24. Aqua with black tracer

The color formulation shall be compatible with the fiber coating and be heat stable.

Color formulation shall not fade or smear or be susceptible to migration and it shall not affect the transmission characteristics of the optical fibers and shall not cause fibers to stick together.

CABLE MARKING

The fiber optic cable outer jacket shall be marked with manufacturer’s name, the year of manufacture, the words “optical fiber cable”, fiber count, type of fiber, owner name “TRAFFIC”, and sequential linear foot markings. Repeat the markings every 3 feet. The actual length of the cable shall be within -0/+1% of the length marking. The marking shall be in a contrasting color to the cable jacket. The marking shall be 2.5 mm in height and must be permanent weatherproof and shall not wear off during the installation in the underground conduit system.

QUALITY ASSURANCE PROVISION

Fiber optic cable shall meet or exceed the requirements of this specification when measured in accordance with the methods of the individual requirements or the following methods as defined in EIA-455-A:

1. Fiber dimensions
2. Attenuation
3. Numerical aperture
4. Fiber proof test
5. Crush resistance
6. Cable bending
7. Tensile load
8. Impact resistance
9. Attenuation vs. Temperature

METHOD OF MEASUREMENT

Fiber optic cable, of each type, measured by linear foot as specified, will be measured to the center of foundation or junction box, plus an allowance for cable coiled at junction boxes, splices, and structures. This measurement shall be compared with footage markings of the cable jacket. All storage slack locations will be identified on the plan sheets and provided to the Engineer as an “as-built” record along with a spreadsheet detailing the information. The Contractor shall obtain approval of the formatting of the spreadsheet prior to its implementation. All fiber optic markers, splices, tracer wire, training, testing, support equipment and miscellaneous items shall be incidental to the cost of the fiber optic pay items. Drop cable will be measured by the number of each installed between the splice enclosure and

termination panel location, and will include all costs for material, equipment, slack, tools and labor to provide and install the drop cable.

BASIS OF PAYMENT

Fiber optic cable will be paid as indicated below, and will include furnishing all materials, installation, splicing, equipment, labor and incidentals necessary to complete the work specified.

<u>Unit</u>	<u>Description</u>
Linear Foot	Fiber Optic Cable (Airblown/Pushable, 144 Strand)
Linear Foot	Fiber Optic Cable (Airblown/Pushable, 48 Strand)

**MICRO-DUCT PATHWAY-2 CELL;
MICRO-DUCT PATHWAY-3 CELL**

Furnish and install a micro-duct pathway for the purpose of installing air-blown/pushable fiber optic cable. Unless otherwise indicated, 3 cell pathways shall be installed for all buried 48 and 144 strand fiber optic cables and 2 cell pathways shall be installed for fiber optic drop cable (between underground splice enclosures and BRT stations or signal controllers). Micro-duct pathways maybe installed directly below grade (microtrench in pavement) or through existing/proposed conduits/ducts.

Internal pathway ducts shall be constructed of clean virgin high density polyethylene (HDPE) conforming to ASTM D3350-98a, Type III, Category 5, Class B or C and Grade P-34 per ASTM D1248-84 or equivalent. External pathway oversheathing shall be constructed of clean virgin high or medium density polyethylene (HDPE or MDPE). Oversheathing shall have a minimum thickness of 0.050mm.

Provide a silicone lubricated co-extruded permanent layer of uniform thickness, containing active or polymeric materials which provide a permanent low friction boundary layer between the micro-duct and cable for a minimum service life of 15 years for the micro-duct. All micro-duct included in the pathway shall be equipped with silicone super slick permanent liner.

The pathways may consist of multiple micro-ducts within a single jacketed duct. The micro-duct pathway shall contain micro-ducts dissimilar in color.

All micro-ducts and oversheathing are to be flexible, lightweight, durable, corrosion resistant, non-conductive and easy to install. Micro-ducts and oversheath shall be constructed of polymeric materials. All micro-ducts are to be smooth on the outside, micro-ribbed on the inside, and have a co-extruded permanent lubrication layer. All oversheathing shall be smooth. All micro-duct oversheathing shall be orange in color and shall include a locate wire (20AWG minimum) and rip cord(s). The locate wire shall be installed in the pathway and shall not be permitted to be located within a micro-duct. At each splice location, install and connect tracer wire test station per the requirements in "Tracer Wire", incidental to this item.

All micro-duct and oversheath shall be free from holes, blisters, inclusions, cracks, or other imperfections, which would affect the performance or serviceability

The micro-duct and oversheath shall be homogenous throughout and free from dimensional non-conformities as much as possible within the manufacturing process.

Micro-Duct Specifications:

Micro-Duct Size	12.7/10	16/12	22/16
Outside Diameter (interior duct)	12.7mm	16.0mm	21.3mm
Inside Diameter (interior duct)	9.8mm	11.6mm	15.5 mm
Maximum Cable Diameter	7.8mm	9.2mm	12.4mm

METHOD OF MEASUREMENT

Micro-duct pathway, of each type, measured by linear foot as specified, will be measured to the center of foundation or junction box, plus an allowance for cable/duct coiled at junction boxes, splices, and structures.

BASIS OF PAYMENT

Micro-duct pathway will be paid as indicated below, and will include furnishing all materials, installation, equipment, labor and incidentals necessary to complete the work specified.

<u>Unit</u>	<u>Description</u>
Linear Foot	Micro-duct Pathway-2 Cell
Linear Foot	Micro-duct Pathway-3 Cell

FIBER OPTIC SPLICE ENCLOSURE

GENERAL

Fiber optic cable splices shall be performed in splice enclosures as shown on the Plans. The splice enclosures shall be corrosion resistant, rodent proof, re-enterable, and manufacturer certified for underground installation.

Splice enclosures are to be installed in junction boxes as directed in the Plans. Contractor shall advise the Engineer in the event that cables cannot enter splice enclosure perpendicularly to cable port entry plate, or if cable bends exceed minimum installation bend radius rating at the enclosure entry due to existing field conditions such as inadequate space in junction box or other obstructions. Additionally, Contractor shall advise the Engineer prior to beginning splicing if planned number of splices cannot be neatly and securely contained in the type of splice enclosure called out in the Plans.

For underground installation, splice enclosure and slack cable must fit within junction box to avoid damage to the enclosure or cable upon closing the junction box lid.

MATERIAL

The splice enclosure shall be weatherproof, waterproof, corrosion resistant, rodent proof, re-enterable, and crush resistant. Clamshell enclosures shall have upper and lower pieces with cable entry plate that are tightened down and sealed using screws / bolts. Dome enclosures shall be single tube with cable entry plate. The splice enclosure shall easily fit into junction boxes along with loops of slack cable in box (approx. 50 ft) the splice enclosure shall be a complete kit including all components and hardware for installation. The splice enclosure shall be suitable for application in the temperature range of -40 C to

+70 C. The splice enclosure shall provide space, allowing entry of fiber optic cable without exceeding the minimum bend radius of the cable. The enclosure shall have provisions for cable and pigtail strain-relief, and shall be equipped with strain-relief hardware. The splice enclosure shall be equipped with elastomeric splice blocks enclosed within manufacturer splice trays and shall permit selective fiber splicing (looping a backbone cable in and out while only cutting into the desired fibers – all buffer tubes not shown as being spliced in the Plans are to be securely coiled within the splice enclosure). The size of the closure shall allow all the fibers of the largest optical fiber trunk cable to be fusion spliced to a second cable of the same size, plus additional pigtails. The splice enclosure shall allow splicing of all fibers up to the maximum number specified on the contract drawings.

Fiber optic cable splice enclosures shall have a three-section, 4, 6, or 8 port end plate with 7/8” diameter ports. Plug kits and brackets shall be incidental to pay item. Any proposed equivalent must be approved by the Engineer prior to installation. Fiber optic cable splice enclosures must meet the requirements listed under Bellcore Testing Requirement GR-771-CORE and UL 1863.

METHOD OF MEASUREMENT

The work as described will be measured as one unit for each of the installations specified, and shall include all materials, equipment and incidentals, complete in place. Terminations, connections, fan-out kits, and other miscellaneous items and materials shall be incidental to this work and no separate payment will be made.

BASIS OF PAYMENT

Payment shall be made per the bid item for each fiber optic splice enclosure that is installed per pay item.

<u>Unit</u>	<u>Description</u>
Each	Fiber Optic Splice Enclosure

CABINET FIBER TERMINATION PANEL

Provide a termination panel in a place that provides the most room for making connections, minimizes fiber bending, and does not subject fibers to interference from door openings or routine maintenance operations inside the cabinet space.

House in the termination panel all fiber optic pigtails, fiber optic connectors, fiber optic patch cords, and splice trays.

All fiber optic pigtails, fiber optic connectors, fiber optic patch cords, splice trays, and pigtail fusion splices shall be incidental to the unit cost of the fiber optic termination panel.

Provide three (3) meter patch cords of the appropriate fiber type and fiber connectors in a quantity that is half of the number of fiber optic connectors available on the termination panel, or as directed by the engineer.

Utilize standard 19-inch rackmount panels for the termination panel where installed in rack.

Splice trays shall be incidental to the cost of the termination panel.

Splice trays shall be of the type that allows up to 12 splices. The buffer tubes of each fiber shall enter at opposite ends of the splice tray and shall have separate coils of fiber at opposite ends of the tray.

Install splice trays in the following manner:

- The splice trays have areas on each end for coiled fiber.
- Coil the entering fiber buffer tube at one end and coil the exiting fiber buffer tube at the opposite end.
- Secure the splice, with splice protector in the holder, located in the center of the splice tray.
- Secure all splice trays in a separate 19 inch rackmount housing from the fiber optic connectors, so as to limit the amount of clutter located in the termination panel housing.
- Make available enough fiber optic cable slack to allow each splice tray to be set flat on the ground outside of the cabinet, during any needed future fiber optic maintenance/repairs.

Install all fiber optic cable, buffer tubes, pigtails, patch cords, and splice trays in a neat and orderly fashion and secured to eliminate any interference with the removal, replacement, operation, and maintenance of all other items located in the cabinet.

Document the function of each terminated/spliced fiber, along with the designation of each connector on labels or charts located either on the inside or outside of the housing door. Provide labels or charts that are UV resistant design for harsh environments and used inside field equipment cabinets. Use permanent marker or method of identification that will withstand harsh environments. Provide each housing with strain relief. Terminate single mode fiber optic cable with LC connectors to the patch panels, unless otherwise shown on the plans.

Provide an emergency restoration kit with each fiber termination panel to perform temporary splices. This kit shall include all necessary materials to perform a minimum of 5 mechanical splices. Tools, such as cleavers, strippers, etc., shall be provided by the owning agency. Each mechanical splice kit shall be capable of achieving not more than 0.5dB loss at any wavelength and contain LC/SC/ST type connectors. This kit shall be incidental to each termination panel. The emergency restoration kit shall be of the same manufacturer as the cable being installed.

Factory pre-terminated drop cable/patch panel systems are permitted with approval of the engineer.

METHOD OF MEASUREMENT

The work as described will be measured as the number of Panels furnished and installed, complete in place. This should include all items included in the standard drawings. Terminations, connections, fan-out kits, and other miscellaneous items and materials shall be incidental to this work and no separate payment will be made.

BASIS OF PAYMENT

<u>Unit</u>	<u>Description</u>
Each	Cabinet Fiber Termination Panel

INTERIOR FIBER OPTIC PATCH PANEL

DESCRIPTION

Where identified on the plans the Contractor shall furnish and install 19" rack-mountable fiber optic patch panel for all interior locations (buildings) at TARC Server Room and Louisville Metro.

MATERIALS:

The Contractor shall furnish and install 19" rack-mount fiber optic patch panels where indicated on drawings for all interior building runs of fiber optic cable.

The patch panel shall be 19" wide painted steel box for rack mounting with knockouts to accommodate raceways being utilized. The height shall be as directed by drawings to include 2U space factor for four connector housing panels and 4U for twelve connector housing panels. Interior patch panels shall meet the requirements of ANSI-568A and ANSI-606.

Panel shall have chambers to isolate trunk and distribution cables and have a lockable continuous hinged covers to separate trunk and demarcation points. Panels shall include strain relief brackets and routing clips and guides. Panels shall include mounting brackets for rack mounting.

Patch panels shall be provided with closet connector housing panels which include twelve (12) SC duplex adapters per panel. Connector housing panels shall support single-mode OS2 fiber. Connector housing panels shall mount within and be of the same manufacturer as the base patch panel.

Patch panels shall be supplied with all necessary accessories to make a complete, functional system including strain relief and fiber fan-out trays.

NOTES

Where indicated on drawings, the Contractor shall furnish and install 80.25" tall network cabinet with accessories including power distribution and cable management accessories.

Network cabinet – provide a communication network cabinet in locations noted on drawings. The network cabinet shall be a minimum of 80" tall (42 or 43 rack units), a minimum of 34" deep, and shall accommodate standard 19" rack mounting angle spacing and constructed of rigid steel with black textured low-gloss polyester powder paint. Network cabinets shall have a perforated steel front door and perforated split rear door with solid side panels. Doors shall be lockable. Enclosure shall be UL 1863 Listed. The network cabinet shall include the following accessories: leveler kit, vertical tie-down cable managers, and single-phase vertical panel mount power distribution unit. The power distribution unit shall be rated at 120VAC with 6 receptacles and surge protection.

Cable management – furnish and install horizontal rack mount cable management assemblies with D-rings. Each cable manager shall be 2U space factors (or 1U space factors where indicated) in height and be constructed of black powder coated steel.

CONSTRUCTION

The Contractor shall be responsible for providing a complete, functional system including all necessary cables and connectors in accordance to the specifications and as specified on the plans. All miscellaneous patch and interconnect cables shall meet the proposed equipment specification requirements and shall meet EIA/TIA telecommunications standards.

Interior patch panels shall generally be installed at the top of the network cabinet and each shall have a cable management section installed beneath. All fibers within the network cabinet shall be neatly routed and secured. Fiber optic cables inside each patch panel and network cabinet shall contain sufficient slack cable to allow for termination work outside of the panel.

The Contractor shall coordinate with Louisville Metro and TARC IT department for access to and any work within municipal node location sites, including installation of cabling, raceway, cabinets, and network infrastructure. Coordinate with IT regarding space allocation for materials and equipment and hours required for completion work. Equipment and materials shall be organized to minimize installation time within municipal node locations.

METHOD OF MEASUREMENT

The work as described will be measured as the number of Panels furnished and installed, complete in place. This should include all items included in the standard drawings. Terminations, connections, fan-out kits, and other miscellaneous items and materials shall be incidental to this work and no separate payment will be made.

BASIS OF PAYMENT

<u>Unit</u>	<u>Description</u>
Each	Interior Fiber Optic Patch Panel
Each	Cabinet Fiber Termination Panel

LAYER 2 ETHERNET SWITCH – FIELD MOUNT, BY PORT COUNT

DESCRIPTION

The Contractor shall purchase and install environmentally hardened Layer 2 Ethernet switches, Cisco Industrial Ethernet 2000 Series, as shown on the Plans. The switch must be compatible with the current City Cisco router central software. This work is the furnishing and installation of a 6-port (Cisco IE-2000-4TS-G-B) managed Ethernet switch for traffic signal control networking or 18-port (IE-2000-16PTC-G-E) managed Ethernet switch for BRT station networking, as specified in the plans. All field switches shall be provided with a minimum of two (2) single mode fiber-based SFP uplink ports and modules for connection to the fiber network.

The Contractor is responsible for ensuring that the furnished Layer 2 Ethernet Switches are fully compatible with the SFP modules as described under *“Fiber Optic Ethernet Transceiver, Short Range”*.

All Layer 2 Ethernet switches shall be of the same manufacturer. All equipment shall be new and in strict accordance with the details shown on the plans and the specifications.

Layer 2 Ethernet switches shall support direct connectivity to proposed and existing networks configured in ring and mesh fault tolerant topologies enabling applications to operate reliably, and with low latency.

All equipment shall include licenses, where required, for any software or hardware in the system.

PERFORMANCE REQUIREMENTS

Layer 2 Ethernet switches shall support direct connectivity to proposed and existing networks configured in ring and mesh fault tolerant topologies enabling applications to operate reliably, and with low latency.

Layer 2 Ethernet switches shall comply with the following Institute of Electrical and Electronics Engineers (IEEE) Standard Specifications:

- IEEE 802.1ab-2009 LLDP
- IEEE 802.1d-2004: Rapid Spanning Tree Protocol
- IEEE 802.1q-2011: VLAN Tagging
- IEEE 802.1x-2010 User Authentication (Radius)
- IEEE 802.3i: 10BASE-T
- IEEE 802.3ab: 1000BASE-T
- IEEE 802.3ax Port trunk with LACP

- IEEE 802.3af Class 1 – 3 Power over Ethernet
- IEEE 802.3d: MAC Bridges
- IEEE 802.3u: 100BASE-TX, 100BASE-FX
- IEEE 802.3x: Full duplex and Flow Control
- IEEE 802.3z: 1000BASE-XR RFC768: UDP
- RFC783: TFTP
- RFC791: IP
- RFC792: ICMP
- RFC793: TCP
- RFC826: ARP
- RFC854: Telnet
- RFC894: IP over Ethernet
- RFC1112: IGMP v1
- RFC1493: Bridge MIB
- RFC1519: CIDR
- RFC1541: DHCP (client)
- RFC1907: SNMP v2 MIB
- RFC2012: TCP MIB
- RFC2013: UDP MIB
- RFC2030: SNTP
- RFC2068: HTTP
- RFC2236: IGMP v2
- RFC2578: SNMP v2 SMI
- RFC2579: SNMP v2 TC
- RFC2819: RMON MIB
- RFC2863: IF MIB

MATERIALS

GENERAL

Layer 2 Ethernet switches shall have a physical design that conforms to the following requirements:

- Be configurable in point-to-point, daisy-chain, ring, and mesh topologies for connectivity into new and existing fiber optic and copper based Ethernet networks.
- Designed with an operating system that allows individual ports to be configured for port mirroring, speed, duplex, auto-negotiation, and flow control. The operating system shall also provide for broadcast storm frame filtering with user defined thresholds.
- Designed with an operating system allows for the collection of statistics on a per port basis and provides for full support of Remote Monitoring (RMON) statistics, history, alarms, and event groups using the City Cisco management system.
- Designed with an operating system that provides port security to prevent unknown devices from gaining access to the network. Unauthorized attempts to access the network shall result in the port being shut down for a period of time along with Simple Network Management Protocol (SNMP) trap and alarm generation.
- Clearly identify all modules and assemblies with name, model number, serial number, or any other pertinent information required to facilitate equipment maintenance.
- Meets NEMA TS-2 (traffic control equipment)

- -40°C to +70°C operating temperature
- -40°C to +85°C storage temperature
- Operating temp: -40°F to 145°F
- Relative Humidity: 5% to 95%
- Metal case used as a heat sink
- Environmental Protection rating: IP52
- Warranty: 3 years

6-Port Switches (Metro/Traffic Signal Network)

- Minimum of two Gigabit Ethernet full-duplex switched SFP ports.
- Minimum of four switched 10/100 MB copper Ethernet (8P8C) ports.
- External 120VAC to 24DC, 50-60W, power adapter – DIN-rail mount (Cisco PWR-IE50W-AC, Sola SDN2.5-24-100P, or approved equal)
- Number of PoE Ports: 0

18-Port Switches (TARC/BRT Network)

- Minimum of two Gigabit Ethernet full-duplex switched SFP ports.
- Minimum of 16 switched 10/100/1000 copper Ethernet (8P8C) ports.
- External 120VAC to 54DC, 170W, power adapter – DIN-rail mount (Cisco PWR-IE170W-PC-AC or approved equal)
- Number of PoE Ports: 4

CONSTRUCTION

- Configure switch.
- Install power adapter, power cables, Category 5e or Category 6 patch cords, and single mode fiber optic patch cables as required and depicted on communications diagrams.
- Route cables neatly in panel, bundle and secure.
- Securely mount the switch and power supply in the cabinet on one section of DIN-rail mounted on the 19" rack in traffic signal cabinets or on the interior wall of the BRT pylon.
- Make power and communication connections.
- Establish and verify communications prior to transitioning signal controller to new system.
- Obtain IP addresses from Metro/TARC to program the switches and program.
- Furnish and install LC duplex and CAT 6 copper SFP transceiver modules.
- Furnish CAT 6 Ethernet patch cables – Metro/TARC shall make final connections to existing traffic control network.

The Contractor shall be responsible for providing a complete, functional system including all necessary cables and connectors in accordance to the specifications and as specified on the plans. All miscellaneous patch and interconnect cables shall meet the proposed equipment specification requirements and shall meet EIA/TIA telecommunications standards. Additionally, fiber optic patch cables shall conform to specifications as stated under *"Fiber Optic Cable, By Strand"*.

METHOD OF MEASUREMENT

The work as described will be measured as one unit for each of the installations specified, and shall include all materials, equipment and incidentals, complete in place. Installation of Ethernet CAT 6 patch cables shall be included with this pay item – See *"CAT 6 Cable"*. Installation of all required Fiber Optic Ethernet Transceivers to complete the communication network shall be incidental to this pay item – See *"Fiber Optic Ethernet Transceiver, Short Range"*. Installation of all required Fiber Optic Patch Cables to

complete the communication network shall be incidental to pay item – See “*Fiber Optic Patch Cord, 2 Fiber.*” Terminations, connections, and other miscellaneous items and materials shall be incidental to this work and no separate payment will be made.

BASIS OF PAYMENT

Network communication to Metro Signal System and TARC must be established and accepted prior to final payment of this item. Layer 2 switches will be paid for at the contract unit price for:

<u>Unit</u>	<u>Description</u>
Each	Layer 2 Ethernet Switch – Field Mount, 6 Port
Each	Layer 2 Ethernet Switch – Field Mount, 18 Port

**LAYER 2 ETHERNET SWITCH– RACK MOUNT;
FIREWALL UNIT-RACK MOUNT**

DESCRIPTION

The Contractor shall furnish and install Cisco Catalyst WS-C3850-24S Ethernet switches as shown on the Plans. The switch shall include an “IP Services” software option, and twenty-four (24) Gigabit Ethernet SFP ports for fiber optic transceiver modules for connection to the fiber network.

The Contractor is responsible for ensuring that the furnished Layer 2 Ethernet Switches are fully compatible with SFP modules as described under “Fiber Optic Ethernet Transceiver, Short Range”.

The Contractor shall furnish two (2) Fortinet FortiGate FG-80E firewall units. The unit shall be installed and assembled for protection of the TARC and Metro Traffic IT networks.

MATERIALS

The Contractor shall deliver the following items to the Construction Project Manager for configuration and testing by the TARC and Metro Traffic:

- Cisco Catalyst WS-C3850-24S
- Fortinet FortiGate FG-80E

Upon acceptance the switches and power supplies will be returned to the Contractor for installation.

The Contractor shall furnish and install the following components to complete the rack mount Layer 2 Ethernet switch system or as indicated on drawings:

- Uninterruptable Power Supply (UPS) – 1500VA, 120VAC rated, rack-mount chassis, 2U rack height, LCD status display, NEMA 5-15P input, NEMA 5-15R output (6), electronic bypass, leakproof maintenance-free battery, Energy Star and UL 1778 Listed. Acceptable manufacturers: APC Smart-UPS C, Tripp-Lite SU1500RTXLCD, or Approved equal.
- Power cables, Category 5e or Category 6 patch cords, and single mode duplex LC/UPC patch cables at various lengths as required.

The Contractor shall install the following items for the completion of the Firewall Unit.

CONSTRUCTION

1. Install Layer 2 rackmount switch and UPS in new rack at TARC.
2. Install Layer 2 rackmount switch and UPS in new rack at Louisville Metro Traffic.
3. Install Two (2) Firewall Units, rackmounted at TARC
5. Install cable management insert, 1U rack height, below each switch.
6. Securely mount the switch and associated components on 19" equipment rack rails.
7. Furnish and install LC duplex and CAT 6 copper SFP transceiver modules.
8. Make power and communication connections, including fiber optic patch cables.
9. Furnish CAT 6 Ethernet patch cables – City shall make final connections to existing traffic control network.

The Contractor shall be responsible for providing a complete, functional system including all necessary cables and connectors in accordance to the specifications and as specified on the plans. All miscellaneous patch and interconnect cables shall meet the proposed equipment specification requirements and shall meet EIA/TIA telecommunications standards.

NOTES

The Owners shall bench test, assign IP addresses and configure the Layer 2 Ethernet switches and firewall units prior to the equipment being installed in the field. Testing shall not begin until all Ethernet switches and expansion modules are received by the Owners. The Contractor shall provide the Engineer a written notification a minimum 14 calendar days before the delivery of the Ethernet switches and expansion modules. The test procedures shall consist of operating the equipment in a network configuration for a minimum of seven days. The Contractor shall coordinate delivery of the Ethernet switches, expansion modules and firewall units for testing with the Owners. The Contractor shall be responsible for loading and unloading all equipment and obtaining a receipt from shop personnel that lists all delivered materials by manufacturer, model number, and serial number. The Owners will complete testing on the Ethernet switches and firewall units within 40 working days. Upon completion of the testing the City will notify the Contractor that the equipment can be picked up. Any Ethernet switch or expansion module found to be unsatisfactory shall be replaced by the Contractor and resubmitted for testing. The Owners will schedule testing of this returned equipment as quickly as possible but will only provide a forty-five (45) day guarantee for the turnaround time period. The Contractor shall be solely responsible for any delay caused by this testing. Proposed equipment which have not passed testing or which have not been tested by the Owners shall not be installed in the field. Any cost associated with the delivery and pick-up shall be incidental to the cost of the bid item. Contact the construction project manager for equipment status. Switches and firewall shall also meeting the testing requirements of SYSTEM INTEGRATION and the associated testing matrix.

METHOD OF MEASUREMENT

The work as described will be measured as one unit for each of the installations specified, and shall include all materials, equipment and incidentals, complete in place. Installation of standard Ethernet CAT 5 patch cables shall be included with this pay item. Installation of all required Fiber Optic Ethernet Transceivers to complete the communication network shall be incidental to this pay item – See "*Fiber Optic Ethernet Transceiver, Short Range*". Installation of all required Fiber Optic Patch Cables to complete

the communication network shall be incidental to pay item – See “*Fiber Optic Patch Cord, 2 Fiber.*” Terminations, connections, and other miscellaneous items and materials shall be incidental to this work and no separate payment will be made.

BASIS OF PAYMENT

All network communication to the switch as described in the Plans must be completed and accepted prior to final payment of this item. Layer 2 switches will be paid for at the contract unit price for:

<u>Unit</u>	<u>Description</u>
Each	Layer 2 Ethernet Switch – Rack Mount
Each	Firewall Unit – Rack Mount

FIBER OPTIC ETHERNET TRANSCEIVER, SHORT RANGE

DESCRIPTION

The Contractor shall furnish and install single mode fiber (SMF), small form factor pluggable (SFP) Gigabit Interface Connector (GBIC) modules at locations as shown on the plans.

MATERIALS

The Fiber Optic Ethernet Transceivers shall transmit and receive 10/100/1000BaseFx to 100BaseFX data over the designated fiber type as per the plans. Each transceiver shall operate at 1310 nm and have a range of 10 km unless a greater range is required to reach the adjacent switch on the same ring. Fiber optic media converter (SFP modules) shall be compatible with the existing Ethernet switches as shown on the plans. The fiber optic media converters shall be CISCO PART #GLC-LH-SMD and meet the following requirements:

- Multi-source package with Duplex LC connector (for optical GBIC modules)
- Optical patch cables shall be compliant with GR-326 (single-mode)
- Safety – Laser Class I 21CFR1040
- Laser Class I IEC 60825-1
- Hot-swappable
- 4.75VDC input voltage
- -40 to +85 C operating temperature
- -40 to +85 C storage temperature

Standards

- Compatible with GBIC standard as specified in IEEE 802.3z
- Compliant with GBIC Specification Revision 5.4
- GR-20-CORE: Generic Requirements for Optical Fiber and Optical Fiber Cable
- GR-326-CORE: Generic Requirements for Single-Mode Optical Connectors and Jumper Assemblies

All SFP modules provided by the Contractor for installation shall be 100% compatible with the approved Layer 2 network switches.

CONSTRUCTION

- Install the SFP module in the Ethernet switch slot.
- Configure as necessary.

The Contractor shall be responsible for providing a complete, functional system including all necessary cables and connectors in accordance to the specifications and as specified on the plans. All miscellaneous patch and interconnect cables shall meet the proposed equipment specification requirements and shall meet EIA/TIA telecommunications standards.

METHOD OF MEASUREMENT

The work as described will be measured as one unit for each of the installations specified, and shall include all materials, equipment and incidentals, complete in place. Terminations, connections, and other miscellaneous items and materials shall be incidental to this work and no separate payment will be made.

BASIS OF PAYMENT

Payment for all fiber optic Ethernet transceivers shall be included in *Layer 2 Ethernet Switch*.

TRANSIT SIGNAL, 3 SECTION 12 IN

Signal heads for transit operations shall meet the requirements of KYTC Standard Specification 835.16, except the optical units shall include the horizontal white line, flashing white triangle, and vertical white line per MUTCD section 8C.11. Transit signal heads shall be installed with backplates, on signal poles as shown in the plans, at a minimum height of 11’ above the ground (measured to the bottom of the signal head). All signal indications shall be LED. As noted in the Specifications, all signal modules must be Intertek certified.

METHOD OF MEASUREMENT

The work as described will be measured as each individual unit installed and connected to signal conductors. All required brackets, mounting arms and bands will not be measured and will be considered incidental to this work item.

BASIS OF PAYMENT

Payment shall be made per the bid item for each transit signal head that is installed per pay item.

<u>Unit</u>	<u>Description</u>
Each	Install Signal – 3 Section 12 IN. (Transit)

EXTERNAL UPS SYSTEM CABINET

Install an external UPS cabinet adjacent to the existing 332 traffic signal cabinet at the intersections of Dixie Highway/E Pages Lane and Dixie Highway/Stonestreet Road that meets the requirements of Section 10, External BBS Cabinet, of the Caltrans Specifications for Battery Back-up System, TEES Chapter 4, July 2009. Cabinet shall be sized to house existing UPS equipment, including existing batteries (4), inverter, transfer switch, wiring, hardware, and incidentals. Contractor to transfer all existing UPS components into new cabinet to the satisfaction of the engineer, tested and accepted.

METHOD OF MEASUREMENT

The work as described will be measured as each individual unit installed.

BASIS OF PAYMENT

Payment shall be made per the bid item for each External UPS cabinet that is installed per pay item.

<u>Unit</u>	<u>Description</u>
Each	Install External UPS System Cabinet

CONTROLLER UNIT

Install actuated, 8-phase, solid state digital microprocessor type controllers -in existing or new cabinets with all accessories (including controller modules and software) that are necessary to make the controllers completely functional and operational at each of the signalized intersections to be upgraded as indicated in the plans. The controllers, to be provided by KYTC, shall be Model 2070 compliant, meeting the latest published KYTC controller specification.

METHOD OF MEASUREMENT

The work as described will be measured as each individual unit installed.

BASIS OF PAYMENT

Payment shall be made per the bid item for each controller that is installed per pay item.

<u>Unit</u>	<u>Description</u>
Each	Install ATC Controller
Each	Install 1C ATC Module w/Maxtime

SYSTEM INTEGRATION

DESCRIPTION

This pay item includes all work required to seamlessly integrate new signals and components into the traffic and transit networks in order to achieve the same level of functionality as the existing system. This integration includes both the traffic and station/transit networks.

The Contractor shall be responsible for integrating all of the new controllers along the BRT route that must provide Transit Signal Priority (TSP) functionality (KYTC compliant 2070 ATC's with Intelight Max Time software) with a to be determined Advanced Traffic Management System (through a future Louisville Metro procurement document). The envisioned ATMS must be capable of fully supporting the Max Time software and meet the Lexington Fayette Urban County Governments ATMS specification. The new ATMS must also allow communications, monitoring and commanding capabilities with the existing compliment of 170E controllers along the north section of the BRT route (with the latest KYTC WAPITI firmware) that will remain on the existing copper and multi-mode fiber interconnect system. Additionally, the new ATMS must be capable of replicating all current TRANSPHAT functionality (with acceptable upload and download speeds). If limited modifications are required to the WAPITI firmware/chip in order for the existing 170E controllers to utilize additional capabilities of the ATMS, those upgrades will be completed by Louisville Metro.

Existing traffic signal timing shall be duplicated and tested on new 2070 traffic signal controllers, modified as necessary to run on the Intelight Max Time Software. Proposed basic, coordinated, and TSP traffic signal timing tables will be provided to the Contractor by Louisville Metro which will need to be programmed on the controllers. Both existing and proposed signal timing programs shall be bench tested for locations with new 2070 controllers. Proposed timing shall also be bench tested for locations with 170E controllers that will remain. Once tested, all existing signal timing programs (for both new 2070 and existing 170E controllers to remain) shall be archived in case the programs need to be reloaded following proposed timing implementation. In a coordinated effort, proposed signal timing

shall be implemented via the installation of new 2070 controllers and loading of proposed timing plans on existing 170E controllers.

Network testing shall be performed as part of this pay item and is required before any of the integrated signals can be accepted by the Engineer.

SIGNAL MIGRATION TO NEW SYSTEM

Where applicable, migration of intersection communication from the existing wireless system to the new fiber optic network must be coordinated so that the transition of signals to the new system does not negatively impact the operation of signals not yet on the new system or the operation of the signals to be maintained on the existing copper system.

TESTING

TEN DAY COMMUNICATIONS VERIFICATION PERIOD

Preliminary Ten (10) Day testing shall be performed by the Contractor prior to cutting communications to any existing field devices or migration of any field device communications to the new system. This testing shall verify that Ethernet network connectivity between communications nodes and field devices has been established, and includes all interconnect, wireless, and network equipment and infrastructure.

The Contractor shall submit a list of intersections/sites and any other field devices to be tested (test group), to the Engineer for approval prior to the start of testing. All devices that will be connected to the proposed communication network shall be tested (as one test group or as separate test groups). The Contractor may submit to the Engineer an alternative testing plan in order to better coordinate with other projects or constructability issues. Additionally, the Engineer may modify the testing plan as necessary.

The Ten-Day Communications Verification Period shall verify that Ethernet network connectivity between communications nodes and field devices, within the respective test group, have been established, and includes all interconnect, wireless, and network equipment and infrastructure. Once the testing period has started, network log files for all communications links (between the communications node and the field device Layer 2 network switch) within the test group shall be kept by the Contractor for the duration of the testing period. Any network event or failure shall be immediately reported to the Engineer. Depending on the cause and/or severity of a failure event the Engineer may determine that the problem(s) be resolved and the testing period be restarted at zero days.

The City may remotely monitor communications to any of the sites undergoing testing at any time.

The Contractor shall submit a report of the communications performance of the test group during the testing period, including all system events or failures, to the Engineer for approval prior to start of Thirty-Day Operation Period.

THIRTY-DAY OPERATIONAL PERIOD

Testing shall consist of a Thirty-day Operational Period. Prior to beginning any testing, the Contractor shall complete the Ten-Day Communications Verification Period for the test group to be tested and provide all submittals, certifications, and reports necessary to determine that the testing equipment will meet specifications. All testing shall be performed in the presence of the Engineer.

The Contractor shall create a detailed test plan that clearly indicates the requirement(s) covered by each test case and also ensure that the requirements of the Testing Matrix are met.

- Monitoring of intersection phase status
- Monitoring of intersection alarm status
- Monitoring of intersection preemption status
- Monitoring of intersection communication status
- Monitoring of intersection coordination status (in step, in transition, etc.)
- Testing of any modifications or extensions to local and/or central software
- Monitoring of Bus Station CCTV
- Monitoring of the Station Display Units

The Contractor shall identify which corridors or region of intersections are ready to be tested. All intersections will not be tested at one time, rather in logical regional groups of intersections proposed by the Contractor and approved by the Owners prior to any testing commencing.

The Contractor shall provide a test procedure and test data forms to the Owners for approval at least thirty (30) calendar days before testing is to begin. The Contractor shall provide a requirement matrix that clearly maps each requirement to a specific test case(s). The Owners will review the test procedures and matrix and return them with comments or approval to the Contractor within twenty-one (21) calendar days after receipt. The test procedures proposed by the Contractor shall be comprehensive, and in sufficient detail to allow the Owners to determine whether or not the system provided fully complies with the system requirements included in these Special Notes for ITS and Plans. If the Owners deems the test procedure to be unacceptable, the Contractor shall revise the procedures according to the Owners' comments without additional cost to the project.

At a minimum the test procedures shall include the following:

- A step-by-step outline of the test sequence to be followed, showing a test of every system requirement
- A description of the expected operation, output and test results
- An estimation of the test duration proposed test schedule
- A data form to be used to record all data and quantitative results obtained during the tests
- A description of any special equipment, setup, manpower, or conditions required for the test
- Meet all requirements of the Testing Matrix
- Monitoring of intersection phase status
- Monitoring of intersection alarm status
- Monitoring of intersection preemption status
- Monitoring of intersection communication status
- Monitoring of intersection coordination status (in step, in transition, etc.)
- Testing of any modifications or extensions to local and/or central software

The Thirty-Day Operational Period will verify that the entire corridor / group of intersections, including primary and secondary communications routes where applicable, functions properly and in accordance with these Special Notes for ITS and Plans. The Thirty-Day Operational Period shall not be completed until all items conform to the Special Notes for ITS and Plans. The Contractor shall perform and document all necessary testing.

The formal start of the Thirty-Day Operational Period or “burn-in” period shall be documented by the Contractor and approved by the Owners. The Thirty-day Operational Period will include the completion of a 30-day period, by the end of which the entire integrated system operates along a corridor / group of intersections without failure and without detrimental effect of other intersections online with the system.

In the event of a failure during the Thirty-Day Operational Period, the Contractor shall repair the equipment as necessary within two (2) working days of the time of notification by the City and the Thirty-day Operational Period at the sole discretion of the Engineer may be suspended and restarted or restarted at zero hours. If the failure is a signal system emergency, a qualified representative from the software and hardware manufacturer shall respond within two hours of notification as required in the maintenance agreement described herein. Signal system emergencies are defined as a condition related to the malfunctioning of the signal hardware or software that impedes normal operation of the signal timing plans, such as going into flash mode. The Contractor shall be responsible for all of the cost involved in the repair of the equipment, including re-testing if necessary.

The manufacturer shall provide certification that the replacement units supplied under these specifications are not units previously rejected by some other municipality or state.

The Contractor or Owners, as mutually agreed to, shall log all failures during the period, using a mutually agreed upon form. In the event that 5% or more of class of equipment fails during the Thirty-day Operational Period, the Contractor shall determine the cause of failure and make any necessary modifications and/or replacements to prevent reoccurrence. All modifications or replacements shall be approved by the Engineer. In the event of a class modification or replacement of components, all such components shall be subjected to the Thirty-day Operational Period.

METHOD OF MEASUREMENT

All materials and labor as described in “System Integration” – will be measured as one lump sum.

BASIS OF PAYMENT

Signalization Integration panel will be paid for at the contract price for System Integration:

<u>Unit</u>	<u>Description</u>
LS	System Integration

TESTING MATRIX

Functional Requirements	Source Document	Test	Pass/Fail	Corrective Action Taken	Date
Traffic Controllers: The Prime Contractor will be furnishing and installing new controllers with all required equipment as specified in the Special Notes for ITS. The Contractor shall be responsible for integrating the new <u>and existing</u> controllers with the existing <u>central system</u> ATMS software (<u>Centraacs</u>) on the new fiber network and maintaining integration with existing controllers that will remain on the existing copper interconnect system. The Contractor shall provide a test methodology that will be	Project Special Notes for ITS	Verify by inspection and system Acceptance testing			

<p>conducted to ensure that each controller is ready for implementation in the field.</p>					
<p>Communications Network: As part of this project, a fiber optic communication network will be installed along with Ethernet communications equipment to connect all signalized intersections and video cameras. The fiber optics communications backbone will support Gigabit speeds.</p> <p>Requirements: <ul style="list-style-type: none"> · The communication system must be able to support Ethernet communication to the new traffic signal controllers. - The communication system must be able to support Ethernet communication to the new station IT. · The new Ethernet communication system shall be based on IP network addressing over Fast Ethernet. · The System Integrator shall coordinate with the Louisville Metro and TARC on developing and configuring the IP addressing. · At the intersection control cabinet, the minimum committed information data rate provided will be 4 MB with no more than 1second latency. · The network will be 100 MB in full duplex. </p>	<p>Project Special Notes for ITS</p>	<p>Verify by inspection and system Acceptance testing</p>			
<p>Layer 2 Ethernet Switch – By Type: The Contractor shall furnish and install environmentally hardened Layer 2 Ethernet switches as shown on the Plans. Layer 2 Ethernet switches shall be manufactured by Cisco.</p>	<p>Project Special Notes for ITS</p>	<p>Verify by inspection and system Acceptance testing</p>			
<p>Fiber Optic Ethernet Transceiver: The Contractor shall furnish and install single mode fiber (SMF), small form factor pluggable (SFP) Gigabit Interface Connector (GBIC) modules at locations as shown on the plans.</p>	<p>Project Special Notes for ITS</p>	<p>Verify by inspection and system Acceptance testing</p>			
<p>Controller Unit, As Per Plan: The Contractor shall furnish and install traffic signal controllers. This will consist of the controller unit, timing unit software and coordination signal timing, communication software with functional Ethernet modules, into the existing prewired cabinet.</p>	<p>Project Special Notes for ITS</p>	<p>Verify by inspection and system Acceptance testing</p>			
<p>Fiber Optic Cable, by Strand Count: Upon receipt of cable reels, the Contractor shall test each fiber separately with an Optical Time Domain Reflectometer (OTDR) to verify fiber length, attenuation, and continuity. Furnish documentation for test results. The Contractor shall monitor cable pull tensions</p>	<p>Project Special Notes for ITS</p>	<p>Verify by inspection and system Acceptance testing</p>			

<p>at all times during pull using a remote sensing puller, strain gauge, or running line tensiometer and shall record the maximum pulling tension for each cable pull. The Contractor shall furnish and install communication system cables of the type specified and associated components in accordance with the plans.</p>					
<p>Fiber Optic Splice Enclosure, By Type, 72 Splice: The Contractor shall furnish and install fiber optic splice enclosures as shown on the Plans. The splice enclosures shall be corrosion resistant, rodent proof, re-enterable, and manufacturer certified for underground or overhead installation.</p>	<p>Project Special Notes for ITS</p>	<p>Verify by inspection and system Acceptance testing</p>			
<p>Interior Fiber Optic Patch Panel: The Contractor shall furnish and install a termination panel which consists of a self-contained enclosure that is standard 19" equipment rack mountable and meets the capacity requirements as indicated in the plans.</p>	<p>Project Special Notes for ITS</p>	<p>Verify by inspection and system Acceptance testing</p>			

FIBER OPTIC PATCH CORD, 2 FIBER

DESCRIPTION

The Contractor shall furnish and install single mode OS2 fiber optic duplex patch cables at locations as shown on the plans.

MATERIALS

The optical patch cords furnished under this contract shall be constructed of duplex single fiber, jacketed, cable equipped with factory assembled optical connectors at both ends (ST, SC-Duplex, or LC/UPC Duplex per required connections).

The sheath shall be flame retardant and coded NFR in accordance with the National Electric Code.

Patch cords for connections from fiber distribution panel (FDP) to FDP or from fiber patch panels shall be equipped with connectors approved by Engineer on both ends of the patch cord.

The optical connectors on the other end of these patch cords shall be compatible with the connectors on the optical transceivers furnished by this project.

Optical fiber connectors shall satisfy all of the interface parameters of equipment components as may be defined by the transmission equipment specifications.

The connector shall be pre-terminated on the fiber cable and core-aligned fusion spliced when applicable. All connectors shall be compliant with industry standard ANSI/TIA/EIA-568B.3. The connector shall comply with TIA/EIA Fiber Optic Connector Intermateability Standard (FOCIS) document, TIA/EIA-604-3.

Connector shall be consistently capable of insertion losses <= 0.3db (typical) and shall be <= 0.75 db when installed in accordance with the manufacturer's recommended procedure and tested in

accordance with FOTP-171. Connector reflectance shall be measured at the factory to be and ≤ -55 db for Ultra Physical Contact (UPC).

Manufacturer shall be ISO 9001 and TL 9000 registered.

No-epoxy, no-polish quick mount single-mode connectors shall be provided.

CONSTRUCTION

- Connect patch cables at both ends – fiber patch down and transceiver.
- Coil additional fiber cable, tie together, and secure.
- Furnish and install identification labels on each end.

The Contractor shall be responsible for providing a complete, functional system including all necessary cables and connectors in accordance to the specifications and as specified on the plans. All miscellaneous patch and interconnect cables shall meet the proposed equipment specification requirements and shall meet EIA/TIA telecommunications standards.

METHOD OF MEASUREMENT

The work as described will be measured as one unit for each of the installations specified, and shall include all materials, equipment and incidentals, complete in place. Terminations, connections, and other miscellaneous items and materials shall be incidental to this work and no separate payment will be made.

BASIS OF PAYMENT

Payment for all fiber optic patch cords shall be included in “Layer 2 Ethernet Switch – Field Mount, By Port Count” and “Layer 2 Ethernet Switch – Rack Mount”.

FIBER OPTIC CABLE, FAN-OUT KIT, 12 FIBER

DESCRIPTION

The Contractor shall furnish and install buffer tube fan-out kits at each fiber optic cable splice or termination location to complete connection of the fiber optic network.

MATERIALS

Buffer tube fan-out kits shall be outdoor rated and provide terminations for 12-fibers or as identified on the drawings. The fan-out assembly shall be color coded to match the color scheme of the connecting fiber optic cable. Fan-out assembly shall provide 25-inch length or as needed for the splice or connector housing.

Connectors attached to the fan-out kit are incidental to the fan-out kit.

CONSTRUCTION

Fiber optic cable shall be inserted into the fan-out kit, connectorized, and inserted in the termination panel.

The Contractor shall be responsible for providing a complete, functional system including all necessary cables and connectors in accordance to the specifications and as specified on the plans.

METHOD OF MEASUREMENT

The work as described will be measured as one unit for each of the installations specified, and shall include all materials, equipment and incidentals, complete in place. Terminations, connections, and

other miscellaneous items and materials shall be incidental to this work and no separate payment will be made.

BASIS OF PAYMENT

Payment for all fiber optic Fan-Out Kits shall be included in “Fiber Optic Splice Enclosure, Clamshell, 72 Splice”, “Fiber Optic Splice Enclosure, Dome, 72 Splice”, and “Interior Fiber Optic Patch Panel”.

PASSENGER INFORMATION SYSTEM

DESCRIPTION

The Contractor shall furnish and install the Digital Signage Displays, and Passenger Information System Media Player as indicated on the plans and riser diagrams, for the customer information system.

The Hardware Installer shall work with the Software and Integrator from Special Note “Passenger Information System Software and Integration.” The integrator will perform the work to integrate from TARC central systems. The Hardware Installer shall insure the hardware and system components meet the “Integrator’s” requirements.

MATERIALS

The Passenger Information System shall comply with the following details

Real Time Display:

- (1) Power requirement: 90 – 240 VAC, 47 – 63 Hz
- (2) Resolution: 1920 x 1080 (1080p/60)
- (3) Color Depth: 10 bit/ 1.06 billion colors
- (4) Contrast Ratio: 1000:1, Aspect ratio 16:9
- (5) Viewing Angle: 178°(H) x 178°(V)
- (6) Brightness: 700 nits
- (7) Input signal: HDMI
- (8) Operating Temp: -40° – +140°F (-40° – +60°C)
- (9) Display to have IP 68/NEMA 6 Fully-Sealed Enclosure
- (10) Mounting: 600mm x 400mm VESA Hole Pattern
- (11) Basis of Design: Tru-Vu SXOB-42-XTR-P” Outdoor Waterproof Sunlight Readable LCD Monitor

Note: All monitors will need to be verified with the sign manufacturer for proper fit and finish with the Sign Designer and HDR Architect.

Real Time Media Player:

- (1) Video Decoder: Native 4K@60p CEA HDR10 video decoding
- (2) Video Output:
 - o HDMI: 1920x1080 @60hz
 - o Display Ports Up to 3840 x 2160 @ 30Hz
- (3) Audio: 3.5mm Audio Out (analog & digital)

- (4) Storage: External micro SD Slot (SDHC and SDXC); SDHC storage up to 32GB SDXC storage up to 2TB
- (5) Ethernet:
 - o Gigabit LAN
- (6) Operating Temp: 0° to 69°C
- (7) Basis of design: BrightSign XD1033

Contractor to supply a USB based GPS dongle compatible with the above media player to supply local LAT/LON coordinates to be used in the next bus server application as required. Local coordinates are to be utilized in locating the bus stop where installed. It is the intent that the locations and stops need not be hard coded into the device but that the bus stop be determined by the local GPS coordinates and the nearest stop be pulled from either the TARC Google schedule feed, Transit App or Trapeze. Integration will be performed by “Passenger Information System Software and Integration.”

CONSTRUCTION

The contractor shall install the Digital Signage Displays for the passenger information system at each station pylon. The displays shall mount per the pylon manufacturer as indicated on the pylon plans. All power and signal wiring shall be provided back to the pylon systems enclosure in raceways provided by the pylon manufacturer. Contractor shall provide Active High Speed HDMI Cabling and/or Display Port to HDMI Devices or Cabling, capable of providing 1080p resolutions up to 100 feet. Coordinate complete installation with pylon manufacturer and submit mounting details to engineer for approval prior to installation.

Integration will be performed by “Passenger Information System Software and Integration.”

Testing shall be performed per the provided and approved testing plan. The Testing plan shall be approved by the Project Manager.

METHOD OF MEASUREMENT

The Digital Signage Displays, Media Player, Cabling, and devices will be measured as each for furnishing and installing complete in place.

BASIS OF PAYMENT

Payment for Digital Signage Displays, Media Player, Cabling, and Devices as provided shall be included in Sign Pylon.

TEXT TO SPEAK ANNUNCIATOR SYSTEM

DESCRIPTION

The Contractor shall furnish and install the Text to Speak Annunciator System, speakers and all ancillary equipment for a complete and operational system, as indicated on the plans and riser diagrams. The work shall include equipment and devices to be installed in the station Pylon.

Contractor shall consult TARC Bus Operations for information regarding the existing RTS and Text to Speak systems and functionality.

TARC currently employs the Trapeze Novas AVL system, which is used to track the locations and schedules of buses. Data from the AVL system is queried and stored in a database, which is updated

every 30 seconds. A web service, hosted by TARC, feeds the Real Time applications, including the Annunciators. Each Annunciator has a unique IP address.

When the annunciator button is pressed, the web service is used to call information related to the bus stop location. The web service passes the required route, direction, and time of the messages for the Annunciator System to play at the bus stop.

The Hardware Installer shall work with the Software and Integrator from Special Note "Passenger Information System Software and Integration." The integrator will perform the work to integrate from TARC central systems. The Hardware Installer shall insure the hardware and system components meet the "Integrator's" requirements.

MATERIALS

The Text to Speak System shall comply with the following details:

- Push Button
- Visual: LED Super-bright Red
- Audible: Dee 2300 Hz – Dah 2000 Hz
- Latching Mode: LED with PBI-L
- Tactile: Optional tactile arrow
- Operating Voltage DC: 18 – 24 VDC
- Operative Voltage AC: 12 – 17 VAC
- On Resistance: < 150 ohm
- Operating Mode: Normally Open
- Closure Dwell: 150 ms
- Maximum Terminal Voltage During Closure: 1.5 V
- Switch: Piezo electric, solid state switch
- Operating temp: -40° – +85°C
- Basis of Design: Campbell Company 4EVR
- Annunciator Speaker

The Annunciator Speaker shall include an approx. 2.5" square frame, 2.35-oz. ceramic magnet, 8 Ohm impedance, and a moisture-resistance cone. The speaker shall be 50W, 8ohm 70v, with a frequency response of 200Hz – 8kHz and a sensitivity of 87dB measured at 1W/1M.

Audio Connection: 9" Stripped and Tinned Leads

Basis of Design: Quam CIS8/8

Text to Speak Module Operating temp: -30° – +70°C

Storage temp: -40° – +85°C

Basis of Design: TextSpeak TSS-EM-ENC1

USB Memory

Construction Requirements:

The contractor shall install the Text to Speak Annunciator System, including Speakers, Modules, Push Buttons and all ancillary equipment as indicated on the plans and diagrams. The system shall be

connected at the TARC head end. Installation of Text to Speak System and wiring of the system shall be coordinated with the pylon manufacturer. The contractor shall provide all mounting brackets required.

METHOD OF MEASUREMENT

The Text to Speak System, including Speakers, Module, Push Buttons, and ancillary equipment will be measured as each for furnishing and installing complete in place.

BASIS OF PAYMENT

Payment for Text to Speak System shall be included in Sign Pylon.

PASSENGER INFORMATION SYSTEM SOFTWARE AND INTEGRATION

DESCRIPTION

TARC is implementing a passenger information system that includes LCD Displays and Text-to-Speak announcements. The Contractor shall develop and integrate the Text-to-Speak Annunciator System and Real-Time Displays.

Contractor shall consult TARC Bus Operations for information regarding the existing Real-Time Services and Text-to-Speak systems and functionality.

TARC currently employs the Trapeze Novas AVL system, which is used to track the locations and schedules of buses. Data from the AVL system is queried and stored in a database, which is updated every 30 seconds. A web service, hosted by TARC, feeds the Real Time applications, including the annunciators and video driver.

Requirements

Text-to-Speak Software

- Supplied voices shall be premium voices and the system shall accommodate both English and Spanish.
- Ambient noise detection and automatic volume adjustment shall be implemented.
- A pleasant, audible signal for the visually impaired shall indicate the location of the annunciator pushbutton. (It is expected that the speaker and annunciator pushbutton shall be located adjacent to each other.)
- Servers shall be VMware based, Windows Server 2016. With any and all initial licensing for all components supplied as part of this project.
- Integrator shall provide a next bus server application that will interface with either TARC's Google Schedule feed and Google Real time feed (preferred) or the Trapeze System directly. The system must include an automatic failover to a secondary server should the primary server fail. TARC will provide the hardware platform on which the expected two virtual servers shall reside.
- Software shall facilitate TTS audio annunciation of the next scheduled buses for all lines that utilize the stop in the appropriate direction and shall utilize real time data if available and scheduled data if real time data is not available. An indication of whether real time or scheduled shall be apparent in the verbiage. Next bus information shall include Line, Signage, and arrival time (estimated or scheduled).
- Remote health monitoring, remote programming, remote programming updates and remote firmware updates shall be a part of the system. Any software to perform these functions along with any and all licensing shall be provided as part of this project.

Real-Time Display Software

- Integrator shall provide a next arrival server application that will interface with either TARC's Google Schedule feed and Google Real time feed (preferred) or the Trapeze System directly. The system must include an automatic failover to a secondary server should the primary server fail. TARC will provide the hardware platform on which the expected two virtual servers shall reside.
- Alternatively, the Integrator shall provide the next bus display service through an internet feed from Transit App (thetransitapp.com) adapted to fit TARC's formatting needs if necessary.
- Any required servers shall be VMware based, Windows Server 2016. With any and all initial licensing for all components supplied as part of this project.
- Software shall facilitate display of the next scheduled buses for all lines that utilize the stop in the appropriate direction and shall utilize real time data if available and scheduled data if real time data is not available. An indication of whether real time or scheduled shall be apparent on the screen. Next bus information shall include Line, Signage, and arrival time (estimated or scheduled).
- Service alerts that affect lines serviced by the stop shall be displayed.
- A static service map of the lines that interact with the stop shall be displayed. An appropriate and easy update mechanism for the static map shall be provided.
- A larger dynamic service map of the area around the stop (local section) shall be displayed showing the real time location of buses along the local corridor (in the appropriate direction for the lines servicing the stop). The bus icons shall indicate the vehicle orientation, line and headway signage.
- The Date and Current time shall be displayed.
- Additional space should be reserved for future media feeds.
- All text shall follow any applicable ADA size and font requirements.
- The background image shall have a customizable default image and be individually customizable by stop should something different from the default be desired. An easy method of implementation and control of both the default background image and individual stop background images shall be provided.
- Connect to the USB based GPS dongle compatible with the media player supplied from Special Note "PASSENGER INFORMATION SYSTEM" to supply local LAT/LON coordinates to be used in the next bus server application as required. Local coordinates are to be utilized in locating the bus stop where installed. It is the intent that the locations and stops need not be hard coded into the device but that the bus stop be determined by the local GPS coordinates and the nearest stop be pulled from either the TARC Google schedule feed, Transit App or Trapeze.

Testing

The software provide shall provide a testing plan for approval by the Project Manager. The testing plan shall provide for steps to determine the software's applicability and performance for the field conditions.

TARC shall be the owner of all software written for Text-to-Speak or Passenger Information systems.

METHOD OF MEASUREMENT

A complete software package that can perform to the requirements for the Text-to-Speak and the Passenger Information system. Testing shall be completed and accepted before final payment is made.

BASIS OF PAYMENT

Payment for Text-to-Speak Software and Integration and Real-Time Display Software and Integration.

UNINTERRUPTED POWER SUPPLY

DESCRIPTION

The Contractor shall furnish and install an Uninterrupted Power Supply (UPS) which shall be a turnkey, true on-line, power conditioner and battery backup or uninterruptible power system (UPS) designed for outdoor use in extreme environments. The Alpha Micro Cabinet should be mounted inside the Pylon. The UPS shall be capable of providing at least 2.0 hours of operation at its maximum power rating.

MATERIALS

This specification describes a continuous duty, on-line, solid state, uninterruptible power system (UPS). The UPS shall operate as a line interactive design - utilizing a ferroresonant transformer or electronic module, battery charger, solid state inverter, fail-safe bypass system, and integral battery subsystem. The specified equipment herein shall be referred to as an UPS.

Transfers to and from battery operation shall be uninterrupted. Furthermore, there shall be no mechanical switching when the UPS transfers to and from battery operation.

The UPS and batteries shall be designed to fit into a NEMA 3R enclosure intended for outdoor installations, inside the Alpha Micro Cabinet. It shall be of modular construction for ease of servicing in the field. The unit shall be rack mountable.

Primary application of the UPS is to provide backup power to station equipment in the event of a power outage. The UPS must provide up to 1000W/VA in power. It shall be single-phase 120 volts, 60 Hz.

The UPS shall consist of a power conditioning and interface device, battery charger, inverter, batteries, fail-safe bypass, protective devices, and monitoring circuitry as specified herein. The Traffic Signal UPS shall automatically assure continuity of conditioned and regulated power within specified tolerance, without interruption, upon failure or deterioration of the input AC power source. Continuity of conditioned and regulated power to the critical load shall be maintained when input power is lost and until input power returns within specifications or until the batteries have been discharged.

The battery system shall consist of one or more strings (typically 4 or 6 batteries per string) of extreme temperature, deep cycle, AGM/VRLA (Absorbed Glass Mat/ Valve Regulated Lead Acid) batteries. Batteries shall be certified to operate at extreme temperatures from -40°C to $+74^{\circ}\text{C}$.

The batteries shall be provided with appropriate interconnect wiring and a corrosion-resistant mounting trays and/or brackets appropriate for the cabinet into which they will be installed.

The interconnect cable shall be protected with abrasion-resistant nylon sheathing.

The interconnect cable shall connect to the base module via a quick-release circular connector.

The basis of design is the ALPHA Micro 1000, and Alpha Micro cabinet.

UPS Input / Output Requirements:

- Nominal input voltage: 120 VAC, single phase.
- Input voltage range: 85 – 150 Vac.
- Input current: 17.5 A nominal
- Nominal frequency: Auto-sensing
- Output voltage regulation: $\pm 10\%$ over input voltage range

- Output current: 16.7 A nominal
- Output power at 50°C: 1000 W/VA
- Operating Temp: -40° – +74°C (-40° – +165°F). The system derates after 60°C
- Audible noise at 25°C: < 45 dBa at 1 metre (39 in)
- Typical output voltage THD: < 3%
- Typical efficiency: > 98% (resistive load)
- Typical transfer time: < 5 ms

CONSTRUCTION

The contractor shall install the UPS in the project field electrical cabinets. The UPS shall be fully wired and connected for a complete working load. The unit and micro cabinet shall be mounted inside the Pylon. Any mounting hardware and connectors shall be considered incidental and, will neither be measured nor paid. The contractor shall also furnish and install a minimum of 5-position power strip.

METHOD OF MEASUREMENT

Each UPS will be measured by the unit per each for furnishing and installing complete in place. The Micro unit shall include the ALPHA micro cabinet and batteries.

BASIS OF PAYMENT

Payment for Uninterrupted Power Supply (UPS) shall be included in Sign Pylon.

ENVIRONMENTAL MONITOR

DESCRIPTION

The Contractor shall furnish and install a networkable Environmental Monitor in each BRT pylon.

Environmental Monitor shall be a network device and shall support the most current version of SNMP.

Cabinets shall be equipped with monitoring equipment to detect continuous analog temperature, with high and low temperature alarms based on the analog input (High temperature alarm shall initially be set at 90 degrees F. / Low temperature alarm shall initially be set at 50 degrees F.)

Environmental Monitor shall be an AVTECH Room Alert 3E or approved equal.

METHOD OF MEASUREMENT

Each Environmental Monitor will be measured by the unit per each for furnishing and installing complete in place.

BASIS OF PAYMENT

Payment for Environmental Monitor shall be included in Sign Pylon.

**~~SHELF MOUNT MULTIMODE PHASE SELECTOR (WITH POLE MOUNTED ANTENNA)~~
~~GPS POLE MOUNTED ANTENNA W/ RECEIVER~~**

General

Install multimode phase selector, GPS Antenna. A multimode priority control system shall operate in a manner that allows infrared, and Radio/GPS priority control technologies to interoperate and activate one another in a consistent manner. The priority control system shall consist of a matched system of

vehicle equipment and intersection equipment capable of employing data-encoded radio communications to identify the presence of designated priority vehicles. In preemption mode, the data-encoded communication shall request the traffic signal controller to advance to and/or hold a desired traffic signal display selected from phases normally available. A record of system usage by agency identification number, vehicle classification and vehicle identification number shall be created. The system software shall support call history analysis and reporting across any subset of intersections and/or vehicles independent of activation method. System software shall also support both on-site and remote configuration, programming and monitoring of the priority control system. The central system shall be located at Louisville Metro Traffic Office.

Vehicle Radio Geo-fencing

The bus equipment shall have the following ability.

- The equipment shall be able to utilize geo-fencing to automatically turn on/off the radio transmissions when exiting/entering a bus compound. This feature would be used at facilities like the TARC maintenance campus.
- Data downloads would need to be performed over Ethernet via an RJ45 connection on the existing Digi transport WR-44 router currently deployed on the bus within the campus geo-fence.
- Maintenance would need to be able to override the geo-fence and toggle the radio on/off as needed.

Materials

The Contractor shall provide the following:

- On-site Interface Software Package
- ~~F~~Provide a ~~F~~Four-~~c~~Channel ~~M~~Multimode ~~P~~Phase ~~S~~Selector ~~C~~Card, pole-mounted GPS antenna/receiver, and all associated interconnection cabling, power provisions, and hardware
- Corresponding wiring to connect system to traffic controller
- Central Management Software to be provided with installation support services and a new server to be located at Louisville Metro Traffic Office.

Construction Requirements

The 4-channel phase selector must support infrared and GPS detection simultaneously. The phase selector must support four channels with two auxiliary inputs.

The Multimode Phase Selector shall have the features listed below.

- Four dual-priority and probe frequency channels
- Priority override: always higher over lower
- GPS Radio/GPS Unit input
- Low-priority output may be configured for first-come, first-served or all-channel active
- History log of most recent infrared and GPS system activities (10,000 entries)

- Appropriate mechanisms and visual indicators to enable diagnostics and test calls to each channel in an easy manner.
- IR detector inputs may be mapped to any channel

The physical dimensions of the Multimode Phase Selector should be sized to be rack mounted where allowable and shelf mounted as required.

The Operating Parameters of the Multimode Phase Selector should be as below:

- Voltage: +24 VDC or 120 VAC
- Temperature: -20°C and 70°C
- Humidity: 5% to 95% relative
- CE certified
- Compliant with NEMA TS-2
- Compliant with FCC

Central Server shall be provided as part of the project procurement. The server shall be rack mounted, Windows based, and meet the requirements of Louisville Metro with a hardware configuration that satisfies software provided by the vendor.

Warranty

The manufacturer of the required priority control system will warrant that, provided the priority control system has been properly installed, operated and maintained, component parts of a matched component system that prove to be defective in workmanship and/or material during the first five (5) years from the date of shipment from the manufacturer will be covered in a documented system-protection plan. Additionally the manufacturer must provide an added five-year maintenance plan for repair or replacement for a total of ten (10) years of product coverage.

The protection plan will warrant that component parts of a matched component system that are not subject to coverage limitations and prove to be defective in workmanship and/or material during the first five (5) years from the date of shipment from manufacturer will be repaired at no charge, and that extended coverage will be available for an additional five (5) years.

In total, the warranty/maintenance coverage must assure that system components will be available to allow system operation during the ten (10) year warranty/maintenance coverage.

A copy of the manufacturer's written warranty outlining the conditions stated above will be supplied with the bid. Coverage and coverage limitations are to be administered as detailed in the manufacturer's Warranty/Maintenance document.

Testing

The contractor will develop, document and implement a Field Unit Verification/Validation Performance Test Plan. The Verification portion of the plan will demonstrate system performance to the specifications guaranteed by the equipment provider and insure that the installations are completed per

manufacturer documented installation procedures. The Validation portion of the plan will demonstrate that the system meets user expectations as defined in the IFB document(s) and insure that any/all performance issues have been addressed.

The contractor will work with the user, stakeholders, and installers to finalize, coordinate and implement the Field Unit Verification/Validation Performance Test Plan. Successful Bidder will, furthermore, document and distribute Verification/Validation Performance Test Plan results in a predetermined and agreed to format.

The Field Unit Verification/Validation Performance Test will be completed no later than 60 days after award of contract. The Final Test Plan will specify the number of completed intersections and vehicles required to perform a comprehensive test. The test plan shall provide a summarized table for each intersection and vehicle noting the location, signal controller firmware, testing acceptance using the test call from the phase selector, vehicle calls are received and processed, and the signal controller is implementing the requests.

The project manager must approve the testing plan and results before final payment is released.

METHOD OF MEASUREMENT

The contract unit price for Multimode Phase Selector assembly, furnished and installed will include all labor and equipment specified in this Special Note, and miscellaneous materials necessary for a complete and acceptable installation, including new or additional surge protection equipment if necessary to accommodate the new intersection equipment, central equipment and operational software packages, firmware, and warranty documentation.

BASIS OF PAYMENT

Prices and payment will be full compensation for all work specified in this Special Note. Payment will be made under:

<u>Unit</u>	<u>Description</u>
Each	Multimode Phase Selector (with Pole Mounted Antenna)

Additionally, a discrete output from the phase selector may be used to reset the traffic controller using the clock reset function/input of the controller. This output shall be available on the Auxiliary Interface Panel. This output shall be referenced to the GPS date and time.

This output may be configured as follows:

- Enabled or Disabled
- Time of day reset is activated (12:00 A. M. to 6:00 A.M. in 30 minute increments)
- Duration of reset pulse (100-2,000 milliseconds)
- Repeat every 1 to 30 days

The following diagnostic tests are incorporated in the multimode phase selector:

- Power up built in test
- Communications port tests
- Preemption output test call
- Detector response test

The multimode phase selector shall be capable of call bridging. Call bridging enables the treatment of two vehicles requesting priority activation to have their calls linked together to hold a call to the controller so that they may traverse the approach together.

When used with a GPS radio unit, the multimode phase selector shall relay a priority request to the next adjacent intersection based on the direction indicated by the vehicle's turn signals.

The multimode phase selector shall support evacuation mode for low priority calls. Upon activation of this mode from the central management software, low priority vehicle calls shall be recognized by the multimode phase selector as if they were high priority vehicle calls for a temporary period of time as defined by the user. This mode shall be supported for both infrared and radio/GPS units. Vehicles transmitting high priority signals shall continue to maintain priority over the evacuation mode priority vehicles.

The multimode phase selector shall allow relative priority. Relative priority allows emitter classes to be used as an additional level of prioritization within priority levels (i.e. high and low priority levels have different sets of relative priorities). Relative priority shall support up to 16 unique classes in each priority level (High and Low). Relative priority class level 16 will have the highest weight and 1 the lowest weight in each. If relative priority is enabled, a priority call will be granted to the caller with the higher class level within high and low priority levels. A vehicle with a call granted, shall be able to have its call taken away by a higher level class vehicle. The system shall provide a lockout threshold that once met, shall disallow higher relative priority calls from taking away a call. Separate thresholds for infrared and Radio/GPS calls shall be provided. Infrared call thresholds shall be specified as an intensity with a default value of 1,000. Radio/GPS call thresholds shall be specified as an ETA in seconds. The default ETA shall be 12 seconds. Threshold values for both types of calls shall be settable via system software. High priority calls will always be served over low priority calls regardless of either's relative class. Preemption for vehicles with the same base priority (high, low) and the same relative priority is done using the default first come, first served mechanism. Relative priority is capable of being enabled or disabled using system software. Relative priority for high and low can be separately enabled or disabled using system software. The default settings for all relative priority (high and low) values will be 15. Relative priority shall be disabled by default for both high and low priority.

Card Rack

The card rack consists of a metal enclosure with a dedicated card slot for one phase selector or discriminator. Either two- or four-channel units may be used. The front panel includes a terminal strip for connecting the optical detectors and a 9-pin circular connector and harness to connect the infrared system phase selector's or discriminator's outputs and 120 VAC to power the phase selector or discriminator.

The terminal block, TB1, on the front of the card rack is for primary optical detector connections for channels A, B, C, and D. It will be located on the left side. The specified function for each pin is:

1. Channel A (1) primary detector signal input
2. Channel B (2) primary detector signal input
3. Channel C (3) primary detector signal input
4. Channel D (4) primary detector signal input
5. Detector power
6. Detector power
7. Detector ground
8. Detector ground

The card rack's J1 connector is located next to TB1 and is for providing all the signals needed to a phase selector directly to the Econolite controller. The specified function for each pin is:

1. 115 VAC (AC+)
2. AC return (AC-)
3. Chassis ground
4. Not used
5. Channel A priority control output
6. Channel B priority control output
7. Channel C priority control output
8. Channel D priority control output
9. Logic ground

The card rack will have dimensions of 8.5 inches (21.6 cm) long, 5.25 inches (13.3 cm) wide, and 5.25 (13.3 cm) inches high and a weight of 1.37 lbs.

"D" Connector Harness and Preemption Panel

A "D" connector harness and preemption panel shall be added to the existing cabinet equipment as required to fully accommodate the proposed signal priority system.

Intersection GPS Module

A GPS receiver and antenna will obtain the intersection position from the GPS satellite system operated by the DoD. The time information from the GPS satellites will be used to synchronize the frequency hopping of the 2.4 GHz radio and to time stamp the activity log. The GPS receiver and the GPS antenna will reside inside of the radio/GPS module.

A 2.4 GHz spread spectrum/frequency hopping radio will provide the communications from the intersection to the vehicle as well as from intersection to intersection. The radio shall have a maximum transmit power of not more than 1 watt. The radio shall have an unobstructed range of at least 2,500 feet (762 m). The radio shall meet FCC Part 15 rules. The radio and the radio antenna will reside inside of the radio/GPS module

The radio/GPS module will be housed in a white, impact resistant polycarbonate housing that will include a water resistant wire entry point. It will contain a water resistant access cover to facilitate cable termination

The radio/GPS module will be designed for mounting at or near an intersection on mast arms and span wire poles. The following additional hardware will be needed for mounting the GPS module:

- (1) Pelco Astro-Brac, Stellar Series Clamp Kit, Cable Mount, AS-3009-84-PNC
- (1) Pelco Nipple, 1-1/2" NPS, Alum, SE-0436-24-PNC
- (2) Pelco Notched Coupling, 1-1/2" NPS x 2", Alum, SE-0346-PNC
- (1) Pelco Reducer Brushing, 1-1/2" NPT x 3/4" NPT, Galvanized Iron, SE-0471-GLV
- (1) Pelco Insulator Brushing, 1-1/2" NPS, Black Plastic, SE-401-PNC

(1) 3/4" Close Nipple

The radio/GPS module will communicate to the phase selector via a radio/GPS cable up to 250 feet (76 m) in length.

As an alternate the following radio/GPS unit and radio GPS antenna, may be used in the intersection.

The radio/GPS module will have dimensions of no greater than 4.5 inches (11.4 cm) wide by 2.75 inches (7.0 cm) high by 8.0 inches (20.3 cm) long. This module may also be used in the intersection

The radio/GPS antenna will be a hemispherical dome with a height of 1.43" (3.6 cm) a diameter of 2.85" (7.2 cm) with a pair of 15' (4.6 m) coax cables with factory terminated SMA connectors. One of these connectors will have a pin and the other will have a socket. This antenna will include one element for receiving the GPS signal and one element for transmitting and receiving the radio signal. This antenna (along with the radio/GPS module described in paragraph 5 above) may also be used in the intersection

Radio GPS Cable

The radio/GPS cable will deliver sufficient power from the phase selector to the radio/GPS module and will deliver the necessary quality signal from the radio/GPS module to the phase selector over a non-spliced distance of 250 feet (76 m). Use of coaxial cable is not permitted for this cable.

The radio/GPS cable will deliver sufficient power from the vehicle control unit to the radio/GPS module and will deliver the necessary quality signal from the radio/GPS module to the vehicle control unit over a non-spliced distance of 50 feet (15 m).

The cable will be of durable construction to satisfy the following installations:

- Direct burial.
- Conduit and mast arm.
- Exposed overhead (supported by messenger wire), not to be connected to existing messenger wire.

The outside diameter of the cable will not exceed 0.4 inches (10.16 mm).

The insulation rating of the cable will be 300 volts minimum.

The temperature rating of the detector cable will be -40°F (-40°C) to +194°F (+90°C).

The conductors will be AWG #20 (7x28) stranded and individually tinned. The cable will be shielded and have a drain wire to provide signal integrity and transient protection.

The radio/GPS cable wires shall be color coded as follows:

- Yellow/Yellow-Black dot for Radio transmit.
- Blue/Blue-White dot for Radio receive.
- Orange/Orange-Green dot for Radio clock.
- Brown/Brown-White dot for GPS power and common.
- Violet/Violet-White dot for Radio power and common.
- Bare for shield drain.

When the aluminum enclosure version of the radio/GPS module is used, a radio/GPS cable assembly using the above cable with a 15-pin connector that will mate with the connector on the radio/GPS module will be used.

On-site Interface software

Interface software shall be provided to manage the multimode phase selector while on-site at the intersection.

The on-site software shall be provided on CD-ROM or via download from the vendor's website.

The on-site software shall be supported on Windows™ XP and Windows™ 7 operating systems.

The vendor shall provide minimum hardware configuration information for computer(s) running the on-site software.

The on-site software shall provide context-sensitive online help.

The on-site software shall allow the user to view and update all programmable configuration parameters of the multimode phase selector.

The on-site software shall allow the user to provide intersection name and approach names for each of the four channels and store these as part of the multimode phase selector configuration.

The on-site software shall allow the user to view and update valid and blocked vehicle codes for the multimode phase selector.

The on-site software shall allow the user to create preemption zones directly on a GIS map. Provided the map data is complete, it shall not be necessary to drive a vehicle to create the preemption zones. In areas where map data is incomplete or incorrect, it shall be possible to record points to be used as a reference to create the preemption zones.

The on-site software shall allow the user to save the configuration from the multimode phase selector to a file.

The on-site software shall allow the user to restore the configuration for a multimode phase selector from a saved configuration file.

The on-site software shall allow the user to print the multimode phase selector configuration.

The on-site software shall allow the user to view the activity log from the multimode phase selector.

The on-site software shall allow the user to save the activity log to a file.

The on-site software shall allow the user to print the activity log.

The on-site software shall allow the user to update firmware for all upgradable modules of the multimode phase selector.

The on-site software shall display current status of all vehicles within range of the multimode phase selector, both in table format and displayed on a GIS map (GPS Vehicles only). The following details shall be tracked (Fields will vary by vehicle type):

- The approach channel
- Vehicle code
- Priority level
- Preempt / priority status
- No preempt cause
- Turn signal status
- Signal strength
- Unit ID
- Radio channel
- ETA, distance, heading and velocity of vehicles in approach corridor
- Source of the call: vehicle or intersection
- Green phase monitoring with information on the current greens
- Active preemption / priority output
- Noise levels
- Intensity
- Primary or Auxiliary detector

The on-site software shall display current status of all other intersections within radio range of the multimode phase selector. The following details shall be tracked:

- a. Name
- b. Radio channel
- c. Signal strength
- d. Number of vehicle tracked
- e. Number of satellites heard
- f. Fix type
- g. Horizontal and position dilution
- h. Unit ID

The on-site software shall display current status of visible GPS satellites. The following details shall be tracked:

- Intersection latitude and longitude
- Fix type
- Horizontal and position dilution
 - Satellite number, elevation, and azimuth

Central Management software

The central management software shall be provided with installation support services to interface with phase selectors via customer communication architecture. A **new server** shall be provided by the contractor.

The central management software shall be provided on CD-ROM.

The server software shall run on **new standalone** Windows™ Server 2003 or Windows Server 2015. The client software shall run on Windows™ Server 2003, Windows Server 2008, Windows XP, or Windows 7.

The vendor shall provide minimum hardware configuration information for computer(s) running the central management software.

The central management software shall provide context-sensitive online help.

The central management software shall provide the functionality detailed for the on-site software above, allowing the user to configure and monitor individual multimode phase selectors remotely, except that configuration settings directly related to intersection wiring shall only be modifiable via the on-site software.

The central management software shall track all configuration changes made through the central system, including the user who made the change, the date and time of the change, and the specific configuration information changed.

The central management software shall provide for management of the priority system by jurisdiction, intersection, agency and vehicle.

The central management software shall provide asset inventory information of all configured phase selectors, including component serial numbers and firmware versions.

The central management software shall provide asset inventory information of all configured vehicles, including component serial numbers.

The central management software shall allow the user to directly manage the security of the priority control system. Supported security levels include 1) all vehicles allowed, 2) all vehicles allowed except uncoded vehicles, 3) all vehicles allowed except uncoded and default-coded vehicles, and 4) only those vehicles allowed where mutual aid agreements exist.

The central management software shall allow the user to block access to the priority control system by specific vehicle, vehicle code, or agency.

The central management software shall allow the user to schedule a job to update security settings in each phase selector, or within a selected jurisdiction or intersection set.

The central management software shall allow the user to schedule a job that updates firmware in each phase selector, or within a selected jurisdiction or intersection set.

The central management software shall support regular collection of priority call status, equipment health status, and communications status across any/all configured intersections.

The central management software shall be highly scalable, so that adding additional intersections may be supported with corresponding increases in system processing, memory, and storage capacity.

The central management software shall display the current (when last polled) operational status of each phase selector, including whether the phase selector has an equipment health or communications issue, is currently in a priority call, and/or is operating in evacuation mode.

The central management software shall display active (in-progress) priority calls and recently logged priority calls, filterable by jurisdiction, agency, vehicle, intersection, and/or priority call attribute.

The central management software shall display recent system events, including equipment and communications status, filterable by jurisdiction, intersection, event severity, and/or additional event attributes.

The central management software shall provide a configurable alerting interface that may send email/text messages when designated priority calls or system events occur.

The central management software shall store all collected log and configuration information in the central database, and augment all log data to include agency, vehicle, and intersection information as configured by the user.

The central management software shall provide ad-hoc and scheduled reports for system usage, usage by agency, vehicle and intersection, unauthorized vehicles, unregistered vehicles, and excessive preemption duration.

The central management software shall support analysis of all system log data through sorting, filtering, and pivot table analysis of all log fields.

The central management software shall allow the user to configure multiple evacuation plans, including the sets of intersections to be placed into evacuation mode and the time and duration of the evacuation plan.

The central management software shall manage the replacement of phase selectors from central by provisioning the specific configuration for the intersection from the central management software database.

The central management software shall support user roles such that each user is allowed to perform only those operations essential to their position.

The central management software shall provide a mechanism to import configuration and log information from offline intersections (those without communication to the central server) into the management database.

Standard Specifications

All equipment supplied as part of the priority control system intended for use in the controller cabinet will meet the following electrical and environmental specifications spelled out in the NEMA Standards Publication TS2 2003, Part 2: v02.06.

- Line voltage variations per NEMA TS2 2003, Paragraph 2.1.2.
- Power source frequency per NEMA TS2 2003, Paragraph 2.1.3.
- Power source noise transients per NEMA TS2 2003, Paragraph 2.1.6
- Temperature range per NEMA TS2 2003, Paragraph 2.1.5
- Humidity per NEMA TS2 2003, Paragraph 2.1.5
- Shock test per NEMA TS2 2003, Paragraph 2.2.9.

- Vibration per NEMA TS2 2003, Paragraph 2.2.8
- Non-Destructive Transient immunity NEMA TS2 2003, Paragraph 2.1.8.
- Input-output terminals NEMA TS2 2003, Paragraph 2.1.7.
- FCC Part 15 Subpart B Class A EMC Standard
- Canada ICES-003, Issue 4:2004 Class A EMC Standard
- EN 50293: 2000 Electromagnetic Compatibility – Road Traffic Signal Systems – Product Standard.
- EN 61326-1:2006 EMC Standard
- EN 55011:2007 +A2:2007 EMC Standard.

Warranty

The manufacturer of the required priority control system will warrant that, provided the priority control system has been properly installed, operated and maintained, component parts of a matched component system that prove to be defective in workmanship and/or material during the first five (5) years from the date of shipment from the manufacturer will be covered in a documented system-protection plan. Additionally the manufacturer must provide an added five-year maintenance plan for repair or replacement for a total of ten (10) years of product coverage.

The protection plan will warrant that component parts of a matched component system that are not subject to coverage limitations and prove to be defective in workmanship and/or material during the first five (5) years from the date of shipment from manufacturer will be repaired at no charge, and that extended coverage will be available for an additional five (5) years.

In total, the warranty/maintenance coverage must assure that system components will be available to allow system operation during the ten (10) year warranty/maintenance coverage.

A copy of the manufacturer's written warranty outlining the conditions stated above will be supplied with the bid. Coverage and coverage limitations are to be administered as detailed in the manufacturer's Warranty/Maintenance document.

Testing

The contractor will develop, document and implement a Field Unit Verification/Validation Performance Test Plan. The Verification portion of the plan will demonstrate system performance to the specifications guaranteed by the equipment provider and insure that the installations are completed per manufacturer documented installation procedures. The Validation portion of the plan will demonstrate that the system meets user expectations as defined in the IFB document(s) and insure that any/all performance issues have been addressed.

The contractor will work with the user, stakeholders, and installers to finalize, coordinate and implement the Field Unit Verification/Validation Performance Test Plan. Successful Bidder will, furthermore, document and distribute Verification/Validation Performance Test Plan results in a predetermined and agreed to format.

The Field Unit Verification/Validation Performance Test will be completed no later than 60 days after award of contract. The Final Test Plan will specify the number of completed intersections and vehicles required to perform a comprehensive test.

METHOD OF MEASUREMENT

The contract unit price for Multimode Phase Selector assembly, furnished and installed will include all labor and equipment specified in this Special Note, and miscellaneous materials necessary for a complete and acceptable installation, including new or additional surge protection equipment if

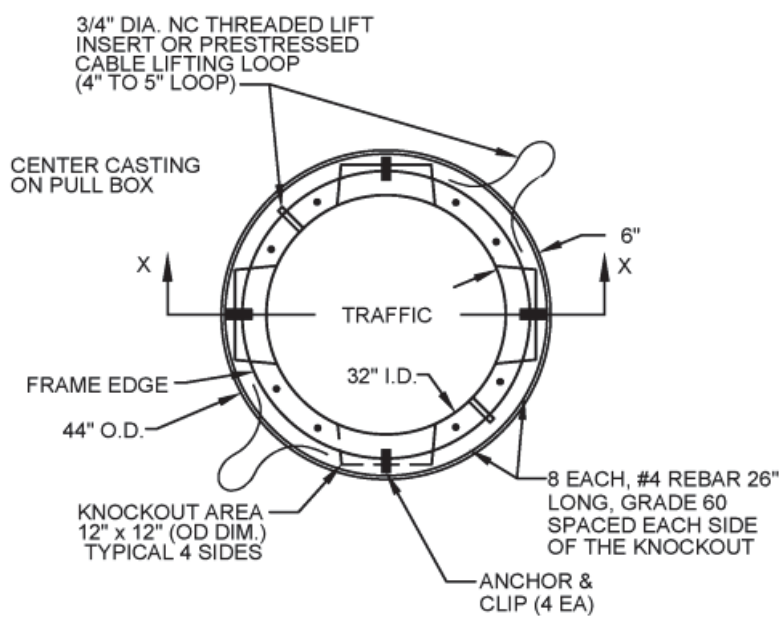
necessary to accommodate the new equipment and operational software packages, firmware, and warranty documentation.

BASIS OF PAYMENT

Prices and payment will be full compensation for all work specified in this Special Note. Payment will be made under:

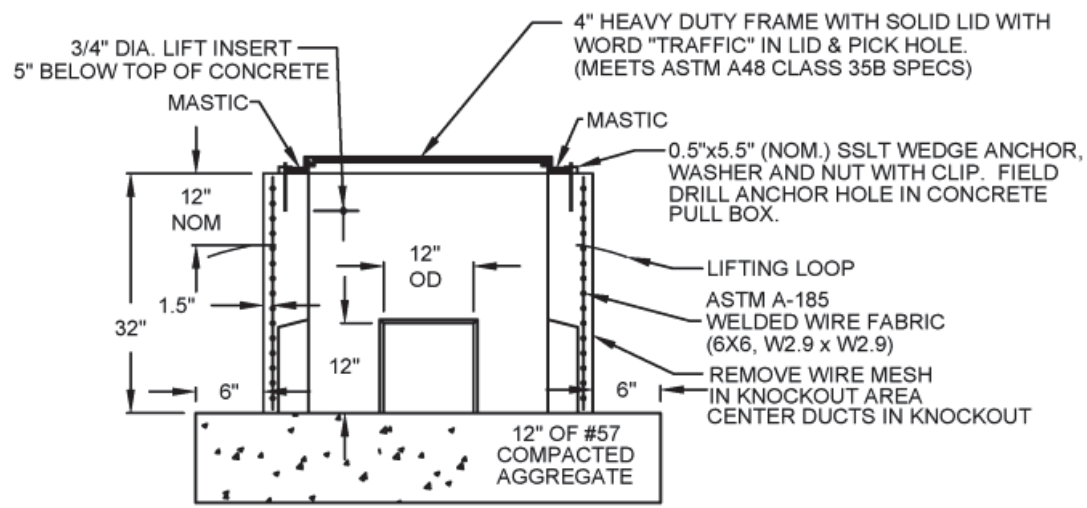
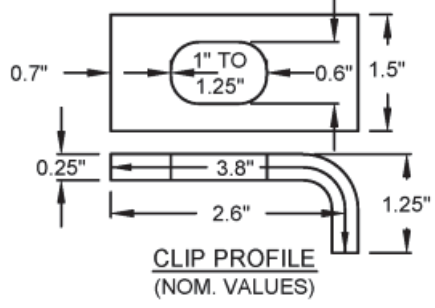
<u>Unit</u>	<u>Description</u>
Each	Multimode Phase Selector (w/ Pole Mounted Antenna)

APPENDIX A –STANDARD CONSTRUCTION DRAWINGS FOR JUNCTION BOXES (PULL BOXES)



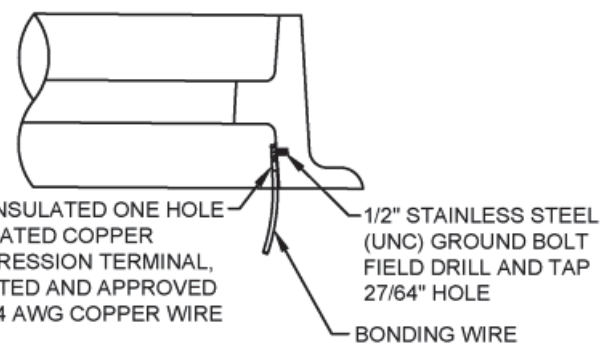
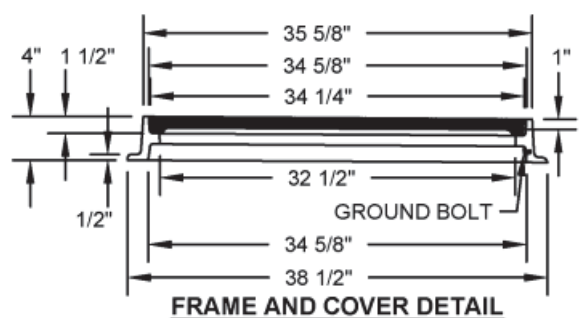
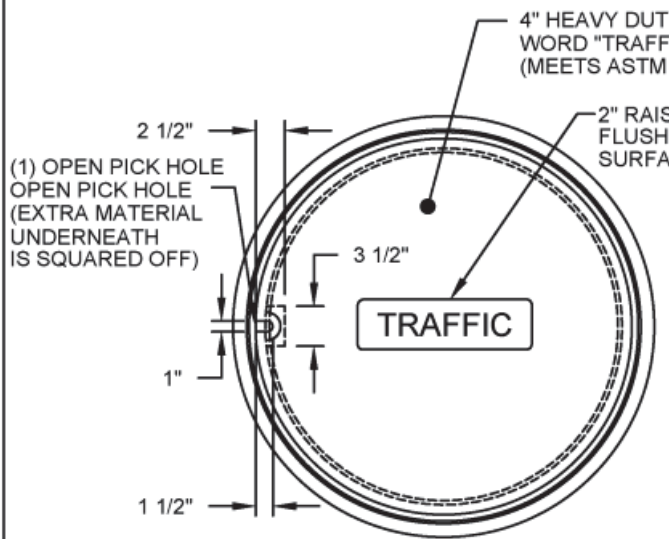
TOP VIEW OF CONCRETE PULL BOX

THE CLIP SHALL BE MADE FROM A36 METAL, HD GALV (ASTM A123) AND IN THE SHAPE SHOWN.



SECTION X-X PULL BOX WITH FRAME AND LID

PULL BOX 32"	
CITY OF COLUMBUS, OHIO DEPARTMENT OF PUBLIC SERVICE DIVISION OF DESIGN AND CONSTRUCTION	STD DWG 4022
<i>Hassan Zahran</i>	5/01/2014
CITY ENGINEER	SHT 1



GROUND BOLT INSTALLATION DETAIL

PULL BOX 32"	
CITY OF COLUMBUS, OHIO DEPARTMENT OF PUBLIC SERVICE DIVISION OF DESIGN AND CONSTRUCTION	STD DWG 4022
<i>Hassan Zahran</i>	5/01/2014
CITY ENGINEER	SHT 2

**APPENDIX B – LOUISVILLE METRO PUBLIC WORKS & ASSETS UTILITY POLICY
2016 (REVISED MAY 17, 2017)**

Louisville Metro Public Works & Assets UTILITY POLICY



**Mayor
Greg Fischer**

**LOUISVILLE METRO
DEPARTMENT OF PUBLIC WORKS
UTILITY POLICY**

July 1, 2016
Revised May 17, 2017

DATE

May 17, 2017

REVISION

Add section V(A)(3) to address microtrenching in pavement. Add Appendix-C, Microtrenching Specifications. Misc. definitions added in section V(A)(2) to cover DAS systems and restricting pole heights. Allowable distances between existing DAS antennae also defined. Conditions for conduit placement outlined.

ACCEPTED

Varesha Dale Buss

DATE

5/17/17

UTILITY POLICY

The utility policy is established to describe the means and methods by which any contractor or franchised or legislatively empowered utility companies or those working for such entities (hereinafter referred to as "Permittee") will be permitted to work within the Louisville-Jefferson County Metropolitan public right-of-way.

INDEX

- I. PURPOSE & BACKGROUND 1
- II. POLICY OBJECTIVES 1
 - A. Ensure Public Safety / Minimize Public Inconvenience 1
 - B. Protect Public Infrastructure 1
 - C. Facilitate Right of Way 1
- III. PUBLIC SAFETY/MINIMIZE PUBLIC INCONVENIENCE 1
 - A. Work Within the Pavement 2
 - 1. General 2
 - 2. Arterial Streets 2
 - 3. Collector Streets 2
 - 4. Local Streets 3
 - B. Work Outside the Pavement 3
 - C. Work Areas Generally 3
- IV. PROTECT THE PUBLIC INFRASTRUCTURE 4
 - A. Quality Assurance/Quality Control/Inspection 4
 - B. Reconstruction/Restoration Standards 4
- V. FACILITATE RIGHT-OF-WAY WORK 8
 - A. Standards for Various Utility Elements 8
 - 1. Utility Elements 8
 - 2. Additional Standards For Telecommunications Elements 10
 - 3. Microtrenching Alternative 12
 - 4. CABLE TV: RESERVED 13
 - B. Right-of-way Permits 13
 - 1. When Permits Required 13
 - 2. Obtaining Permits 13
 - 3. Responsibility 13
 - C. Bond Requirements and Insurance 14
 - D. Radio Frequency Identification (RFID) 14
 - E. Permit Denial 14

APPENDIX A: LOUISVILLE METRO LANDSCAPE PLAN 15
APPENDIX B: UTILITY POLICY FOR PARKS AND PARKWAYS..... 17
APPENDIX C: MICROTRENCHING SPECIFICATIONS..... 19

I. PURPOSE & BACKGROUND

This policy is established to describe the means and methods by which any Permittee or franchised or legislatively empowered Permittee will be permitted to work within the Louisville/Jefferson County Metro (hereinafter referred to as "Metro") right-of-way.

The placement of utilities in Metro's rights-of-way is at the discretion of the Louisville Metro Public Works Department (hereinafter referred to as "LMPW") under Chapter 53 of the Louisville Metro Code of Ordinances (hereinafter referred to as "LMCO"). LMCO 53.06 of the Code states: that "...No person other than an authorized officer or employee of the Metro Department of Public Works shall make any opening, cut, or excavation in or under the surface of any street, alley, sidewalk, or highway of Louisville Metro without a written permit from the Director."

It is recognized that there is a need to accommodate Permittee in the provision of public services; however, Metro must ensure that the primary purpose of the street, passage of vehicular, bicycle and pedestrian traffic, is maintained to the greatest extent possible. The use of the street corridors by Permittee is secondary to the movement of traffic. This policy strikes a balance between the public need for efficient, safe transportation routes and utility services within these routes.

II POLICY OBJECTIVES

Based on the Metro Code requirement, this utility policy has three primary objectives.

A. Ensure Public Safety / Minimize Public Inconvenience

First, Metro must ensure that the public safety is maintained and that public inconvenience is minimized by establishing time constraints for utility work, response time for utility repairs to the pavement, and standards for work zone safety.

B. Protect Public Infrastructure

The second objective is to protect the public's infrastructure investment by establishing repair standards for the pavement when utility cuts are made, and by specifying the inspection requirements for street repairs. Standards include but are not limited to: Americans with Disabilities Act (hereinafter referred to as "ADA") Standards for Transportation Facilities; Kentucky Transportation Cabinet Standard Drawings and Specifications; and Louisville Metro Standard Drawings and Specifications.

C. Facilitate Right of Way

The third objective is to facilitate utility work within the right-of-way through the standardization of utility placements and the maintenance of an efficient permit process.

To guide the staff, Permittee, and Permittees in achieving the above stated objectives, the following policy has been prepared. The policy is intended to provide general guidance only. Specific requirements will be developed based on site-specific conditions. Also, as with any policy, exceptions may be granted as deemed necessary by the Director of Public Works or designee (hereinafter referred to as "Director"). LMPW will conduct periodic reviews of the policy and invite Permittee's input in order to make this document an effective tool for the conduct of our mutual responsibilities to serve our respective "customers".

To meet all requirements of law, including but not limited to, the Americans with Disabilities Act (ADA), the Kentucky Department of Transportation (KYTC) Standard Designs, the Manual on Uniform Traffic Control Devices, Louisville ordinances, MSD Standards, Roadside Design Guide, Parks policies, and AASTHO.

III. PUBLIC SAFETY/MINIMIZE PUBLIC INCONVENIENCE

LMPW is charged with managing and coordinating all construction in Metro rights-of-way and easements. A major objective is to provide for public safety and to minimize inconvenience during the course of

construction activities within Metro. Accordingly, the constraints specified below vary according to the classification of the work area.

A. Work Within the Pavement

1. General

There must be at all times sufficient traffic lanes open to permit a substantially normal flow of traffic and proper provisions for maintenance of traffic. Street intersections must be kept open to traffic, sufficient space being provided for two (2) lanes of traffic unless an exception is granted by the Director. Traffic lanes shall be a minimum of ten (10) feet wide unless lanes of lesser width are approved by the Director. All exceptions to the Utility Policy shall be in writing.

When notified by Metro of an improper maintenance of traffic, the Permittee shall provide proper provisions for traffic control immediately. In case of emergency, arrangements are to be made by Permittee with the Police Department so that officers may be assigned to handle traffic until facilities for traffic maintenance can be obtained and placed. If proper facilities for maintenance of traffic and/or proper provisions for traffic control are not being provided by the Permittee, LMPW may take necessary steps to place traffic maintenance and traffic control facilities in proper condition. The cost thereof shall be collected from the Permittee.

Steel plates or bridges of sufficient size shall be furnished to cover openings, and to provide crossings over trenches or new pavement on main thoroughfares and at important intersections. The plates or bridging shall be securely fastened in place to prevent movement. It shall remain in place when no work is being done on a particular length of opening on which it is used as a cover. Temporary paving with a cold asphalt mix should be used to feather the edges of the plate to form a wedged taper to cover the edges of the steel plate in advance of oncoming traffic. Other alternative methods to accomplish this will be considered for approval.

When the final surface is not installed after backfilling of the trench, it shall be necessary to place a temporary surface on any street cut opening. The temporary surface installation and maintenance shall be the responsibility of the Permittee until the permanent surface is completed and accepted. The temporary surface shall be either hot mix asphalt, cold mix asphalt or concrete. Temporary asphalt surfaces shall be compacted and rolled smooth with a drum vibratory roller.

Meter Bagging: For parking meter bagging requests, a permit from the Parking Authority of River City (PARC) is required. When permit has been obtained, contact PARC at 574-3817 with Meter and permit number as well as location(s). If work vehicles will be parking on site the permit must be in the window and visible at all times. Bagging must be done 24 hours in advance of any work.

2. Arterial Streets

Arterials are those streets in Louisville Metro designated as major thoroughfares (See Public Works Street Class on LOJIC). Being essential to the safe movement of the majority of citizens, these streets require stricter regulation to maintain the orderly and safe flow of traffic. Unless sufficient traffic lanes remain open to permit a substantially normal flow of traffic, work will be confined to the hours between 9:00 a.m. to 3:00 p.m. and 6:00 p.m. to 6:00 a.m., however, the Director may grant a change in hours.

When the final surface is not immediately installed after backfilling of the trench, it shall be necessary to place a temporary asphalt surface on any street cut opening. The temporary surface installation and maintenance shall be the responsibility of the Permittee until the permanent surface is completed and accepted.

3. Collector Streets

These are all streets which connect local streets to arterial streets. Note: restrictions such as those for arterial streets may apply depending on peak traffic hour activity. Generally, there will be no

restrictions on work hour or work days; construction shall be limited to 7:00 a.m. – 8:00 p.m. Monday through Friday (emergency work excluded). Two-way traffic shall be maintained at all times during peak traffic times; one lane closure will be allowed between 9:00 a.m. and 3:00 p.m. with flaggers.

Permanent restoration shall occur within one (1) week except as outlined by Public Works in the Permit. When the final surface is not installed within one (1) week after backfilling of the trench, it shall be necessary to place a temporary asphalt surface on any street cut opening. The temporary surface installation and maintenance shall be the responsibility of the Permittee until the permanent surface is completed and accepted.

4. Local Streets

These are those streets and cul-de-sacs which provide direct access to adjacent property or individual homes. Generally, there will be no restriction on work hours or workdays. Construction hours shall be limited to 7 a.m. - 8 p.m. Monday through Friday (emergency work excluded). At least a single lane shall be provided for two-way traffic with a flagman available for control.

Permanent restoration shall occur within two (2) weeks except as outlined in the Permit. When the final surface is not installed within two (2) weeks, it shall be necessary to place a temporary surface on any street cut opening. The temporary surface installation and maintenance shall be the responsibility of the Permittee until the permanent surface is completed and accepted.

B. Work Outside the Pavement

All work areas within the public right-of-way and outside the pavement shall be restored to their original condition or better after work completion. Pits/trenches that remain open overnight shall be secured to protect the public and adjoining property. In no case shall any work area outside of the pavement be left in a disturbed state longer than 30 days. When notified of a failure in the work area (i.e. cave-in), the Permittee shall respond and repair said work within twenty-four (24) hours.

C. Work Areas Generally

Disturbed areas shall be limited to no more than 300 linear feet of open trench before temporary repairs are initiated.

Care should be taken in job site parking to avoid damage to sidewalks and landscaping. Any curb, gutter, sidewalk or landscaping damaged by the utility shall be removed and replaced within thirty (30) days after the damage has occurred. Parked construction vehicles and equipment shall not restrict private property access for both pedestrians and traffic, nor hinder sight distances for traffic.

When notified by LMPW, or any other Metro entity, of an unsafe opening, the Permittee shall respond within twenty-four (24) hours.

No work will be permitted (except for emergencies) on certain streets during special Metro events, such as Derby, Thunder Over Louisville, etc., or others so designated in writing by the Director.

Salvage Requirements for work in Preservation Districts: In preservation districts the Permittee must be aware of type of street, sidewalk & curbing to determine type of repair or restoration needed. All areas within the designated historic preservation areas must be repaired using like materials and restored to its original condition. For information on historic preservation areas you can go to the following link: <http://www.louisvilleky.gov/PlanningDesign/Historic+Landmarks+and+Preservation+Districts+Commission.htm>

Work in a Restricted District: Pursuant to LMCO Section Chapter 53, all work in District A must comply with the provisions of LMCO Chapter 53.

The Permittee shall provide and maintain safeguards, safety devices and protective equipment and take any other needed actions as may be necessary to protect the public and property in connection with their work.

The presence of barricades, lights, or other traffic control devices provided and maintained by any party other than the Permittee, shall not relieve the Permittee of this responsibility. All traffic control around construction sites shall be in accordance with the Manual for Uniform Traffic Control Devices (MUTCD) and Louisville Metro Pre- Approved Plans, subject to modification for specific locations by LMPW Traffic Engineering.

Erosion and sediment control around work sites shall be in accordance with the Louisville Metropolitan Sewer District (MSD) standards. Inlet protection shall be provided at curb inlets and yard drains. Under no circumstances shall material (sediment, gravel, concrete, asphalt, etc.) be washed into storm drains. Excess material/sediment shall be allowed to dry and then be removed by vacuum sweeper or shovel and hauled away. Street washing shall be allowed only after sediment is removed in this manner. Effluent from dewatering operations shall be filtered or passed through an approved sediment-trapping device, or both, and discharged in a manner that does not adversely affect adjacent property. Saw cutting effluent and waste shall not enter the storm system and the Permittee conducting the saw cutting shall be prepared to collect the effluent and waste before starting the work. Upon notification of excessive erosion or sediment around work sites, the Permittee must take corrective action within twenty-four (24) hours.

IV. PROTECT THE PUBLIC INFRASTRUCTURE

The inspection process is the primary instrument by which LMPW seeks to protect the public investment in its infrastructure. Through a uniform and responsive inspection process, the public can be assured that work has been completed in accordance with current standards for reconstruction and site restoration. The objective of LMPW's inspection effort is to ensure that Metro infrastructure attains its maximum useful life and utility restoration callbacks are minimized.

A. Quality Assurance/Quality Control/Inspection

Every street and street repair situation is unique. Design criteria and construction standards cannot address every situation but, in order to maintain some form of consistency, these standards have been developed. In most cases, they provide the minimum acceptable standards for construction or repair. Consequently, when strictly applied, they will provide the minimally acceptable product. Therefore, this criteria has been developed to maintain the same integrity of the street pavement and subsurface condition prior to its being cut for utility installations.

Metro's quality assurance effort complements the Permittee's quality control efforts. Quality assurance is provided through the LMPW staff, who are responsible for the inspection of all right-of-way work. The staff serves as liaison with the Permittee to advise on construction standards, to coordinate activities between Metro and other Permittees and to advise on the extent of restoration.

Quality control is the responsibility of the Permittee. The Permittee is expected to be familiar with the applicable standards referenced herein and to employ qualified subpermittees who utilize these standards in the restoration of the right-of-way. Permittees who fail to comply with these standards risk exclusion from performing future right-of-way work.

Surface tolerances for street repairs should meet the standard for new construction. That is, the finished surface of the street repair should be tested with a ten-foot (10') straightedge parallel to the centerline or perpendicular across joints. Variations measured from the testing face of the straightedge to the surface of the street repair should not exceed one-quarter-inch (1/4").

B. Reconstruction/Restoration Standards

The proposed criteria are guidelines to achieve the goal of "Quality" in street repairs. When used in conjunction with good planning and judgment, the repair methods will maintain the street at an acceptable condition with minimal degradation. All restoration shall result in a work site condition equal to or better than that which existed prior to construction. The following provisions will serve as guidelines for work in Metro:

1. Pavement:

Before any digging commences in pavement, the pavement shall be sawcut around the perimeter of the proposed trench. Pavement cuts shall be filled with compacted select material. Either concrete or asphalt will be placed to match at a minimum the existing street cross section.

Select material shall be placed in an excavation in lifts and compacted as indicated in the "Report of Trench Backfill Procedure Updates for LWC, LG&E and MSD Pavement Restoration," University of Louisville Center for Infrastructure Research; and Stantec Consulting Services.

Once the compacted backfill has been placed, the asphalt cutback shall be made. The cutback will extend 1 foot minimum on each side of the opening and will be over undisturbed existing base. All edges of the opening shall be neatly cut with an asphalt saw and uniformly tacked. In concrete pavement, the depth of the cutback excavation shall be to the depth of existing concrete pavement or eight-inches, whichever is greater. In asphalt pavement, the depth of the cutback excavation shall be to a depth of ten-inches (10") to allow for an eight-inch (8") concrete cap and a two-inch (2") asphalt surface.

When it is necessary to use cold patch in an opening due to the unavailability of plant mix materials, the cold patch will be compacted with a vibratory drum roller.

Pavement restoration will be approved based on their general appearance as well as their "rideability." Rideability is defined as a leveling tolerance to within one-quarter inch (1/4") at any point across the street cut as it relates to the surrounding asphalt street surface.

In all cases, site clean-up is necessary and required.

2. Overlay Requirements:

All public streets will be overlaid when any of the following conditions apply:

- a. When any underground facility is installed in the street and is parallel to the centerline of the right-of-way, the street must be overlaid from curb line or edge of pavement to curb line or edge of pavement for the entire length of the utility extension. If the utility extension terminates within 150 feet of the near right-of-way line of an intersecting street, the overlay shall extend to said right-of-way line. Otherwise, the overlay shall extend 15 feet from the end of the excavation. If granted an exception by the Director, limits of overlay may be reduced to existing joints in the pavement.
- b. When any underground facility is installed in the street and is perpendicular to the right-of-way centerline, and, if there are three such crossings within 150 feet of each other, the overlay shall encompass all excavations and extend from curb line or edge of pavement to curb line or edge of pavement. If the last excavation is within 150 feet of the near right-of-way line of an intersecting street, the overlay shall extend to said right-of-way line. Otherwise, the overlay shall extend 15 feet from the end excavation. If granted an exception by the Director, limits of overlay may be reduced to existing joints in the pavement.
- c. When any underground facility is installed in the intersection of two streets, the entire intersection must be overlaid to the extended right-of-way line of each intersecting street. If granted an exception by the Director, limits of overlay may be reduced to existing joints in the pavement.

An adequate overlay will consist of a 2" mill around the perimeter of the proposed overlay, tack coat and a 2" overlay of surface asphalt, with sealing on all of the joints.

3. Signalized Intersections

In no case shall a Permittee cut into the pavement of a signalized intersection without having contacted LMPW Electrical Maintenance (hereinafter referred to as "EM") Shop at (502)574-3261 forty-eight (48) hours prior. EM will locate buried loop detection devices so as to protect them from damage. Any Permittee that damages a loop detector will have the loop repaired or be charged for the repair or reinstallation of the device.

4. Pavement Marking

Lane striping or other painted and affixed delineators which are removed by Permittee shall be replaced by the Permittee before restoration will be considered complete. The inspector will notify the Permittee of the product (traffic paint, thermoplastic, raised pavement markers, lane tape) and applications, and Traffic Engineering will approve all traffic delineation materials. If pavement markings are not properly replaced twenty-four (24) hours after written notice to the Permittee, LMPW may take necessary steps to replace pavement markings. The cost thereof shall be collected from the Permittee.

5. Sidewalk

Sidewalks damaged by Permittee shall be removed and replaced in full sections. A section's size will be determined by the adjacent sections or Metro inspector.

All edges of concrete to be removed shall be sawcut and then formed from construction (or dummy) joint to joint. Any sections of sidewalk which have been undermined as work progressed will also be cut out and replaced with suitable backfill prior to replacement.

Should damage to Metro sidewalks be observed after the work has been completed, the Permittee shall be notified in writing to perform the repairs within thirty (30) days. Where sidewalk sections are removed at street corners, the sidewalk and adjacent curb shall be restored as a curb cut handicapped ramp. Construction of the ramp shall be in accordance with current ADA standards.

6. Aprons

Driveway aprons will not be "patched" following utility work. All edges of concrete restoration shall be sawcut and the property owner's access to his/her property shall not be unreasonably denied. In the event of a repair being necessary, an apron will be repaired with the same material from which it was made (i.e. exposed aggregate aprons will be repaired with exposed aggregate concrete).

7. Curb and Gutter

When curb and gutter is replaced, it will be restored to the nearest joint. Match existing curb elevations and ensure constant grade and positive drainage. Expansion material will be used at joints. Should the work include removal of a section which was finished with a dummy joint, the Permittee will saw cut the joint prior to forming and pouring the new section.

8. Street Crossings

In streets that are less than five (5) years old or have a Pavement Condition Index (PCI) greater than 85, the LMPW reserves the right to deny any street excavation or require repairs that are over and above these specifications.

9. Utility Marking

The overly-large paint marks left after utility marking is a source of concern to Metro. Marks made on curbs as well as beyond the location which will not be removed during construction have a tendency to remain in place for an indefinite time. Therefore, Metro's policy is that marks shall be large enough and frequent enough so as to be seen by the Permittee but not so as to become

graffiti on the pavements, curbs, and sidewalks. Marking of valve box and service locations shall be made neatly and be less than four inches square. As the use of concrete pavers and specialty concrete finishes increases, the Permittee are specifically cautioned to be discrete with marks on these surfaces, whether on Metro-owned or private property.

10. Grass Areas and Trees

All areas that have been landscaped prior to construction shall be restored to original or better condition. Un-landscaped areas that were otherwise covered with vegetation shall be reseeded with grass seed after construction. In areas that have been previously sodded, sod will be considered the appropriate restoration.

Trees will not be removed or heavily pruned in the course of programmed utility work without prior review by Metro's arborist.

In the event that construction may impact a tree root zone area (that area underneath the drip line of the tree), Metro may require boring the utility instead of an open trench.

11. Landscaped Areas

Metro has done extensive landscaping in areas of Metro, principally in medians of arterial streets. When work is planned in one of these planted areas, it is the Permittee's responsibility to contact the Metro Arborist two (2) days prior to the start of work for consultation and possible removal/replacement of plantings. LMPW will determine procedures to be followed for maintenance of the plants and their policies will govern.

In cases where above ground work needs to be screened or where existing plant materials must be replaced, the Permittee will install landscaping materials in accordance with a landscape plan provided by Louisville Metro. Appendix A – "Standard Landscaping Screening Materials for Use in the Public Right-of-Way" and "General Landscaping Notes" outlines in general acceptable materials and practices.

12. Special Construction

Areas such as Historic Preservation Districts, Historic Registries, Fourth Street, West Main Street, historical alleys consisting of exposed aggregate sidewalk, brick paving, granite curbs, cobblestones and "bomanite" type concrete are extremely difficult to match and may require replacement of entire slabs versus patching. Extreme care is required when working in these areas. All work under the pavements in these areas will require prior coordination with LMPW.

13. Parks and Parkways

Louisville Metro Parks is committed to the preservation, protection and enhancement of Louisville Metro parks and parkways and general guidelines for work in those parks and parkways is provided in Appendix B.

14. Brick Paver Salvage

Brick masonry pavers that are removed by any person or by Metro shall be salvaged by Permittee and stored by LMPW for future use. Salvaged or harvested brick masonry pavers can then be used for the purposes of preservation and maintenance of existing brick streets and alleys. Pavers that are installed pursuant to this section shall be installed using the same construction processes and techniques as used in the existing historic surface where possible (LMCO 97.095).

15. Environmentally Sensitive Areas:

Proposed Permittee work in environmentally sensitive areas, which include wetlands, streams, unstable slopes, and areas of differential settlement (i.e. peaty soils) may require a review by MSD for possible mitigation requirements. It is the Permittee's responsibility to educate itself on the

location of sensitive areas. The Louisville Jefferson Information Consortium (LOJIC) has interactive maps showing these areas within Metro limits.

V. FACILITATE RIGHT-OF-WAY WORK

Metro recognizes that work within its rights-of-way by Permittee is necessary in order to provide our citizens with essential services. Accordingly, an efficient and responsive right-of-way permitting process has been established to avoid delays in allowing Permittee to maintain service to their customers. Also, by establishing uniform placements for utilities, conflicts between utilities may be minimized, benefiting all parties.

A. Standards for Various Utility Elements

The following information provides location and configuration standards for utilities for new developments and redevelopments, existing rights-of-way, easements, and Metro Capital projects. This section also addresses the requirements for telecommunication elements proposed to occupy and function within the right-of-way. The goal is to standardize and document Metro requirements regarding the placement of utility and telecommunication elements in accordance with applicable Metro standards, ordinances, regulations, and long-range plans, and current accepted utility standards.

1. Utility Elements

- a. Meters: Where practical, water meters are to be located within two feet of the back of the curb or at the property line where there is no curb and gutter. When possible, avoid placing within sidewalks or driveway aprons. Where new driveway aprons are to be built over existing water meters, Louisville Metro shall notify the Louisville Water Company and advise the homeowner of conflict consequences.
- b. Poles: With all new street side pole installations, including those poles installed to support a small cell antenna and, where required, associated attached appurtenances, consideration should be given to clear zones as designated by the Roadside Design Guide. See Section B. hereof for additional standards related to small cell antennae. Downguys shall be minimized and provided with yellow covers. Unused or abandoned guy anchors shall be removed (not cut flush) six inches (6") below grade and sidewalk section replaced, or surface backfilled and restored to original contours.

In specific areas (e.g. Central Business District) and in any new development (e.g. capital projects and subdivisions), Metro reserves the right to require underground services. Any proposed overhead facilities shall be subject to review by the Director. The Director shall also review any proposed changes to existing overhead utilities in existing developed areas, including but not limited to routing changes, installation of different materials or type of facilities than currently in use, and pole pattern re-locations.
- c. Sewer cleanouts: Sewer cleanouts will be provided per MSD specifications and located at the right-of-way line.
- d. Valves: All valves are to be installed with valve boxes set flush (1/4" + tolerance) with adjacent surfaces and located out of the pavement if possible. Gas valves for private services shall be located at or near the property line, outside of concrete sidewalks. When possible, avoid placing within sidewalks or driveway aprons. When notified by Louisville Metro of the settlement of a valve box, the Permittee shall raise the box within 30 days.
- e. Vaults: Locations of all vaults (telephone and electric) shall be coordinated with Metro on a case-by-case basis. Access to vaults shall be through standard manhole castings. For any vault to be repaired, replaced, or installed, the lids must meet ADA criteria longitudinally and horizontally.
- f. Waterlines: Waterlines shall be installed underground with six-inch (6") clearance at utility crossings. Installing facilities directly over and parallel to water mains shall be avoided.

- g. Ground Level Elements (hereinafter referred to as "GLEs"): GLEs are those elements associated with electrical and telecommunications utilities, including, but not limited to Panel boxes, Distribution boxes, Transformers, Public Telephone Kiosks, Pedestals, Switches, Battery Cabinets, and Video-Ready Access Devices ("VRADs"), etc.

GLEs shall be painted green, black or brown (unless aluminum or stainless), and/or screened from view by plantings. Such plantings shall be reviewed and approved by the Metro Arborist prior to installation.

When installed in easements alongside open drainage ditches such ground level elements shall be placed 10' from the edge of the ditch to allow for access by slope mowing equipment. Any exceptions will need specific written approval from LMPW.

Large GLEs (GLEs which exceed four (4) cubic feet in volume and/or eighteen (18) inches in height), shall be required to be metered to the extent they require an independent power supply, and the responsible Permittee shall pay any service charges, meter fees, lighting and maintenance fees and other expenses associated with connecting to the municipal power provider.

Utilities and approved franchisees engaged in the installation and maintenance of telecommunications utilities and associated equipment such as battery cabinets, small cell antennae, and VRADs are encouraged to obtain a private easement for Large GLEs.

- h. Hydrants: Fire Hydrants shall be set to established grade, with the center of the barrel two feet (2') behind the face of the curb line for standard curbs, and eighteen inches (18") behind the back edge of the curb for rolled curbs. In the absence of a curb, the hydrant shall be set approximately five feet (5') to fifteen (15') from the edge of the pavement, and no more than fifteen feet (15') from a hard traveled surface.
- i. Underground Cables and Pipelines: In new developments and redevelopments, Metro reserves the right to review the location of all underground facilities prior to their construction. Screening Required: VRADs and, at the discretion of LMPW, other Large GLEs shall be required to locate in an existing decorative newspaper corral where one exists in the public right-of-way. Where such corral does not exist, or where adequate space is not available in an existing corral, the Permittee shall install such decorative corral, the design of which shall be approved by LMPW in consultation with Develop Louisville's Planning and Design Services and Advanced Planning staff, to screen the installation. Where a VRAD or other Large GLE is located in a decorative corral, the Permittee shall maintain full responsibility for upkeep and maintenance of the corral. At the sole discretion of the Director in consultation with Develop Louisville's Planning and Design Services and Advanced Planning staff, where a VRAD or Large GLE is located in a residential area, appropriate landscaping may be substituted for the corral. The Director shall determine to what extent (if any) screening is required for a small cell antenna pole and any associated GLE.
- j. Sequential Preference Standards: Subject to satisfaction of the other placement criteria set forth herein, and as applicable, the terms of any franchise or municipal facilities agreement approved by Metro, sites for Large GLEs, and poles for small cell antennae located on the public right-of-way will be evaluated based on the following sequential preference, provided that all landscaping or screening required by LMPW can be provided at that location.
 - i. Right-of-way or utility easement abutting industrial sites;
 - ii. Right-of-way or utility easement abutting office or commercial sites;
 - iii. Right-of-way or utility easement abutting parking lots that accommodate multi-family residential uses;
 - iv. Right-of-way or utility easement abutting government centers, public or private schools, churches or other public buildings;

- v. Right-of-way or utility easement abutting undeveloped sites;
- vi. Right-of-way or utility easement abutting the rear yard of a single family residential property at an interface with a made alley;
- vii. Right-of-way or utility easement abutting the back yard of a single family or multi-family residential property which is not at an interface with a made alley;
- viii. Right-of-way or utility easement abutting the side yard of a corner single family residential property;
- ix. Right-of-way or utility easement abutting the front yard of a residential property.

This is not an all-encompassing list and is provided to develop a thoughtful approach to proper siting of utilities and associated elements. For example, assuming a proposed location meets all other placement criteria, a structure will be permitted to be placed in a right-of-way or utility easement abutting the front yard of a residential property only if the Permittee demonstrates to the Director's satisfaction that it cannot reasonably be placed in any location described in 1 through 8 above.

The foregoing notwithstanding, new or replacement utility structures and related appurtenances must be placed in accordance with AASTHO (American Association of State Transportation and Highway Officials) Roadside Design Guide. Furthermore, utility structures and associated appurtenances may not create a sight distance obstruction and should not be placed at mid-block locations.

2. Additional Standards For Telecommunications Elements

- a. Location of GLEs. The placement and design of GLEs associated with telecommunications elements shall comply with the requirements for GLEs set forth in Section A. above, and the additional requirements of this Section.
- b. Location of Small Cell Antennae: A small cell antenna is a device mounted on existing or proposed poles the purpose of which is to receive and/or transmit digital data and relay this data to a central node or hub for further processing and distribution to a user base. A small cell antenna may be mounted on a new or existing pole, such as existing wooden power utility poles, wooden or metal light poles, or newly installed wooden or metal poles. Any antennae installed on existing utility poles shall have the approval of the affected utility in writing. A small cell antenna also requires a battery cabinet, which may be mounted on the pole or set on the ground. For purposes of this Metro Utility Policy, the term 'small cell antenna' shall include the antenna, pole, pole-mounted or ground-mounted battery cabinet, and other associated equipment. Likewise, the term DAS shall mean Distributed Antenna System. A DAS system is a group of small cell antennae individually mounted on poles and designed in a specific layout configuration. Antennae within the system are linked by fiber optic cable to a main network.

When considering the location of small cell antenna, the highest preference shall be given to co-location of any proposed antennae on existing utility poles. The location of any associated battery cabinets and other appurtenances shall, by attachment agreement with the affected utility, be placed in accordance with the National Electric Safety Code and applicable requirements of the affected local utility.

Poles that are designed to support a small cell antenna may not exceed thirty five (35) feet in height, exclusive of the antenna height. Pole locations and their materials shall be reviewed and approved by Metro as outlined in Section V(A)(2) of this document. Requests for an exception to the terms of this paragraph may be considered by LMPW on a case-by-case basis.

If co-location is not possible, proposed siting of small cell antennae shall comply with the Sequential Preference Standards set forth in Section A. above. It is understood that locations of telecommunication elements are, by the nature of the type of service they provide, governed

by customer density and demand. To that end, it is recognized that an evaluation process should be conducted based on the Sequential Preference Standards to establish proper siting to minimize visual/physical inconvenience on the general public.

Proposed DAS systems utilizing small cell antennae may not locate a small cell antenna (including the pole and any appurtenances) within one thousand (1,000) feet of any other existing DAS system or single small cell antenna. Exceptions may be considered on a case-by-case basis by LMPW.

Prior to approval of any proposed small cell antennae, the Permittee shall submit to LMPW a written explanation of how the proposed location comports with the Sequential Preference Standards.

- c. Screening Required. Due to the potential for small cell antennae in the right of way to constitute visual nuisances, the Director may require placement and/or replacement of landscaping or other screening which the Director deems necessary as a condition of approval of the site.
- d. FCC-RF Compliance Assessment. Prior to approval of proposed small cell antennae, the Permittee shall submit to LMPW an FCC-RF compliance assessment by a third party, qualified to prepare such assessment, demonstrating that the proposed installation will comply with all federal RF exposure guidelines during all conditions of its operation.
- e. Public Notice Requirements. Before final approval for the location of any small cell antenna, including its appurtenances as previously described herein, the Permittee shall, at their own expense, provide written notification by first class mail to the Metro Council member of the affected property and to all property owners located within 150 feet of the proposed installation of the Permittee's intent to install such equipment. The Permittee shall provide a copy of the notice and a list of everyone to whom the notice was mailed to LMPW, and shall certify in writing that the notice was sent pursuant to the requirements of this section. The notice shall include (a) an explanation of the purpose of the small cell antenna, (b) a description of the proposed location, including dimensions for the base and supporting pad, and a depiction of the general appearance, (c) information addressing public safety concerns related to RF emissions, and (d) contact information for the Permittee and a statement advising the property owner that he or she may contact the Permittee within fourteen (14) days after receipt of the letter to discuss any questions or concerns.

No permit shall be issued for any small cell antenna or related appurtenance until twenty-one (21) days after the Permittee provides the certification to LMPW that the notice required by this section was mailed.

- f. Aesthetic Considerations. The Permittee shall provide lighting or other design elements and amenities as required by the Director to enhance the aesthetic appearance and coordinate the proposed telecommunications elements with the surrounding environs.
- g. The Permittee may exercise the option of using the services of a third party to assist in the location of any small cell antenna and associated appurtenances however the permittee remains responsible for all areas addressed in this policy.
- h. Fiber optic cable shall be placed in conduit(s) when located underground on arterial and collector roadways. Likewise, cable installed in grassed or dirt areas shall also be placed in conduit(s). Fiber optic cable located on local roads may be installed by direct bury methods without conduit. LMPW shall review and approve all routes, method, and materials for installation on Metro roadways. Guidance is provided by Microtrenching Specifications found in Appendix-C.
- i. Removal of telecommunications elements. The Permittee shall immediately remove telecommunications elements that become redundant, unnecessary or otherwise unused, or if

the Permittee discontinues service in Louisville, fails to receive a renewal of any expired franchise or municipal facilities agreement from Metro or is able to provide the service that required the installation of such elements using technology that does not require above ground installation. At the sole discretion of the Director, a bond shall be posted to cover the costs of future removal of telecommunications elements. Such bond shall be set in an amount to cover removal as well as reconstruction costs, and shall be administered by LMPW.

3. Microtrenching Alternative

- a) Definition: Microtrenching is a low-impact slot-cut trenching method that enables quick installation of underground fiber in trenches that are narrower and shallower than typical open trenches currently used in the industry.
- b) The Director of Public Works, or designee, may approve use of microtrenching requests for specifically approved areas. Microtrenching shall follow the Microtrenching Specifications presented in Appendix C. Any deviation from these specifications may be considered on a case-by-case basis by LMPW.
- c) All requirements of the Public Works and Assets Utility Policy shall be complied with except as specifically permitted in this section. Requests that involve placement of cable/conduit within the asphalt pavement at depths shallower than required in the Microtrenching Specifications and as shown on the Standard Drawing, shall comply with the following supplementary requirements for microtrenching within pavement areas.
- d) Supplementary Requirements for microtrenching within pavement areas:
 - i. Metro may allow "microtrenching construction" in the right of way at a depth and configuration that is mutually acceptable to Applicant and Metro.
 - ii. At no cost to Metro, the Applicant shall provide permanent on-going maintenance to the fiber routes in the Project Areas. Maintenance shall include providing materials and labor to properly maintain in good condition pavement, sidewalks, curbs, curbs and gutters and softscape areas (dirt and grass) per Public Works and Assets Utility Policy.
 - iii. The Applicant, at no cost to Metro shall replace any fiber/conduit, including the Applicant's and all other fiber/conduits, that are damaged or destroyed due to any paving/resurfacing activities. This also includes those activities necessary for Metro to maintain drainage infrastructure.
 - iv. The Applicant shall replace at no cost to Metro, any fiber/conduit, the Applicant's and all other fiber/conduits, damaged or destroyed in the softscaped areas (dirt shoulders, grassed utility strip, etc.).
 - v. Metro will not be responsible for any damage to the cable/conduit resulting from utility construction activities by Applicant or its contractors and others in the approved areas.
 - vi. The Applicant will post a performance bond in a form and an amount to be determined by Metro. Said bond shall be in force for five years from the completion date of the project. At the sole discretion of Metro, the bond amount may be reduced over this period.
 - vii. The Applicant agrees to conform to the Metro standard specifications and the terms in the Utility Policy. Any changes shall be at the sole discretion of Metro.
 - viii. The Applicant shall conduct an inspection of the approved areas on years one, three and five. Subsequent inspections thereafter may be coordinated between the Applicant and Metro. Applicant shall provide inspection reports for each approved area after each inspection that details the results of the inspections. Metro shall participate in the inspections as it deems necessary.
 - ix. Applicant shall indemnify and hold Metro harmless from any and all liabilities, losses, claims, settlement payments, costs and expenses, damages, penalties, fines, attorney's fees and other amounts resulting from: a) Construction, operation, and maintenance activities

- associated with the Applicant's fiber optic network located within the approved areas; b0 Maintenance and repair activities associated with any public assets as previously described.
- x. Metro reserves the right to terminate the associated activities within each or all of the approved areas without cause after thirty days written notice or for cause immediately at any time. Any outstanding costs, debt or other financial commitments related to the Project shall be the sole responsibility of Applicant. Upon cancellation, the terms of this agreement more specifically, the maintenance obligations of Applicant, shall survive.

4. CABLE TV: RESERVED

B. Right-of-way Permits

Metro monitors utility work through the utility permitting process. This process allows Metro to coordinate activities between Metro forces and other utilities, to maintain a record of street cuts & repairs and to identify specific Metro requirements.

1. When Permits Required

Any work within the right-of-way which disturbs the pavement, curb and gutter, driveway entrances, sidewalk, landscaping or grassed areas, requires a permit.

This work may include, but is not limited to: utility main and/or lateral replacement and repair; valve replacement and repair; installation of new underground mains or laterals, structures or accessories; splices, buried drops (under pavement or sidewalks); pole changes for height, accident, etc.; cathodic protection; boxes and vault installations and jacking or boring under the right-of-way where disturbance within the right-of-way may occur.

2. Obtaining Permits

Before work within the right-of-way is started the necessary permit shall be obtained from LMPW. Unless otherwise agreed, emergency work requires that a permit be obtained as soon as possible but not later than 18 hours after the onset of work (LMCO 97.091). Permits are usually issued for the time period requested by the Permittee. However, when situations warrant, the permit expiration date may be extended when prior notification is received. If work on an existing permit has not been started by the expiration date, the permit will be cancelled and a new permit will then be required to initiate the work.

3. Responsibility

The Permittee is responsible for the work performed and LMPW will contact the Permittee for required adjustments or corrections regardless of whether the Permittee performed the work itself or subcontracted and assigned the work. The Permittee is solely responsible for the work performed. The Permittee shall have a copy of the permit on the job site at all times.

Permittee shall be responsible for the condition of any right-of-way repairs. The restoration shall be made with like materials to that which the street, alley, sidewalk, or highway is constructed. After the completion of the work allowed by such permit, the Permittee shall, within five days, report in writing to the Director that the work has been completed. The Permittee shall maintain the condition of the surface over such opening or excavation for five years in as good condition as the remainder of the street, alley, sidewalk, or highway and shall repair or reconstruct the surface as often as may be necessary. Should such person fail to maintain, repair, or reconstruct any such surface within ten days after written notice from the Director, LMPW may have such surface repaired or reconstructed and charge the cost of repair, including any costs associated with the use of any like materials used in restoration, to the person responsible therefor. Such person shall indemnify and save harmless the Metro, its elected and appointed officials, employees, agents and

successors against any claim for damages by reason of any defective condition of any such street, alley, sidewalk, or highway surface due to such existence, construction, or by reason of any work so done, of whatever nature (LMCO 53.06).

Should the condition of the restoration become such that additional pavement is in jeopardy of failure, then the Permittee may be held responsible for an area larger than the original repair. Other repairs (sidewalk, curb and gutter, trenches, etc.) shall be warranted for two (2) years.

C. Bond Requirements and Insurance

To protect Metro against any loss or damage on account of any opening or excavation in or under the surface of any street, alley, sidewalk, or highway, every person before doing any work therein shall file with LMPW acceptable insurance and bonding per LMCO 53.07.

D. Radio Frequency Identification (RFID)

To track restoration responsibility, LMPW will provide RFID tags with the permit. The RFID tags will be preprogrammed with:

- Year of restoration;
- Utility permit number; and
- Permittee responsible for the work.

RFID tags are to be placed in the concrete cap below the final surface in the middle of all street cuts. For longer or wider trenches, RFID tags are to be placed in the concrete cap at both ends of the street cut, at each intersection, and at intervals not to exceed 250 feet.

E. Permit Denial

A permit application may be denied for the following reasons if deemed in the public's interest;

- Past due fees from prior permits.
- Failure to return the right-of-way to its previous condition under previous permits.
- Undue disruption to existing utilities, transportation or Metro use.
- Area is environmentally or historically sensitive as defined by federal, state or local laws and regulations.
- Failure to provide required information in a timely manner.
- The applicant is in violation of the provisions of this policy.

APPENDIX A: LOUISVILLE METRO LANDSCAPE PLAN

STANDARD LANDSCAPING SCREENING MATERIALS FOR USE IN THE PUBLIC RIGHT-OF-WAY

	BOTANICAL	COMMON
<u>EVERGREEN</u>	<i>Pinus strobus</i>	White Pine
	<i>Pinus taeda</i>	Loblolly Pine
	<i>Pinus virginiana</i>	Virginia Pine
	<i>Taxodium distichum</i>	Bald Cypress
	<i>Juniperis virginiana</i>	Eastern Red Cedar
	<i>Juniperis species - Thuga occidentalis</i>	Eastern Arborvitae
<u>SHRUBS</u>	<i>Aesculus parviflora</i>	Bottlebrush Buckeye
	<i>Aralia spinosa</i>	Devil's Walkingstick
	<i>Corylus americana</i>	American Hazel Nut
	<i>Ilex decidua</i>	Possumhaw
	<i>Ilex glabra</i>	Inkberry
	<i>Myrica pennsylvanica</i>	Bayberry
	<i>Cornus sericea</i>	Red Twig Dogwood
	<i>Forsythia x intermedia</i>	Border Forsythia
	<i>Rhus aromatica</i>	Fragrant Sumac
	<i>Rhus typhina</i>	Staghorn Sumac
	<i>Rhus copallina</i>	Shining Sumac
	<i>Viburnum dentatum</i>	Arrowwood
	<i>Sambucus pubins</i>	Red Elder
	<i>Sambucus canadensis</i>	American Elder
	<i>Spirea</i>	
	<i>Weigelia</i>	
	<i>Philadelphus coronarius</i>	Mockorange
<i>Rhamnus cathartica</i>	Buckthorn (Tall Hedge)	
<i>Viburnum prunifolium</i>	Blackhaw	
<i>Viburnum trilobum</i>	American Cranberrybush	

PERENNIAL GRASS

Miscanthus sinensis	Chinese Silver Grass
Erianthus ravennae	Pampas Grass
M. Strictus	Porcupine Grass
M. Zebrinus	Zebra Grass

BAMBOO

Phyllostachys spp.	Chinese Hardy Bamboo
--------------------	----------------------

GENERAL LANDSCAPING NOTES

1. The type of plant material to be used will be specified on the permit by Louisville Metro.
2. On Standard Landscaping Plans, utility equipment access doors will generally be oriented to face away from the street.
3. The clearance on non-door sides shall be three (3) feet, ten (10) feet clearance on the door access side.
4. Indigenous plants should be specified whenever possible.
5. Plant selection and placement are both site-specific components of the screening process

** NOTE: all fire hydrants shall be kept clear of weeds, rubbish, and all other obstructions, by the abutting property owner. Landscaping or decorations shall not be used to obstruct or hide the fire hydrant from clear view, nor prohibit access to the hydrant for use or maintenance. Hydrants shall not be permitted to supply irrigation systems. Damage caused to landscaping within a 15-foot radius of the hydrant due to periodic maintenance, use, or testing of a fire hydrant, shall be the responsibility of the owner of the landscaping. (Ord. 29-1980 Code: 94.82)

APPENDIX B: UTILITY POLICY FOR PARKS AND PARKWAYS

Louisville Metro Parks (Metro Parks) is committed to the preservation, protection and enhancement of Louisville Metro parks and parkways and the following policy is intended to provide general guidelines for work in those parks and parkways.

Specific requirements will be developed based on site-specific conditions and standards and criteria will continue to be refined as this process is implemented. Standards for the Olmsted parks and parkways are being developed in a Master Plan.

Requirements for work on the parks and parkways include:

A. Initial Notification

Prior to the development of detailed design, the Parks Director is to be notified in writing of any project being considered in the parks or parkways. Notification should include a description of the work to be done, the location, the date when construction will begin and the estimated duration of the construction period. If Metro Parks determines that a design review will not be necessary, permit notification will follow (see Section C).

B. Design Review

Depending on the proposed scope of work, size of project, location and environmental conditions, the Parks Director may assign staff to participate in the detailed design process. Metro Parks will set project construction standards specific to the site which will include but may not be limited to:

- Trenching and pruning requirements to protect trees and shrubs.
- Worksite boundaries, fencing, access roads and staging areas.
- Erosion control, aeration and fertilization.
- Restoration of turf and grading for proper drainage and appearance including specifications for seed mixture.
- Designating employee and equipment parking and materials storage boundaries.
- Issues of traffic and public safety.
- Screening of permanent structures with plant materials and/or fencing.

C. Permit Notification

The Permittee must submit a permit application, including any exhibits, to the Parks Director allowing two (2) weeks for review and approval.

D. Inspection

Metro Parks staff will inspect all work during and after construction to ensure compliance with agreed upon standards.

E. Special Conditions

Scheduling: At the time of permit notification, Metro Parks will identify potential scheduling conflicts resulting from major mark/community events in the immediate vicinity.

Safety: Metro Parks expects Permittees to use special precautions to insure the safety of all park and parkway users. Park roads may be congested with bicyclists, pedestrians, joggers and horseback riders and sight distances are often significantly shorter than typical Metro streets.

Environmental and Historical: Erosion control measures in excess of those required by MSD may need to be implemented. Historic elements and materials, i.e., limestone curbs, cobblestone paths, etc., should be preserved or salvaged. Replacement materials and details should match the original in quality, appearance and durability.

F. Tree Replacement Policy

Care must be taken to preserve and protect specimen trees and shrubs. Any tree within a construction zone that dies within three (3) years must be replaced according to an established ratio based on value of the tree lost, as calculated by a certified Arborist or landscape architect, unless death by other causes can be proven.

G. Emergency Work

The Parks Director must be notified within 12 hours of the start of any emergency work required in the parks and parkways.

APPENDIX-C: MICROTRENCHING SPECIFICATIONS

1.0 INTRODUCTION

Microtrenching is a low-impact trenching method that enables quick installation of underground fiber in trenches that are narrower and shallower than typical open trenches currently used in the industry. Moreover, microtrenching minimizes the risk of damage to existing utilities by excavating a narrower and shallower trench.

For the purpose of this specification the following shall be considered:

- A microtrench shall be considered a slot-cut trench between 1/2" and 1-1/2" (not including overbanding) , and cut to a depth of 4" to 16", depending on location. Shallower slots may be considered by LMPW on a case by case basis.
- Microtrenching may not be used when the asphalt pavement section is less than four (4) inches.
- Cable or conduit may be located in an active parking or travel lane. Placement and depth to be reviewed and approved by LMPW.
- If trenching in concrete (seam/joint) cable or conduit must be placed below the bottom of the concrete pavement section.
- When the action of microtrenching caused a significant vertical and/or lateral displacement to the surrounding surface, the trenching operation shall cease and the process will continue with traditional excavation as covered in the Louisville Metro Public Works & Assets Utility Policy, July 1, 2016 (LMPW Utility Policy).
- Vertical displacement is defined as the existing surface not raising or depressing more than plus or minus 1/4" as compared to the current adjacent surface elevation. Due to the requirements of square edge cuts, limits for lateral displacement will not be necessary.
- Restoration shall be done immediately after installation of the cable/conduit and shall not remain open for any period longer than that required for restoration.

2.0 ROUTE/LINE DESCRIPTIONS

During initial planning and design, a comprehensive field investigation should be conducted to determine the most effective route for any proposed underground facilities. At a minimum the investigation should evaluate microtrenching along roadways and in the grass shoulder/utility strip areas. The following should be considered when planning a fiber or distributed antenna system (DAS) route.

2.1 Roadway

When positioning the microtrench routes within the road cross-section, consideration should be given to wheel paths of cars, trucks, motorcycles, and bicycles. Routes that may be considered within the roadway are:

- Curb & Gutter-Asphalt Joint: The curb & gutter-asphalt joint utilizes the construction joint between the concrete gutter and the asphalt pavement. During the excavation process,

the route/excavation only removes the asphalt along the gutter line and does not disturb the gutter, or curb concrete.

- Driving Lane: This option sets the route location a permitted distance and depth from the face of the curb or the edge of pavement within the driving lane. Depth and location to be approved by LMPW.
- Intersections and Curves: Intersections or curved routes (to hand-holds) shall be approved by LMPW.

2.2 Grass Shoulder/Utility Strip

In some cases, it may be more desirable to trench along the grass shoulder or utility strip. Utilities must be located prior to any activity. Trenching can be shallower, but must maintain minimum depths that are appropriate for the location of the cable/conduit. No cable or conduit shall be located less than six (6) inches below the proposed grade when located adjacent to the edge of sidewalk or against the back of curb. For all other locations the minimum depth shall be eight (8) inches. Typical conditions that may be encountered are:

- Between back of curb and sidewalk: This is the most desirable scenario since the back of the curb as well as its depth will provide protection to the fiber cable/conduit.
- Between the edge of pavement (no curb) and sidewalk: If no curb or curb and gutter exist, then installation next to the edge of the sidewalk is preferred. A minimum depth of 6 inches below the top of the softscape adjacent to the sidewalk is recommended.
- Between edge of pavement and adjacent right of way line: When trenching under this scenario, consideration should be given to current and future use of the route specifically with reference to drainage swales, paved drainage ditches, or major drainage construction with associated piping and drainage structures located along the route.

All routes and proposed depths shall be reviewed and approved by LMPW before any construction commences.

3.0 EXCAVATION

3.1 Roadway

A dry cutting process combined with vacuum removal of dust and large particles shall be used in the microtrenching process. Other methods of excavation must be approved by LMPW. Slots may be cut to the width of the cable/conduit and if necessary up to a maximum width of 1-1/2 inches. Trenches greater than 1-1/2 inches are not considered microtrenches and must be approved by LMPW. Restoration of trenches greater than 1-1/2 inches shall be reviewed and approved by LMPW.

Trenching shall be a single pass operation with the slot being vacuum-cleaned or air-blasted clean with oil free compressed air. Any large pieces of rock, dirt or asphalt material(s) that protrude into the slot shall be removed. The slot shall be free from other loose organic materials. Slot excavation shall permit placement of cable/conduit on the bottom of the slot.

3.2 Grass and Dirt

Excavation in grassed or dirt areas may be done by trenching or plowing techniques. Removal of any loose rocks or other materials that may cause long term damage to the cable/conduit should be done prior to installing the cable/conduit. Cable/conduit shall not be placed in the inverts of any drainage ditch or swales.

4.0 CABLE/CONDUIT INSTALLATION

Cable may be installed in the following manner:

- Direct bury,
- Air blown or pulled through conduit or,
- Inlaid into a two piece conduit system then assembled prior to placement into the microtrench.

Likewise, conduit is typically installed by direct bury in the slot. Conduit may be single duct or multiple ducts typically arranged in a single conduit system.

Should conditions warrant, cable/conduit installed in the bottom of the slot shall be held in place utilizing one of the following methods:

- Clips,
- Plugs (backer rods) of high density foam,
- Flowable fill or,
- Other suitable means, as approved by LMPW.

A tracer wire shall be incorporated on top of the backer rods.

5.0 GENERAL MATERIAL SPECIFICATIONS FOR BACKFILL & SURFACE RESTORATION

5.1 Flowable Fill

In general, flowable fill shall consist of a mixture of cement, sand, fly ash and water. Any additional materials must be approved by LMPW. Flowable fill shall maintain the consistency that will result in a flowable self-leveling material at the time of placement. Flowable fill shall have a minimum compressive strength as shown on the applicable standard drawing and shall be no less than 1200 psi at 28 days.

Flowable fill shall conform to the specifications as found in Sections 601.02 and 601.03 of the Kentucky Transportation Cabinet's 'Standard Specifications for Road and Bridge Construction', latest edition.

LMPW may on a case-by case basis, require higher compressive strengths.

5.2 Thermoset Resin

Thermoset resin material shall be a self-compacting, high modulus, thermosetting slot-filling compound with a high tensile bond strength and good dimensional stability over the anticipated operating temperature range. At a minimum, infill material shall meet the following criteria:

- Tensile Strength 5,000 psi
- Compressive Strength 1500 psi
- Void Content <1%
- Installation Temperature Range 40° F to 110° F
- Operating Temperature Range -40°F to 158°F
- Material Color Asphalt black/grey.

In cases where flowable fill is used as a first course of restoration, material may be placed over flowable fill and shall be asphalt grey/black or concrete grey. In shallower applications, only resin may be used for restoration. Placement shall be made utilizing a shoe and direct injection system that will completely fill the remaining void, restoring the surface profile and forming a durable rugged seal to the asphalt surfaces within the microtrench and to restore the surface profile by forming an over-band seal on the asphalt roadway surface on each side of the edges of the microtrench. The over-band component of the surface fill course shall be no more than 1/16" thick.

Prior to setting/curing, the resin surface course shall be over-scattered by a fine aggregate material to provide early skid resistance.

At the discretion of LMPW, a fully cured sample may be required for approval. The sample shall include where applicable, cured resin compound with material supplier's specification and where necessary, any proposed aggregate for initial and long term skid resistance and surface texturing as described above. The sample shall be to the actual dimensions of the proposed trench.

5.3 Cementitious Fiber Reinforced Material

This material shall be a single compound, non-asphaltic cementitious material that is tinted black and is fiber reinforced. This material typically has medium to fast setting properties. At a minimum this material shall meet the following criteria:

- Compressive Strength 6,000 psi
- Flexural Strength, Ultimate 1200 psi
- Splitting Tensile Strength 700 psi
- Shrinkage - 0.04%

To insure a strong bond to the asphalt surface of the slot/microtrench an adhesive/primer meeting the requirements of ASTM C1059 Type 1 and 2 shall be applied to the cleaned slot/microtrench walls.

A specification for this material shall be submitted to LMPW for approval. Asphaltic compounds will not be considered for restoration.

5.4 Expansion Joint Sealant

This material shall be a flexible, two component polyurethane-based material that is self-leveling, with highly elastic properties. At a minimum this material shall meet the following criteria:

- Tensile Strength 200 psi
- Elongation 1,000 %
- Hickman Class 50 Cycling Pass with no loss of adhesion
- Installation Temperature Range 50° F to 100° F
- Operating Temperature Range -30°F to 170°F

LMPW may consider other materials on a case-by-case basis.

6.0 AS-BUILT DRAWINGS

Upon completion of a project or phase(s) of a project, as built drawings shall be submitted to LMPW. As built drawings shall, at a minimum contain the following information:

- Aerial and underground fiber routes.
- Type of conduit used (ie: single conduit or vertical deflecting conduit (VDC))
- Number of conduits and cables in VDC. Number of strands in each cable.
- Date of installation/Contractor.

As built drawings may be submitted in pdf or KMZ file formats.

RESTORATION MATERIAL OPTIONS:

ARTERIALS AND COLLECTORS

1. ELEPHANT ARMOR OR EQUAL
2. THERMOSET RESIN:
FAST PATCH 8400 OR EQUAL

LOCAL STREETS

1. ELEPHANT ARMOR OR EQUAL
2. THERMOSET RESIN:
FAST PATCH 8400 OR EQUAL
3. POLYURETHANE BASE SEALANT:
EJC 50 OR EQUAL
4. FLOWABLE FILL: STRENGTH TO BE
DETERMINED BY LMPW PRIOR TO
INSTALLATION

MICROTRENCH (SLOT)
WIDTH OF DUCT/CABLE
1/2" MINIMUM

ASPHALT DEPTH VARIES
WITH ROAD CLASSIFICATION

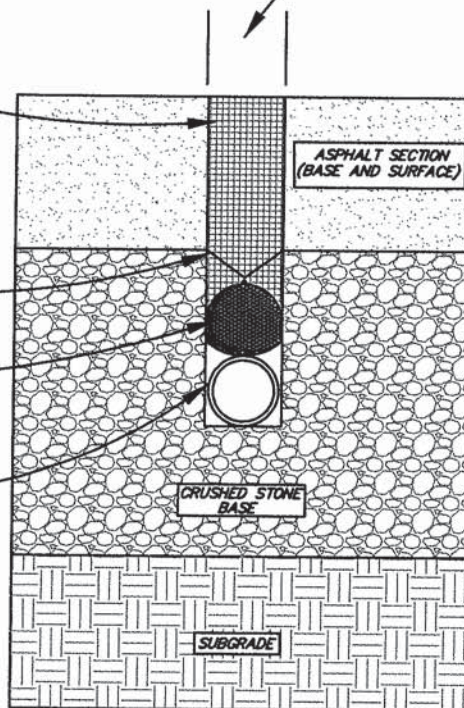
MICRO TRENCH CLIP

VERTICAL LOCATION
VARIES WITH APPLICATION
(U-TECK OR EQUAL)

FOAM BACKER ROD
WITH TRACER WIRE

CONDUIT/CABLE

1. MICRO-CONDUIT,
2. MULTI-DUCT CONDUIT OR
3. SINGLE CABLE.
(DURA-LINE, TERASPAN
OR EQUAL)



DEPTH VARIES

ARTERIALS AND COLLECTORS = 9" to 16"
LOCAL STREETS = MIN BELOW ASPHALT
SECTION AS SHOWN

NOTES:

1. POLYURETHANE SEALANT MAY BE USED AT CONCRETE TO CONCRETE JOINTS OR AT EDGE OF PAVEMENT AND CURB OR CURB AND GUTTER JOINTS. MINIMUM DEPTHS OF USE TO BE IN ACCORDANCE WITH MFR'S SPECIFICATIONS.
2. FOR LOCAL STREETS TOP OF CABLE/CONDUIT SHALL BE LOCATED AT BASE OF ASPHALT. 4" MINIMUM ASPHALT COVER REQUIRED OVER CABLE/CONDUIT.
3. ALL RESTORATION MATERIALS TO BE APPROVED BY LMPW



LOUISVILLE METRO
PUBLIC WORKS

NOT TO SCALE

MICROTRENCH DETAIL
DRAFT



KYTC

Transforming Dixie Highway

Item 5-478.7

Special Note for Signal Pole Installation

1. Working in the Vicinity of High Voltage Lines and Equipment

The contractor must be approved by LGE to work in spaces that are considered hazardous next to Existing Power Poles. Contractor shall be qualified, as defined by OSHA Regulations (Standards – 29 CFR Part 1910 Subparts R and S), to work within the vicinity of high voltage lines and equipment. Below are excerpts from the document that pertain to this.

1910.269(x)

Definitions.

Qualified employee (qualified person). An employee (person) knowledgeable in the construction and operation of the electric power generation, transmission, and distribution equipment involved, along with the associated hazards.

Note 1 to the definition of "qualified employee (qualified person)": An employee must have the training required by (a)(2)(ii) of this section to be a qualified employee.

Note 2 to the definition of "qualified employee (qualified person)": Except under (g)(2)(iv)(C)(2) and (g)(2)(iv)(C)(3) of this section, an employee who is undergoing on-the-job training and who has demonstrated, in the course of such training, an ability to perform duties safely at his or her level of training and who is under the direct supervision of a qualified person is a qualified person for the performance of those duties.

1910.269(a)(2)

Training.

1910.269(a)(2)(i)

All employees performing work covered by this section shall be trained as follows:

1910.269(a)(2)(i)(A)

Each employee shall be trained in, and familiar with, the safety-related work practices, safety procedures, and other safety requirements in this section that pertain to his or her job assignments.

1910.269(a)(2)(i)(B)

Each employee shall also be trained in and familiar with any other safety practices, including applicable emergency procedures (such as pole-top and manhole rescue), that are not specifically addressed by this section but that are related to his or her work and are necessary for his or her safety.

1910.269(a)(2)(i)(C)

The degree of training shall be determined by the risk to the employee for the hazard involved.

1910.269(a)(2)(ii)

Each qualified employee shall also be trained and competent in:

1910.269(a)(2)(ii)(A)

The skills and techniques necessary to distinguish exposed live parts from other parts of electric equipment,

1910.269(a)(2)(ii)(B)

The skills and techniques necessary to determine the nominal voltage of exposed live parts,

1910.269(a)(2)(ii)(C)

The minimum approach distances specified in this section corresponding to the voltages to which the qualified employee will be exposed and the skills and techniques necessary to maintain those distances,

1910.269(a)(2)(ii)(D)

The proper use of the special precautionary techniques, personal protective equipment, insulating and shielding materials, and insulated tools for working on or near exposed energized parts of electric equipment, and

1910.269(a)(2)(ii)(E)

The recognition of electrical hazards to which the employee may be exposed and the skills and techniques necessary to control or avoid these hazards.

Note to paragraph (a)(2)(ii): For the purposes of this section, a person must have the training required by paragraph (a)(2)(ii) of this section to be considered a qualified person.

1910.333(c)

"Working on or near exposed energized parts."

1910.333(c)(1)

"Application." This paragraph applies to work performed on exposed live parts (involving either direct contact or by means of tools or materials) or near enough to them for employees to be exposed to any hazard they present.

..1910.333(c)(2)

1910.333(c)(2)

"Work on energized equipment." Only qualified persons may work on electric circuit parts or equipment that have not been deenergized under the procedures of paragraph (b) of this section. Such persons shall be capable of working safely on energized circuits and shall be familiar with the proper use of special precautionary techniques, personal protective equipment, insulating and shielding materials, and insulated tools.

1910.333(c)(3)

"Overhead lines." if work is to be performed near overhead lines, the lines shall be deenergized and grounded, or other protective measures shall be provided before work is started. If the lines are to be deenergized, arrangements shall be made with the person or organization that operates or controls the electric circuits involved to deenergize and ground them. If protective measures, such as guarding, isolating, or insulating, are provided, these precautions shall prevent employees from contacting such lines directly with any part of their body or indirectly through conductive materials, tools, or equipment.

Note: The work practices used by qualified persons installing insulating devices on overhead power transmission or distribution lines are covered by 1910.269 of this Part, not by 1910.332 through 1910.335 of this Part. Under paragraph (c)(2) of this section, unqualified persons are prohibited from performing this type of work.

1910.333(c)(3)(i)

"Unqualified persons."

1910.333(c)(3)(i)(A)

When an unqualified person is working in an elevated position near overhead lines, the location shall be such that the person and the longest conductive object he or she may contact cannot come closer to any unguarded, energized overhead line than the following distances:

1910.333(c)(3)(i)(A)(1)

For voltages to ground 50kV or below - 10 feet (305 cm);

1910.333(c)(3)(i)(A)(2)

For voltages to ground over 50kV - 10 feet (305 cm) plus 4 inches (10 cm) for every 10kV over 50kV.

..1910.333(c)(3)(i)(B)

1910.333(c)(3)(i)(B)

When an unqualified person is working on the ground in the vicinity of overhead lines, the person may not bring any conductive object closer to unguarded, energized overhead lines than the distances given in paragraph (c)(3)(i)(A) of this section.

Note: For voltages normally encountered with overhead power line, objects which do not have an insulating rating for the voltage involved are considered to be conductive.

1910.333(c)(3)(ii)

"Qualified persons." When a qualified person is working in the vicinity of overhead lines, whether in an elevated position or on the ground, the person may not approach or take any conductive object

without an approved insulating handle closer to exposed energized parts than shown in Table S-5 unless:

1910.333(c)(3)(ii)(A)

The person is insulated from the energized part (gloves, with sleeves if necessary, rated for the voltage involved are considered to be insulation of the person from the energized part on which work is performed), or

1910.333(c)(3)(ii)(B)

The energized part is insulated both from all other conductive objects at a different potential and from the person, or

1910.333(c)(3)(ii)(C)

The person is insulated from all conductive objects at a potential different from that of the energized part.



Kentucky Transportation Cabinet
Division of Highway Design
TRAFFIC MANAGEMENT PLAN

12/2010
Page 1 of 6

County: Jefferson Item No.: 5-478.7

Federal Project No.: TGR 0311 034

Project Description:

This project will install a new bus rapid transit system along the Dixie Highway corridor from US841 to Downtown Louisville. A portion of this route, from Crums to Greenwood includes a complete streets redesign with access management policies and better pedestrian facilities. This project will increase safety by reducing the number of vehicular and pedestrian crashes (or collisions), improve mobility by reducing the travel times for both vehicular and transit users, and create new transit opportunities thus facilitating transit service efficiency and regional mobility.

Roadway Classification: Urban Rural
 Local Collector Arterial Interstate
ADT (current) 35,000-58,400 AM Peak Current _____ PM Peak Current _____ % Trucks
2%-8%

Project Designation: Significant Other: _____

Traffic Control Plan Design:

Taper and Diversion Design Speeds No

Minimum Lane Width 11 Minimum Shoulder Width N/A

Minimum Bridge Width N/A

Minimum Radius 1910' Maximum Grade 1.10%

Minimum Taper Length 320' Minimum Intersection Level of Service N/A

Existing Traffic Queue Lengths N/A Projected Traffic Queue Lengths N/A

Comments:

The project provides for safety, access control, bus (brt), signal (its), and landscaping improvements on Dixie Highway between greenwood road and the downtown central business district. The section between greenwood road and Crums Lane receives significant road improvements and is identified as Section "A". The section north of Crums Lane and south of greenwood road does not involve significant road improvements and is primarily limited to BRT and its improvements and is identified as Section "B".

1. Maintenance of traffic will be in accordance with section 112 of the KYTC standard specifications for road and bridge construction. Lane closures will be in accordance with KYTC Standard Drawings.



Kentucky Transportation Cabinet
Division of Highway Design
TRAFFIC MANAGEMENT PLAN

12/2010
Page 2 of 6

2. In the notes, the inside lane refers to the lane closest to the median. The outside lane implies the lane nearest the sidewalk.
3. Revisions to the mot plan will be considered, but will require submittal to the Engineer for approval by the Department per KYTC policy. The contractor will be required to submit a construction schedule which identifies the anticipated start and finish dates in each work area.
4. Temporary access in the construction work areas:
 - a. Bus stations - the contractor will be required to maintain temporary access for bus stop locations. An individual bus stop can be temporarily closed as long as the before and after stations are operational.
 - b. Commercial businesses - access will need to be maintained during all operational times. An option is to reconstruct entrances with half-width construction where at least one lane remains open.
 - c. Residential locations can be temporarily closed as long as satisfactory arrangements are made with the property owner.
 - d. Pedestrian access will be closed in all construction areas and diverted to the opposite side of Dixie highway. See sheet R155.
 - e. Adequate temporary drainage will be provided at all times, as determined by the Engineer, and will be incidental to the "Maintain and Control Traffic" bid item.
5. Traffic control related to the signal rebuild and signal modifications work items is incidental.
6. The major work involves reconstructing the outside curb and gutter, sidewalks, and entrance aprons in each direction, and reconstructing the median. The new outside face of curb will be moved toward the centerline. The existing 16' wide mountable median is reconstructed with a 14' non-mountable median.
7. The posted design speed is currently 40 mph between greenwood road and the Watterson expressway, and 35 mph north of the Watterson expressway. The speed limits during construction may be reduced by 10 mph, at the discretion of the Engineer.



Kentucky Transportation Cabinet
Division of Highway Design
TRAFFIC MANAGEMENT PLAN

12/2010
Page 3 of 6

Item No. 5-478.7

Discussion:

1) Public Information Plan	
a) Prepare with assistance from <input checked="" type="checkbox"/> KYTC or <input type="checkbox"/> _____	
b) Identify Trip Generators N/A	f) Railroad Involvement N/A
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

NEW DIXIE HIGHWAY PROJECT DOWNTOWN TO GENE SNYDER PUBLIC INFORMATION PLAN

The primary goal of the Public Information Plan (PIP) is to inform the motoring public and area stakeholders of project information including Maintenance of Traffic (MOT).

C2 Strategic Communications will work closely with the KYTC District 5 Public Information Officer (PIO) to coordinate and disseminate to stakeholders and the media appropriate information regarding construction plans.

LOCAL STAKEHOLDERS

- Elected Officials
 - Louisville Mayor Greg Fischer – (502) 574-2003; greg.fischer@louisvilleky.gov
 - Shively Mayor Sherry Conner – (502) 449-5000; sherry.conner@shivelyky.gov
 - State Senator Perry Clark – (502) 564-8100; perry.clark@lrc.ky.gov
 - State Senator Dennis Parrett – (502) 564-8100; dennis.parrett@lrc.ky.gov
 - State Senator Denise Harper Angel – (502) 564-8100 denise.harperangel@lrc.ky.gov
 - State Senator Gerald Neal – (502) 564-8100; gerald.neal@lrc.ky.gov
 - State Representative Charlie Miller – (502) 937-7788; charlie.miller@lrc.ky.gov
 - State Representative Joni Jenkins – (502) 564-8100; joni.jenkins@lrc.ky.gov
 - State Representative Dennis Horlander – (502) 564-8100;
dennis.horlander@lrc.ky.gov
 - State Representative Reginald Meeks – (502) 564-8100; reginald.meeks@lrc.ky.gov
 - Metro Councilwoman Mary Woolridge – (502) 574-1103;
mary.woolridge@louisvilleky.gov
 - Metro Councilwoman Barbara Sexton Smith – (502) 574-1104;
barbara.sextonsmith@louisvilleky.gov
 - Metro Councilman David James – (502) 574-1106;
david.james@louisvilleky.gov
 - Metro Councilman Rick Blackwell – (502) 574-1112;
rick.blackwell@louisvilleky.gov
 - Metro Councilwoman Cindi Fowler – (502) 574-1114;
cindi.fowler@louisvilleky.gov
 - Metro Councilman David Yates – (502) 574-1125; david.yates@louisvilleky.gov

- Local Agencies
 - Frank Frantz, Director of Transportation for Jefferson County Public Schools – (502) 485-3470; randy.frantz@jefferson.kyschools.us
 - Barry Barker, Transit Authority of the River City (TARC) – (502) 561-5100;
jbarrybarker@ridetarc.org; acopic@ridetarc.org; rgoodwin@ridetarc.org
 - Lt. Joe Seelye, Louisville Metro Police Department Traffic Division – (502) 574-2445; joe.seelye@louisvilleky.gov

- Chief Vincent Smith, Pleasure Ridge Park Fire Dept. – (502) 935-3878;
vsmith@prpfire.org
 - Chief Greg Cambron, Shively Fire Dept. – (502) 449-5020;
greg.cambron@shivelyky.gov

 - Utility Companies
 - Local utility companies are kept apprised of this project at the monthly utility coordination meetings hosted by District 5

 - Neighborhoods and their Mayors

 - New Dixie Advisory Team (contacts in attached document)

 - Business groups and associations
 - Southwest Dream Team – Vince Jarboe, vince.jarboe.jyr0@statefarm.com
 - Dixie Area Business Association – June Meredith, julicreationssl@gmail.com
 - Riverport Area Business Association – Jenny Fox, jfoxln10@yahoo.com
 - Southwest Rotary Club – Dana Slucher, DSlucher@swcky.org
- (see attached excel sheet for contacts)
- Current New Dixie Highway Project e-newsletter recipients (C2 has master list)

TRUCKING FIRMS AND OUT OF STATE STAKEHOLDERS

Information will be distributed electronically to trucking firms via the Kentucky Motor Transport Association (kentuckytruckingassociation@kytrucking.net). Information will also be posted on the GoKy website (www.goky.ky.gov) for traffic and travel information.

PRESENTATIONS

A project description including anticipated schedule will be provided to the media, stakeholders and other emergency service agencies via news conference and/or e-mail prior to construction.

Information will be provided to these groups via traffic advisories, press releases, the District 5 website and the weekly District 5 Road Show of Construction and Maintenance Activities.

C2 Strategic will update information regularly to the project website as well as to the New Dixie Highway Project's social media platforms (Facebook and Twitter). C2 will develop a series of 6-8 social media videos about the project's progress over the course of construction. C2 will also plan and manage presentations to business groups as needed to update construction progress.

MEDIA RELATIONS

C2 Strategic and the District PIO will coordinate with media relations throughout the project. District PIO will manage inquiries regarding technical details of project (construction timing, locations of construction, etc.) while C2 Strategic will manage inquiries explaining why the project team chose elements of the plan (why bus stops are located where they are, why medians were chosen, etc.)

The District PIO will prepare an initial news release regarding the contract award for the project.

C2 Strategic will plan and execute several news conferences throughout construction to celebrate milestones, advance the project narrative, and tamp down negative experiences. All media planning will be coordinated with District PIO.

C2 and/or the PIO will conduct interviews with the media throughout the project duration to keep the public informed of construction progress. Traffic advisories will be submitted to the media when a change in the MOT occurs. The contractor must provide to the PIO via the Project Engineer notification of any change in the MOT at least five (5) days prior to the change.

5-478.7 Stakeholder List

First Name	Last Name	Organization	District / Affiliation	Email Address
Sherry	Connor	Mayor of Shively		sherry.conner@shivelyky.gov
David	Tandey	Metro Council Rep.	District 4	david.tandey@louisvilleky.gov
David	James	Metro Council Rep.	District 6	david.james@louisvilleky.gov
Mary	Woolridge	Metro Council Rep.	District 3	mary.woolridge@louisvilleky.gov
Marianne	Butler	Metro Council Rep.	District 15	marianne.butler@louisvilleky.gov
Rick	Blackwell	Metro Council Rep.	District 12	rick.blackwell@louisvilleky.gov
Cindi	Fowler	Metro Council Rep.	District 14	cindi.fowler@louisvilleky.gov
Vicki	Welch	Metro Council Rep.	District 13	vicki.welch@louisvilleky.gov
David	Yates	Metro Council Rep.	District 25	davidyates@louisvilleky.gov
Reginald	Meeks	Kentucky Legislators	District 42	reginald.meeks@lrc.ky.gov
Dennis	Horlander	Kentucky Legislators	District 40	Dennis.Horlander@lrc.ky.gov
Joni	Jenkins	Kentucky Legislators	District 44	Joni.Jenkins@lrc.ky.gov
Charles	Miller	Kentucky Legislators	District 28	Charlie.Miller@lrc.ky.gov
Denise	Haper Angel	Kentucky Senator	District 35	denise.harperangel@lrc.ky.gov
Gerald	Neal	Kentucky Senator	District 33	gerald.neal@lrc.ky.gov
Perry	Clark	Kentucky Senator	District 37	perry.clark@lrc.ky.gov
Dennis	Parrett	Kentucky Senator	District 10	dennis.parrett@lrc.ky.gov
Vince	Jarboe	Advisory Team, SW Dream Team	Southwest Dream Team - President	vince.jarboe.jvr0@statefarm.com
June	Meredith	Advisory Team, DABA	Dixie Area Business Association- President	julicreations@gmail.com
Ronnie	McKiernan	Advisory Team	Southwest YMCA - Executive Director	rmckiernan@ymcalouisville.org
Tim	Weihe	Advisory Team	Holy Cross School President	tweihe@holycrosshs.com
Roxanna	Trivitt	Advisory Team	Shively Area Ministries - Executive Director	roxanna.trivitt@shivelyareaministries.com
Wayne	Cassady	Advisory Team	Riverport - Vice President	wayne.cassady@jeffersonriverport.com
David	Nicklies	Advisory Team	Nicklies Development President	dnicklies@nicklies.com
Kurt	Maddox	Advisory Team	Theineman-Maddox Real Estate - President	kurt@tmreal.com
David	Daunhauer	Advisory Team	Byerly Ford - Vice President	ddaunhauer@byerlyford.com
David	Seay	Advisory Team	CBRE (Kentucky One) - Vice President	david.seay@cbre.com
Rick	Wimsatt	Advisory Team	Brown-Forman - Director, Workplace	rick_wimsatt@b-f.com
Mitzi	Kasitz	Advisory Team	Shively City Hall - City Clerk	mitzi.kasitz@shivelyky.gov
Vincent	Tinebra	Advisory Team	National College - Campus Director	vtinebra@an.edu
Vincent	James	Advisory Team	Elim Baptist Church - Pastor	vincentjamesr@msn.com
Charles	Elliott	Advisory Team	King Solomon Missionary Baptist Church - Pastor	gladys.bailey@ksmbc.org
Sharon	Toms	Advisory Team, SW Dream Team		sharon@sharontoms.com
Dreema	Jackson	Advisory Team	California Neighborhood Resident	dreamj@hotmail.com
Marshall	Gazaway	Advisory Team	Beecher Terrace Resident Council	seabees0305@att.net
Gwen	Kelly	Advisory Team	California Neighborhood Resident	gifted63@aol.com
Bennett	Knox	Southwest Dream Team		Bennett.Knox@louisvilleky.gov
Benjamin	Hill	Southwest Dream Team		ben@benjaminhill.com
Mohammad	Nouri	Southwest Dream Team		mnouri@concepts21.net
Patti	Linn	Southwest Dream Team		Patti.Linn@louisvilleky.gov
Karen	Finlinson	Southwest Dream Team		Karen.Finlinson@parkcommuntiy.com
Julie	Scoskie	Southwest Dream Team		julie.scoskie@lfpl.org
Yetta	Blair	Southwest Dream Team, DABA	Ink Magazine	blair@inkmagazines.com
Neville	Blakemore	Southwest Dream Team		nevilleb@gnbuilding.com
Connie	Henken	Dixie Area Business Association	Mary Hatfield Olivia Tax & Bookkeeping Service	taxlady7530@gmail.com
Don	Lawson	Dixie Area Business Association	Stephens and Lawson	Donjr@sandlcpas.com ; stuart@sandlcpas.com ;
Victoria	Quibell	Dixie Area Business Association	The Tax Professionals	vquibell@gmail.com
Jason	Brown	Dixie Area Business Association	Signarama Dixie	info@signaramadixie.com
Rene	Bell	Dixie Area Business Association	WAKY Radio	rbell@wakyradio.com
Brian	Weber	Dixie Area Business Association	Brian Weber Law Firm	brian@bmwo.com
John	Summers	Dixie Area Business Association	AAMCO Transmission & Total Care	aamcodixie@yahoo.com
Lary	Craig	Dixie Area Business Association	Craig and Landreth	craigsbstcars@gmail.com
John	Daunhauer	Dixie Area Business Association	Byerly Ford	jdaunhauer@byerly.com
Kent	Forshee	Dixie Area Business Association	Neil Huffman	kent.foushee@neilhuffman.com
Melissa	Miles	Dixie Area Business Association	Timmy's Auto Wash	timmysautowash@att.net
Michael	Hayes	Dixie Area Business Association	Flaget Center	mhayes@archlou.org
Patti	Linn	Dixie Area Business Association	Riverside, The Farnsley Moremen Landing	Patti.Linn@louisvilleky.gov
Dana	Delepierre	Dixie Area Business Association	Sun Valley Community Center	dana.delepierre@louisvilleky.gov
Benjamin	Hill	Dixie Area Business Association	Benjamin Hill Consulting	ben@benjaminhill.com
Rebecca	Maddox	Dixie Area Business Association	SW Regional Library	rebecca.maddox@lfpl.org
Kim	Leanhart	Dixie Area Business Association	Leanhart Plumbing	kimleanhart@leanhartplumbing.com
Amy	Koenig	Dixie Area Business Association	Christian Academy	akoenig@caschools.us
Marty	Pollio	Dixie Area Business Association	Doss High School	marty.pollio@jefferson.kyschools.us
Jennifer	Broda	Dixie Area Business Association	St.Andrews Academy/St.Peter Apostle	jbroda@saintpeterapostle.org
Jennifer	Roberts	Dixie Area Business Association	Southwest YMCA	jmroberts@ymcalouisville.org
Karen	Swinney	Dixie Area Business Association	Spencerian College	kswinney@spencerian.edu
Glen	Taylor	Dixie Area Business Association	Cold Air Hot Air	coldairhotair@gmail.com
Jean	Zappa	Dixie Area Business Association	Shively Area Ministries	ja.zappa@shivelyareaministries.com
Chuck	Hall	Dixie Area Business Association	Altitude Trampoline Park	jerry@expofive.com
Jerry	Wilkerson	Dixie Area Business Association	Derby Park Expo Five	khalil@khalilsondixie.com
Khalil	Batshon	Dixie Area Business Association	Khali's Restaurant	kathy.graham@caliberhomeloans.com
Kathy	Graham	Dixie Area Business Association	Mortgage Loan Officer	hilary.spencerpersley@edwardjones.com
Hilary	Spencer Persley	Dixie Area Business Association	Edward Jones Investment	Matt.warner@edwardjones.com
Matt	Warner	Dixie Area Business Association	Edward Jones Investment	canderson@forchtbank.com
Carla	Anderson	Dixie Area Business Association	Forcht Bank	ackeeling@fortknocfuc.net
Angie	Keeling	Dixie Area Business Association	Fort Knox Federal Credit Union	ivy@ivybritto.com
Ivy	Brito	Dixie Area Business Association	Insurance and Financial Service	business@ifcu.org
Mai	Bixner	Dixie Area Business Association	Jefferson Federal Credit Union	nicole.howell@lnfcu.com
Nicole	Howell	Dixie Area Business Association	L&N Federal Credit Union	debbie@kyltelco.com
Debbie	Presley	Dixie Area Business Association	Kentucky Telco Federal Credit Union	Karen.Finlinson@parkcommuntiy.com
Karen	Finlinson	Dixie Area Business Association		ppeercy@republicbank.com
Phillip	Peercy	Dixie Area Business Association	Republic Bank	wfaust@consultretriever.com
Wes	Faust	Dixie Area Business Association	Retriever Consulting Inc.	melissa.mckee@yourkybank.com
Melissa	Fox Mckee	Dixie Area Business Association	River City Bank	Christy.wathen@usbank.com
Christy	Wathen	Dixie Area Business Association	US Bank	martin.wissing@lpl.com
Martin	Wissing	Dixie Area Business Association	Wissing Wealth Management, LLC	bthomas@2020icare.com
Bonita	Thomas	Dixie Area Business Association	20/20 Eye Care	jgentner@bcwoodproperties.com
Jason	Gentner	Dixie Area Business Association	BC Wood Properties	Ataulbee@algoodfood.com
Aj	Taulbee	Dixie Area Business Association	ALGood Food Company	

5-478.7 Stakeholder List

First Name	Last Name	Organization	District / Affiliation	Email Address
Charles	Gibson	Dixie Area Business Association	Berkshire Hathaway Home Services	cgibson@BHHSparksweisberg.com
Rick	Redding	Dixie Area Business Association	Alpha Mechanical	rick.redding@aamservice.com
Butch	Ernspiker	Dixie Area Business Association	Bud's Tavern	aernspiker@att.net
Rich	Gimmel	Dixie Area Business Association	Atlas Machine	rfgimmel@atlasmachine.com
Anne	Callahan French	Dixie Area Business Association	Chest Medicine Associates	info@kysleepmed.com
Scot	Regan	Dixie Area Business Association	Coit Cleaning & Restoration	msr@coit-lou.com
Susan	Romans	Dixie Area Business Association	Choice Counselling	susanroman1@aol.com
Mary	O'Bryan	Dixie Area Business Association	Community Service Project	mary.csp@bellsouth.net
Art	Davenport	Dixie Area Business Association	Davencorp Management Co. DBA McDonalds	bigmacart@att.net
Mary	Boley	Dixie Area Business Association	Elmcroft	marygenboley@elmcroft.com
Adam	Nugen	Dixie Area Business Association	Festival Cuisine & Spirits	adam@festivalcuisine.com



Kentucky Transportation Cabinet
Division of Highway Design
TRAFFIC MANAGEMENT PLAN

Item No. 5-478.7

2) Temporary Traffic Control Plan (For Each Phase of Construction)	
Phase 1	
Exposure Control Measures	Positive Protection Measures
a) Is Road Closure Allowed Type: N/A	Referenced
a) Address Drop Off Protection Criteria	Referenced
b) Detour Conditions	N/A
b) Temporary Barrier Requirements	N/A
c) Working Hour Restrictions	Referenced
c) Evaluation of Existing Guardrail Conditions	N/A
d) Holiday or Special Event Work Restrictions	Referenced
d) Address Temporary Drainage	Referenced
e) Evaluation of Intersection LOS	N/A
Uniformed Law Enforcement Officers	N/A
f) Evaluation of Queue Lengths	N/A
Payment for Traffic Control*	
g) Evaluation of User Costs and Incentives/Disincentives	N/A
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:	
The MOT plan involves shifting lanes where traffic will be driving over the existing mountable median. For the majority of the project, the center median is mountable and essentially flush with the adjacent lanes. However, there are locations where the median and the barrier curbing (at turn lanes) are non-mountable and will be removed prior to traffic being shifted in phase 2. This initial phase involves removing all of the non-mountable median locations. The approximate non-mountable median locations are identified on the phase 1 notes.	



Kentucky Transportation Cabinet
Division of Highway Design
TRAFFIC MANAGEMENT PLAN

Item No. 5-478.7

2) Temporary Traffic Control Plan (For Each Phase of Construction)	
Phase 2	
Exposure Control Measures	Positive Protection Measures
a) Is Road Closure Allowed Type: N/A	Referenced
a) Address Drop Off Protection Criteria	Referenced
b) Detour Conditions	N/A
b) Temporary Barrier Requirements	N/A
c) Working Hour Restrictions	Referenced
c) Evaluation of Existing Guardrail Conditions	N/A
d) Holiday or Special Event Work Restrictions	Referenced
d) Address Temporary Drainage	Referenced
e) Evaluation of Intersection LOS	N/A
Uniformed Law Enforcement Officers	N/A
f) Evaluation of Queue Lengths	N/A
Payment for Traffic Control*	
g) Evaluation of User Costs and Incentives/Disincentives	N/A
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:	
<p>A. The following notes apply to the northbound lanes where construction starts at the southern end of the project and advances northward.</p> <p>B. Work occurs in 1 mile areas.</p> <p>C. The outside lane is closed within the construction limits with the appropriate lane closure.</p> <p>D. Concurrently the pavement in the construction section is restriped per the dimensions identified on the accompanying maintenance of traffic typical sections - see phase 2 typical sections.</p> <p>E. Traffic north of the construction zone remains in the existing lanes as long as possible to avoid the need to restripe and removal of the raised pavement markers.</p> <p>F. As construction proceeds northbound, the road is reopened to three lanes in the area south of the construction. The temporary lane widths and striping remain.</p> <p>G. Turn lanes are restriped to agree with the existing lengths.</p> <p>H. The concrete bus pads, proposed at each bus station location, are constructed during this phase while the outside lanes are closed.</p> <p>I. The relocation of traffic signal heads in all phases will be at the discretion of the engineer. An approximate number has been estimated.</p>	



Kentucky Transportation Cabinet
Division of Highway Design
TRAFFIC MANAGEMENT PLAN

12/2010
Page 6 of 6

Item No. 5-478.7

2) Temporary Traffic Control Plan (For Each Phase of Construction)	
Phase 3	
Exposure Control Measures	Positive Protection Measures
a) Is Road Closure Allowed Type: N/A	Referenced
a) Address Drop Off Protection Criteria	Referenced
b) Detour Conditions	N/A
b) Temporary Barrier Requirements	N/A
c) Working Hour Restrictions	Referenced
c) Evaluation of Existing Guardrail Conditions	N/A
d) Holiday or Special Event Work Restrictions	Referenced
d) Address Temporary Drainage	Referenced
e) Evaluation of Intersection LOS	N/A
Uniformed Law Enforcement Officers	N/A
f) Evaluation of Queue Lengths	N/A
Payment for Traffic Control*	
g) Evaluation of User Costs and Incentives/Disincentives	N/A
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:	
A. Construction is similar to the phase 2 procedures with slightly reduced lane widths due to the reduced useable pavement width.	
B. See phase 3 typical sections	



Kentucky Transportation Cabinet
Division of Highway Design
TRAFFIC MANAGEMENT PLAN

Item No. 5-478.7

2) Temporary Traffic Control Plan (For Each Phase of Construction)	
Phase 4	
Exposure Control Measures	Positive Protection Measures
a) Is Road Closure Allowed Type: N/A	Referenced
a) Address Drop Off Protection Criteria	Referenced
b) Detour Conditions	N/A
b) Temporary Barrier Requirements	N/A
c) Working Hour Restrictions	Referenced
c) Evaluation of Existing Guardrail Conditions	N/A
d) Holiday or Special Event Work Restrictions	Referenced
d) Address Temporary Drainage	Referenced
e) Evaluation of Intersection LOS	N/A
Uniformed Law Enforcement Officers	N/A
f) Evaluation of Queue Lengths	N/A
Payment for Traffic Control*	
g) Evaluation of User Costs and Incentives/Disincentives	N/A
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:	
<p>A. The inside median is reconstructed.</p> <p>B. As opposed to phases 2 and 3 where construction of the outside curb in the nb and sb lanes did not need to be contiguous and could be independent operations; the median reconstruction in the NB and SB lanes must be worked together. Construction is restricted to similar 1 mile areas.</p> <p>C. Turn lanes are reconstructed to agree with the proposed length as identified on the roadway plans.</p> <p>D. Three lanes of traffic in each direction in areas 1-3 (two lanes in area 4) will be operational at the beginning of the phase. The inside lanes in each direction will be closed to allow the median construction. It is anticipated that a moving construction zone will be utilized. As construction proceeds in a particular direction, traffic behind the construction zone is reopened to traffic. The contractor will need to coordinate construction to keep turning lanes operational at all signalized intersections.</p>	



Kentucky Transportation Cabinet
Division of Highway Design
TRAFFIC MANAGEMENT PLAN

Item No. 5-478.7

2) Temporary Traffic Control Plan (For Each Phase of Construction)	
Phase 5	
Exposure Control Measures	Positive Protection Measures
a) Is Road Closure Allowed Type: N/A	Referenced
a) Address Drop Off Protection Criteria	Referenced
b) Detour Conditions	N/A
b) Temporary Barrier Requirements	N/A
c) Working Hour Restrictions	Referenced
c) Evaluation of Existing Guardrail Conditions	N/A
d) Holiday or Special Event Work Restrictions	Referenced
d) Address Temporary Drainage	Referenced
e) Evaluation of Intersection LOS	N/A
Uniformed Law Enforcement Officers	N/A
f) Evaluation of Queue Lengths	N/A
Payment for Traffic Control*	
g) Evaluation of User Costs and Incentives/Disincentives	N/A
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:	
Milling of the existing surface and resurfacing to match the newly constructed curb and gutter grades.	



Kentucky Transportation Cabinet
Division of Highway Design
TRAFFIC MANAGEMENT PLAN

Item No. 5-478.7

2) Temporary Traffic Control Plan (For Each Phase of Construction)	
Phase 6	
Exposure Control Measures	Positive Protection Measures
a) Is Road Closure Allowed Type: N/A	Referenced
a) Address Drop Off Protection Criteria	Referenced
b) Detour Conditions	N/A
b) Temporary Barrier Requirements	N/A
c) Working Hour Restrictions	Referenced
c) Evaluation of Existing Guardrail Conditions	N/A
d) Holiday or Special Event Work Restrictions	Referenced
d) Address Temporary Drainage	Referenced
e) Evaluation of Intersection LOS	N/A
Uniformed Law Enforcement Officers	N/A
f) Evaluation of Queue Lengths	N/A
Payment for Traffic Control*	
g) Evaluation of User Costs and Incentives/Disincentives	N/A
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:	
Final Restriping	

COUNTY OF	ITEM NO.	SHEET NO.
JEFFERSON	5-478.7	R140

MAINTENANCE OF TRAFFIC OVERVIEW AND GENERAL NOTES

OVERVIEW

THE PROJECT PROVIDES FOR SAFETY, ACCESS CONTROL, BUS (BRT), SIGNAL (ITS), AND LANDSCAPING IMPROVEMENTS ON DIXIE HIGHWAY BETWEEN GREENWOOD ROAD AND THE DOWNTOWN CENTRAL BUSINESS DISTRICT. THE SECTION BETWEEN GREENWOOD ROAD AND CRUMS ROAD RECEIVES SIGNIFICANT ROAD IMPROVEMENTS. IDENTIFIED AREAS FOR MAINTENANCE OF TRAFFIC PLANS ARE PRIMARILY LIMITED TO BRT AND ITS IMPROVEMENTS AND IS IDENTIFIED AS "SECTION B". ROAD IMPROVEMENTS AND ITS IMPROVEMENTS ARE DESCRIBED BELOW.

GENERAL NOTES:

- MAINTENANCE OF TRAFFIC WILL BE IN ACCORDANCE WITH SECTION 112 OF THE KYTC STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION. LANE CLOSURES WILL BE IN ACCORDANCE WITH KYTC STANDARD DRAWINGS. IN THE NOTES, THE INSIDE LANE REFERS TO THE LANE CLOSEST TO THE MEDIAN, THE OUTSIDE LANE IMPLIES THE LANE NEAREST THE SIDEWALK.
- REVISIONS TO THE MOT PLAN WILL BE CONSIDERED, BUT WILL REQUIRE SUBMITTAL TO THE ENGINEER FOR APPROVAL BY THE DEPARTMENT PER KYTC POLICY. THE CONTRACTOR WILL BE REQUIRED TO SUBMIT A CONSTRUCTION SCHEDULE WHICH IDENTIFIES THE ANTICIPATED START AND FINISH DATES IN EACH WORK AREA.
- TEMPORARY ACCESS IN THE CONSTRUCTION WORK AREAS:
 - LOCATIONS FOR AN INDIVIDUAL BUS STOP CAN BE TEMPORARILY CLOSED AS LONG AS THE BEFORE AND AFTER STATIONS ARE OPERATIONAL.
 - ALL BUS STOP ACCESS ENTRIES WILL NEED TO BE MAINTAINED DURING ALL OPERATIONAL TIMES. LANE REMAINS OPEN.
 - RESIDENTIAL LOCATIONS CAN BE TEMPORARILY CLOSED AS LONG AS SATISFACTORY ARRANGEMENTS ARE MADE FOR PEDESTRIAN ACCESS WILL BE CLOSED IN ALL CONSTRUCTION AREAS AND DIVERTED TO THE OPPOSITE SIDE OF DIXIE HIGHWAY. SEE SHEET R155.
 - PEDESTRIAN ACCESS WILL BE PROVIDED AT ALL TIMES, AS DETERMINED BY THE ENGINEER, AND WILL BE INCIDENTAL TO THE BID ITEM "MAINTAIN & CONTROL TRAFFIC".

- PAVEMENT EDGE DROPOFFS:
 - A. GREATER THAN 1/2 INCH, THEY MAY BE INCREASED TO 2 INCHES FOR LOW SPEED SITUATIONS. WARNING SIGNS SHALL BE PLACED IN ADVANCE AND THROUGHOUT THE DROP-OFF AREA WHEN DROP-OFFS ARE GREATER THAN 1/2 INCH. MODIFICATIONS WILL BE AS FOLLOWS:
 - LESS THAN 1/2 INCH - NO PROTECTION REQUIRED.
 - 1/2 TO 4 INCHES - PLASTIC DRUMS, VERTICAL PANELS OR BARRIAGES SHALL BE PLACED EVERY 50 FEET FOR SPEEDS LESS THAN 50 MILES PER HOUR AND EVERY 100 FEET FOR SPEEDS OF 50 MILES PER HOUR AND GREATER. CONES MAY BE USED IN PLACE OF PLASTIC DRUMS.
 - 4 INCHES AND GREATER - POSITIVE SEPARATION NEEDED OR WEDGE WITH 3:1 OR FLATTER SLOPE. IF THERE IS 8 FEET OR MORE DISTANCE BETWEEN THE EDGE OF PAVEMENT AND DROP-OFF, PLASTIC DRUMS, VERTICAL PANELS OR BARRIAGES MAY BE USED.
 - FOR TEMPORARY CONDITIONS: DROP-OFFS 4 INCHES AND GREATER MAY BE PROTECTED WITH PLASTIC DRUMS, VERTICAL PANELS, OR BARRIAGES ARE USED SPECIAL REFLECTIVE DEVICES ON STEADY BURN LIGHTS SHALL BE USED FOR OVERNIGHT INSTALLATIONS.
 - PAYMENT WILL BE ALLOWED FOR DCA MATERIAL USED FOR WEDGING.

SECTION A

- TRAFFIC CONTROL RELATED TO THE SIGNAL REBUILD AND SIGNAL MODIFICATIONS WORK ITEMS IS INCIDENTAL.
- THE MAJOR WORK INVOLVES RECONSTRUCTING THE OUTSIDE CURB AND GUTTER, SIDEWALKS, AND ENTRANCE APRONS IN EACH DIRECTION, AND RECONSTRUCTING THE MEDIAN, THE NEW OUTSIDE FACE OF CURB WILL BE CONSTRUCTED WITH A 14" NON-MOUNTABLE MEDIAN. THE EXISTING 16" WIDE MOUNTABLE MEDIAN IS RECONSTRUCTED WITH A 14" NON-MOUNTABLE MEDIAN.
- THE EXISTED DESIGN SPEED IS CURRENTLY 65 MPH BETWEEN GREENWOOD ROAD AND THE WATTERSON EXPRESSWAY. THE MAJOR WORK INVOLVES RECONSTRUCTING THE OUTSIDE CURB AND GUTTER, SIDEWALKS, AND ENTRANCE APRONS IN EACH DIRECTION, AND RECONSTRUCTING THE MEDIAN, THE NEW OUTSIDE FACE OF CURB WILL BE CONSTRUCTED WITH A 14" NON-MOUNTABLE MEDIAN. THE EXISTING 16" WIDE MOUNTABLE MEDIAN IS RECONSTRUCTED WITH A 14" NON-MOUNTABLE MEDIAN.
- THE WORK IN SECTION A IS SEPARATED INTO SIX PHASES:
 - A. PHASE 1 - THE MOT PLAN INVOLVES SHIFTING LANES WHERE TRAFFIC WILL BE DRIVING OVER THE EXISTING MOUNTABLE MEDIAN. FOR THE MAJORITY OF THE PROJECT, THE CENTER MEDIAN IS MOUNTABLE AND ESSENTIALLY FLUSH WITH THE EXISTING MOUNTABLE MEDIAN. TURN LANE CLOSURES WILL BE MAINTAINED THROUGHOUT THE PROJECT. TURN LANE CLOSURES (AT TURN LANES) ARE NON-MOUNTABLE AND WILL BE REMOVED PRIOR TO TRAFFIC BEING SHIFTED IN PHASE 2. THIS INITIAL PHASE INVOLVES REMOVING ALL OF THE NON-MOUNTABLE MEDIAN LOCATIONS. THE APPROXIMATE NON-MOUNTABLE MEDIAN LOCATIONS ARE BEHIND THE MOUNTABLE MEDIAN IN PHASE 1. THIS PHASE WILL BE PAID PER THE "CONSTRUCTION BID ITEM".
 - B. PHASE 2 - CONSTRUCT THE NB CURB AND RELATED WORK FROM GREENWOOD TO WATTERSON.
 - C. PHASE 3 - CONSTRUCT THE SB CURB AND RELATED WORK FROM GREENWOOD TO WATTERSON.
 - D. PHASE 4 - MILLING OF THE EXISTING SURFACE AND RESURFACING.
 - E. PHASE 5 - MILLING OF THE EXISTING SURFACE AND RESURFACING.
 - F. PHASE 6 - FINAL STRIPING.

- WORK WILL BE LIMITED TO ONE MILE CONSTRUCTION AREAS IN EACH DIRECTION. THIS PROVIDES FOR APPROXIMATELY FOUR CONSTRUCTION AREAS PER DIRECTION. THIS MOT PLAN IS BASED ON CONSTRUCTING THE NORTHBOUND AND SOUTHBOUND SIDES SEPARATELY. HOWEVER, APPLICABLE TO PHASES 2 AND 3. WORK IN AREA 4 HEATON TO CRUMS CAN BE DONE CONCURRENTLY WITH AREA 2. THIS ONLY APPLIES TO PHASES 2 AND 3. WORK IN AREA 4 HEATON TO CRUMS CAN BE DONE CONCURRENTLY WITH AREA 2.

- AREA 1: GREENWOOD TO BLANTON
 - AREA 2: HEATON TO WATTERSON
 - AREA 3: UPPER HUNTERS TO HEATON
 - AREA 4: HEATON TO CRUMS
- WORK CAN NOT ADVANCE TO A NEW AREA UNTIL WORK IS SUBSTANTIALLY COMPLETE IN AN AREA. THIS ONLY APPLIES TO ROAD WORK.
 - THE NEW BRT STATIONS AND ANY WATER LINE RELOCATIONS WILL BE CONSTRUCTED CONCURRENTLY WHILE THE ADJACENT ROAD AREA CLOSURE WILL BE INCIDENTAL TO THE STATION CONSTRUCTION OR UTILITY RELOCATION ITEM. AS APPLICABLE, SEE DROP-OFF NOTES THIS SHEET.
 - INSTALLATION OF THE ITS FIBER CAN OCCUR INDEPENDENT OF THE ROAD CONSTRUCTION. IT IS ASSUMED THIS WILL OCCUR UNDER ROLLING LANE CLOSURES. THE CLOSURES ARE INCIDENTAL TO THE FIBER BID ITEM.
 - RECONSTRUCTION OF THE EXISTING CURB INLETS WILL REQUIRE POINT EXCAVATIONS. THE EXCAVATIONS CAN NOT BE LEFT OPEN DURING NON-WORK PERIODS AND WILL REQUIRE STEEL PLATING.

- PHASE 1
 - SEE R142
- PHASE 2
 - A. THE FOLLOWING NOTES APPLY TO THE NORTHBOUND LANES WHERE CONSTRUCTION STARTS. AT THE SOUTHERN END OF THE PROJECT AND ADVANCES NORTHWARD, THE SOUTHBOUND LANES ARE CONSTRUCTED IN SIMILAR FASHION - PHASE 3. THE NOTES ARE SIMILAR.
 - B. THE OUTSIDE LANE IS CLOSED WITHIN THE CONSTRUCTION LIMITS WITH THE APPROPRIATE LANE CLOSURE.
 - C. CONCURRENTLY THE PAVEMENT IN THE CONSTRUCTION SECTION IS RESTRICTED PER THE DIMENSIONS IDENTIFIED ON THE DRAWINGS. MAINTENANCE OF TRAFFIC PLAN SECTIONS ARE SHOWN AS POSSIBLE.
 - D. TO AVOID THE NEED TO RESTRIPE AND REMOVAL OF THE RAISED PAVEMENT MARKERS, SEE PHASE 3 TYPICAL SECTIONS.
 - E. AS CONSTRUCTION PROCEEDS NORTHBOUND, THE ROAD IS REOPENED TO THREE LANES. IN THE AREA OF TURN LANE CLOSURES, THE ROAD IS REOPENED TO THREE LANES. IN THE AREA OF TURN LANE CLOSURES, THE ROAD IS REOPENED TO THREE LANES. IN THE AREA OF TURN LANE CLOSURES, THE ROAD IS REOPENED TO THREE LANES.
 - F. AS CONSTRUCTION PROCEEDS NORTHBOUND, THE ROAD IS REOPENED TO THREE LANES. IN THE AREA OF TURN LANE CLOSURES, THE ROAD IS REOPENED TO THREE LANES. IN THE AREA OF TURN LANE CLOSURES, THE ROAD IS REOPENED TO THREE LANES.
 - G. TURN LANE CLOSURES WILL BE MAINTAINED THROUGHOUT THE PROJECT.
 - H. THE CONCRETE BUS PADS, PROPOSED AT EACH BUS STATION LOCATION, ARE CONSTRUCTED DURING PHASE 2. THE CONCRETE BUS PADS, PROPOSED AT EACH BUS STATION LOCATION, ARE CONSTRUCTED DURING PHASE 2.
 - I. THE RELOCATION OF TRAFFIC SIGNAL HEADS IN ALL PHASES SHALL BE DONE IN A MANNER CONSISTENT WITH THE LANE CONFIGURATIONS AT THE TIME. AN APPROXIMATE NUMBER HAS BEEN ESTIMATED.
- PHASE 3
 - A. CONSTRUCTION IS SIMILAR TO THE PHASE 2 PROCEDURES WITH SLIGHTLY REDUCED LANE WIDTHS DUE TO THE REDUCED TURN LANE WIDTHS.
 - B. SEE PHASE 3 TYPICAL SECTIONS
- PHASE 4
 - A. THE INSIDE MEDIAN IS RECONSTRUCTED.
 - B. NOT USED TO BE CONSIDERED AND COULD BE INDEPENDENT OF OPERATION OF THE MEDIAN RECONSTRUCTION. TURN LANE CLOSURES WILL BE MAINTAINED THROUGHOUT THE PROJECT.
 - C. TURN LANE CLOSURES WILL BE MAINTAINED THROUGHOUT THE PROJECT.
 - D. TURN LANES ARE RECONSTRUCTED TO AGREE WITH THE PROPOSED LENGTH AS IDENTIFIED ON THE ROADWAY.
 - E. THREE LANES OF TRAFFIC IN EACH DIRECTION IN AREAS 1-3 (TWO LANES IN AREA 4) WILL BE OPERATIONAL AT THE BEGINNING OF THE PHASE. THE INSIDE LANES IN EACH DIRECTION WILL BE CLOSED TO ALLOW THE MEDIAN TO BE RECONSTRUCTED. THE INSIDE LANES IN EACH DIRECTION WILL BE CLOSED TO ALLOW THE MEDIAN TO BE RECONSTRUCTED. THE INSIDE LANES IN EACH DIRECTION WILL BE CLOSED TO ALLOW THE MEDIAN TO BE RECONSTRUCTED.
 - F. THE CONSTRUCTION ZONE (EXCLUDING THE LANE CLOSURE TAPER LENGTHS) IS LIMITED TO NO LONGER THAN 1/2 MILE IN LENGTH AT ANY TIME. AS CONSTRUCTION PROCEEDS IN A PARTICULAR DIRECTION, TRAFFIC BEHIND THE CONSTRUCTION ZONE WILL BE OPERATIONAL AT ALL TIMES. CONSTRUCTION WILL NEED TO COORDINATE CONSTRUCTION TO AVOID TURNING LANES OPERATIONAL AT ALL SIGNALIZED INTERSECTIONS.
- PHASE 5
 - A. MILLING OF THE EXISTING SURFACE AND RESURFACING TO MATCH THE NEWLY CONSTRUCTED CURB AND GUTTER GRADES.
- PHASE 6
 - A. FINAL RESTRIPE

SECTION B

- CONSTRUCTION NORTH OF CRUMS LANE AND SOUTH OF GREENWOOD RD. IS PRIMARILY LIMITED TO CONSTRUCTION OF THE INDIVIDUAL BUS (BRT) LOCATIONS, AND INSTALLATION OF THE ITS (FIBER) ALONG THE ROUTE. IF CONSTRUCTION REQUIRES A LANE TO BE CLOSED, INDIVIDUAL LANE CLOSURES, EITHER FIXED OR ROLLING, WILL BE UTILIZED. THE CONTRACTOR WILL BE PAID FOR ONE LANE CLOSURE PER BUS STATION.
- NO WORK WILL BE ALLOWED IN THE CENTRAL BUSINESS DISTRICT (INCLUDING ENTIRE BROADWAY LIMITS) DURING THE TWO WEEKS PRIOR TO THE KENTUCKY DERBY.
- IN THE TWO-LANE SECTION, THE EXISTING PARKING LANES CAN BE CLOSED AND USED TO MAINTAIN TWO-WAY TRAFFIC.

PAYMENT

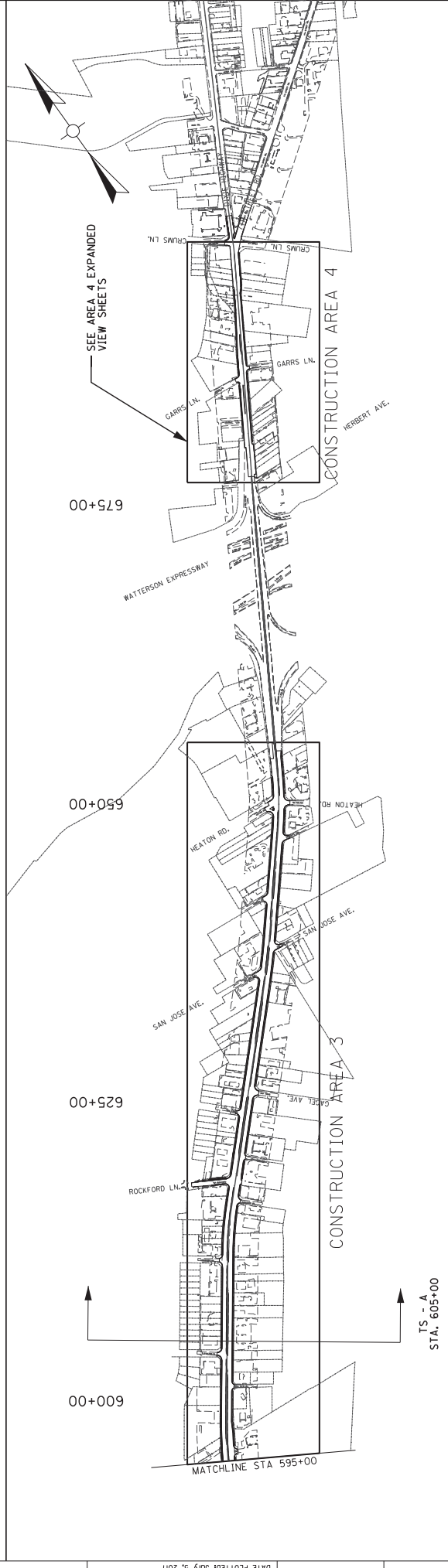
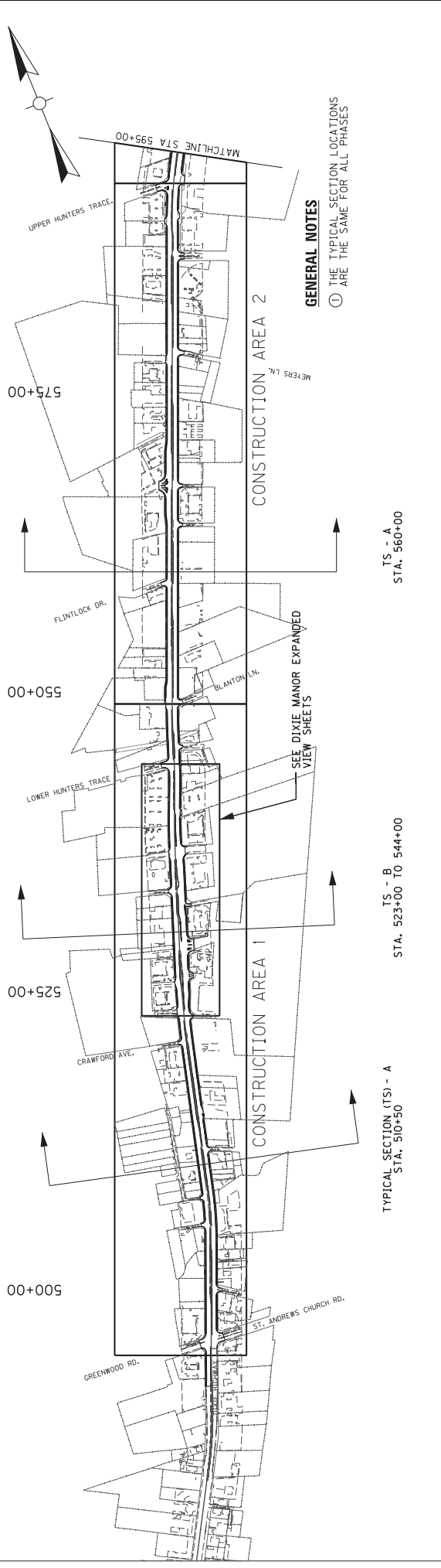
- THE FOLLOWING PROJECT PAYMENT SPECIFIC CLARIFICATIONS APPLY:
 - A. PAYMENT FOR ALL CONSIDERATIONS, UNLESS OTHERWISE NOTED, WILL BE PROVIDED UNDER THE "MAINTAIN AND CONTROL TRAFFIC" BID ITEM.
 - B. MAINTAIN AND CONTROL TRAFFIC SIGNALIZERS WILL BE REMOVED BY THE CONTRACTOR. PAYMENT WILL BE INCURRED FOR THE MILLING OPERATION.
 - C. REMOVAL OF THE EXISTING NON-MOUNTABLE MEDIAN IN PHASE 1 IS PAID PER THE "CONSTRUCTION BID ITEM".
 - D. TEMPORARY CONSTRUCTION SIGNS WILL BE PAID PER THE "TEMPORARY SIGNS" PAY ITEM.
 - E. LONG TERM LANE CLOSURES WILL BE PAID PER THE "TEMPORARY SIGNS" PAY ITEM.
 - F. CONTRARY TO SECTION 112.04.01, REMOVAL OF THE EXISTING AND TEMPORARY STRIPING WILL BE MEASURED PER SQUARE YARD AND PAID PER THE "TEMPORARY STRIPING REMOVAL" BID ITEM.
 - G. TEMPORARY RELOCATION OF SIGNAL HEADS IS A BID ITEM.

TRANSFORMING DIXIE HIGHWAY
MAINTENANCE OF TRAFFIC
OVERVIEW AND GENERAL NOTES

SCALE: 1"=100'

COUNTY OF	ITEM NO.	SHEET NO.
JEFFERSON	5-478.7	RI41

MAINTENANCE OF TRAFFIC



SCALE: 1"=400'

TRANSFORMING DIXIE HIGHWAY
 MAINTENANCE OF TRAFFIC
 INDEX SHEET

COUNTY OF	ITEM NO.	SHEET NO.
JEFFERSON	05-478.7	R142

MAINTENANCE OF TRAFFIC PHASE 1

LOCATION OF NON-MOUNTABLE MEDIAN REQUIRING REMOVAL PRIOR TO PHASE 2

LOCATION S.Y.
 STATION 539+19 to 540+49 54 S.Y.
 STATION 586+69 to 591+93 296 S.Y.
 STATION 601+56 to 601+30 68 S.Y.
 STATION 601+30 to 601+30 68 S.Y.
 STATION 648+00 to 649+53 75 S.Y.
 STATION 650+73 to 655+04 152 S.Y.

TOTAL S.Y. = 642 S.Y.

PAYMENT

REMOVAL OF THE EXISTING NON-MOUNTABLE MEDIAN IS PAID PER THE "REMOVE NON-MOUNTABLE MEDIAN" BID ITEM. SAW CUTTING AND ANY TEMPORARY ASPHALT BACKFILL REQUIRED TO RE-ESTABLISH A FLUSH SURFACE WITH THE SURROUNDING PAVEMENT WILL BE CONSIDERED INCIDENTAL TO THE REMOVAL ITEM.

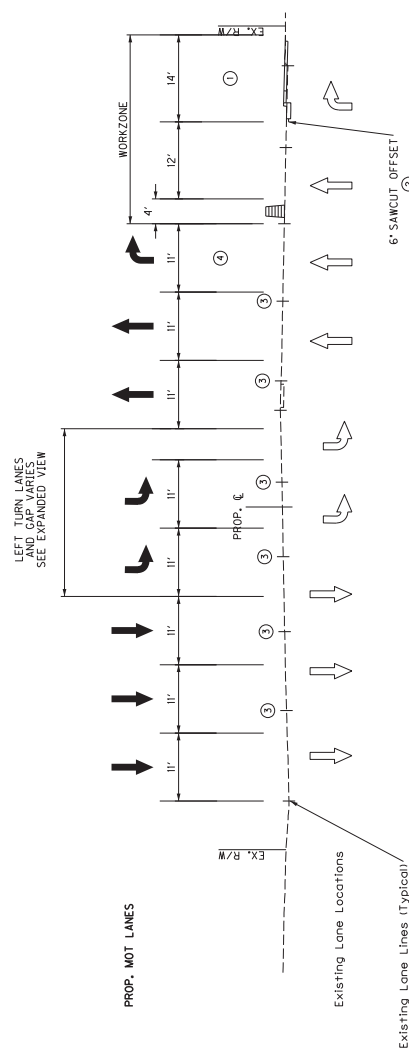
GENERAL NOTES

TRANSFORMING DIXIE HIGHWAY
MAINTENANCE OF TRAFFIC
PHASE 1 NOTES

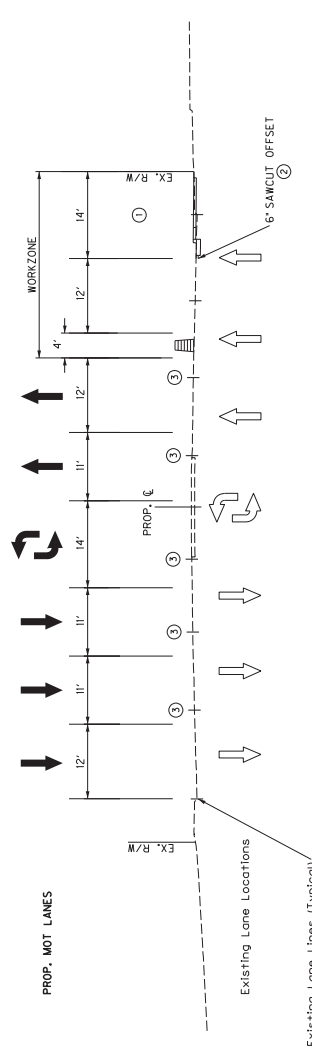
SCALE: T=NTS

COUNTY OF	ITEM NO.	SHEET NO.
JEFFERSON	05-478.7	R143

MAINTENANCE OF TRAFFIC -- PHASE 2



STA. 523+00 TO STA. 540+00
TS-B



STA. 510+50, STA. 560+00, & STA. 605+00
TS-A

LEGEND
 PROP. TRAFFIC LOCATIONS
 EXISTING TRAFFIC LOCATIONS

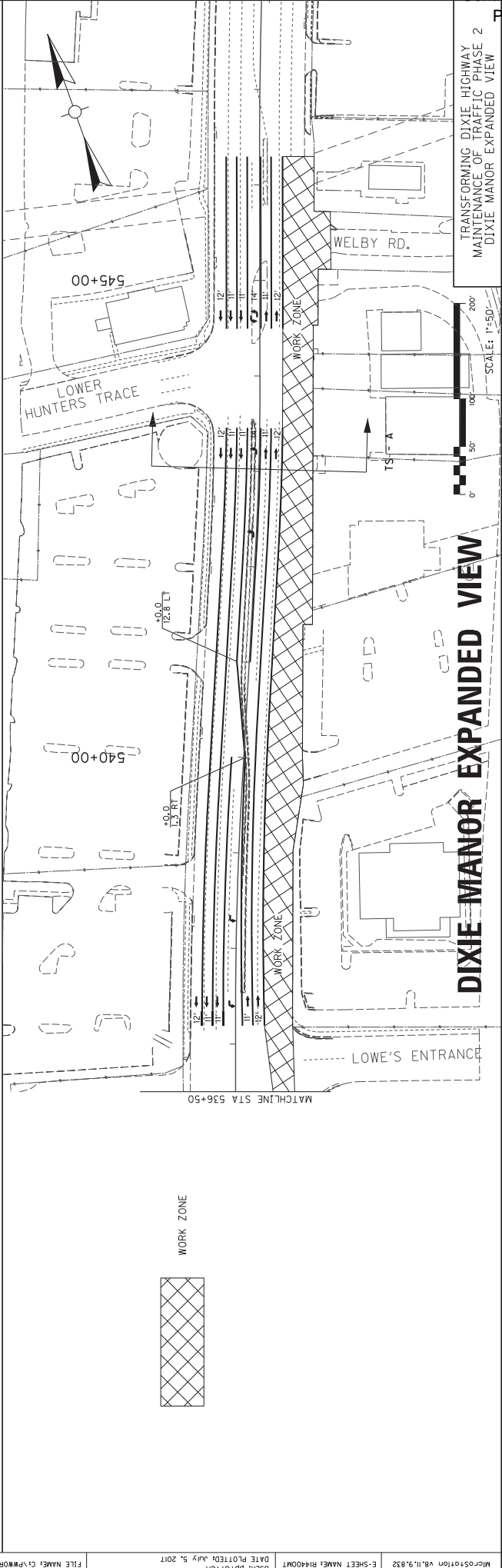
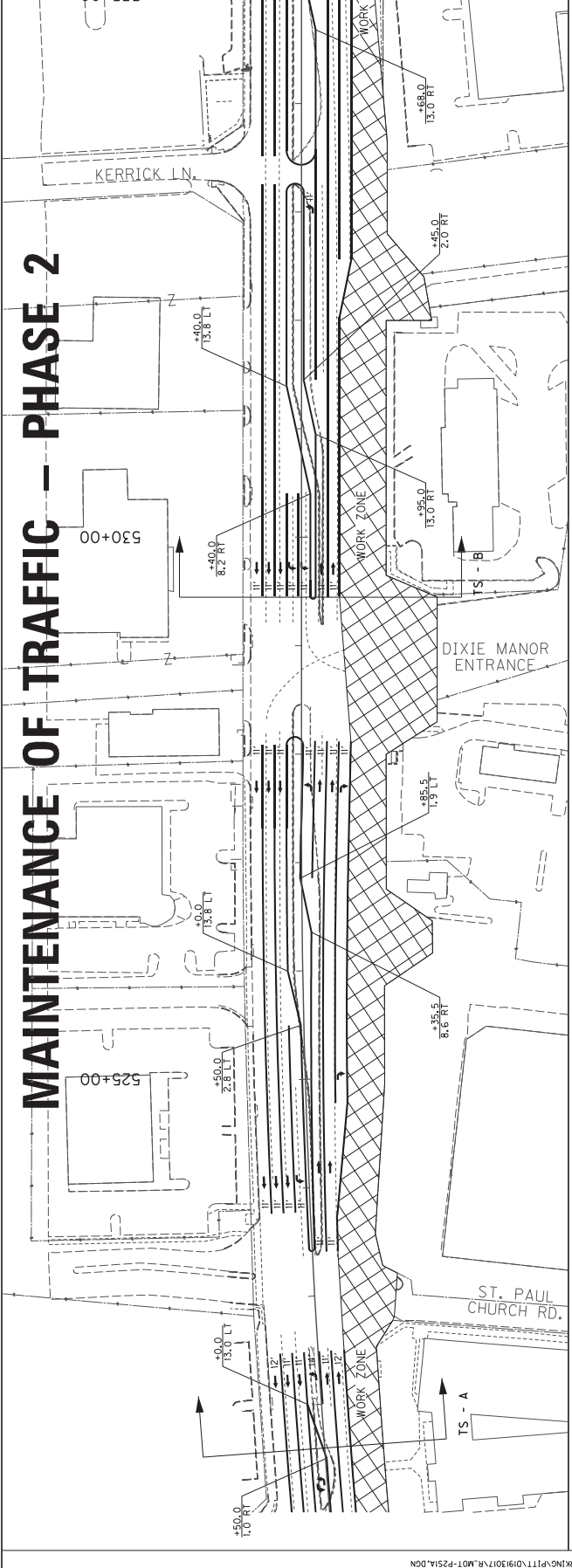
GENERAL NOTES
 ① SEE PROPOSED TYPICAL SECTIONS
 ② LAYOUT OF PROP. LANE LINES SHALL BE IDENTICAL TO THE LAYOUT WHICH IS OFFSET 6' FROM THE PROPOSED EDGE OF CURB.
 ③ LANE LINES REMOVED & RESTRIPED TO MATCH EMERGENCY PATTERN.
 ④ THE RIGHT MERGING LANE IS ELIMINATED BETWEEN STATIONS 560+00 AND 605+00 IN THIS MOT PHASE

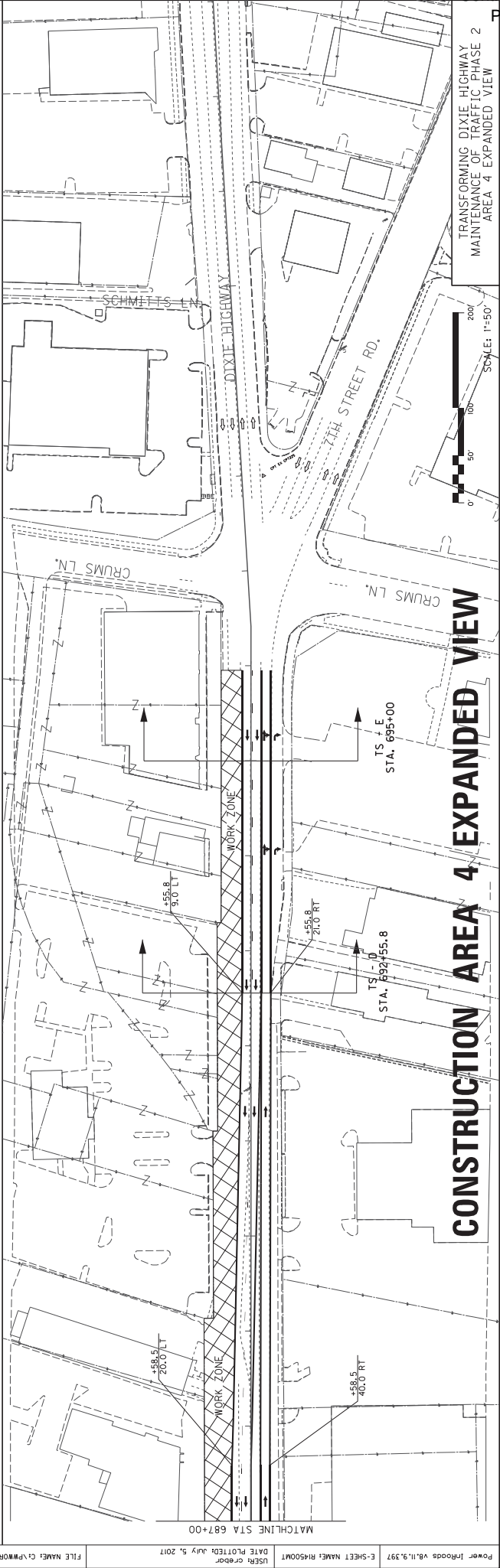
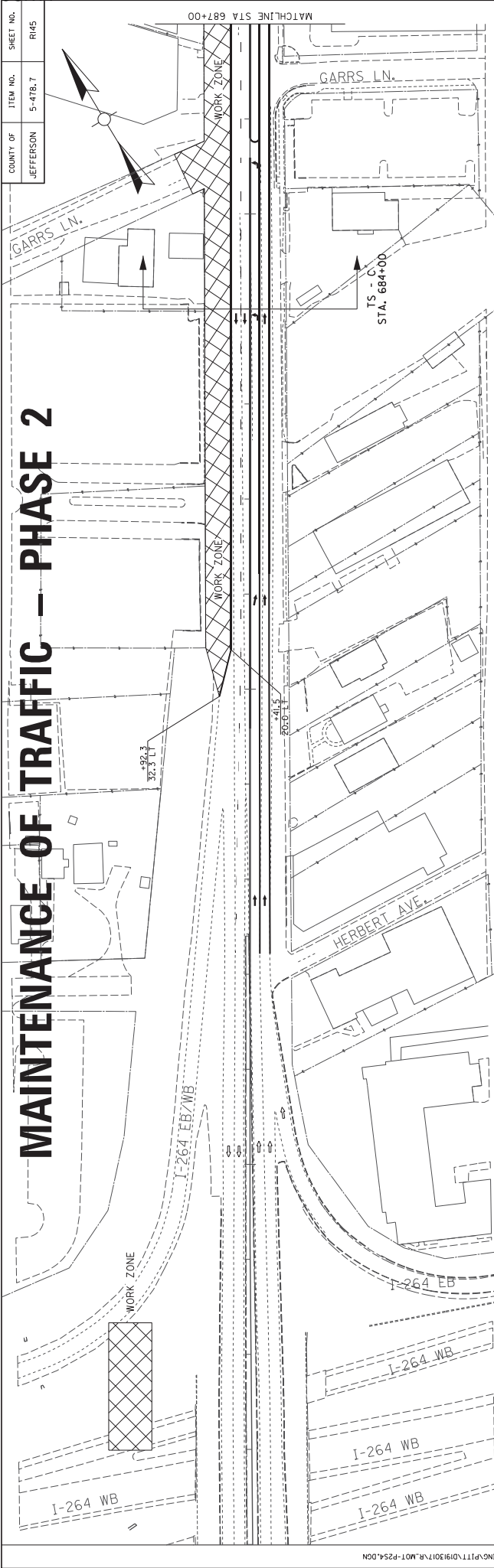
CONSTRUCTION AREAS 1, 2, & 3

TRANSFORMING DIXIE HIGHWAY
MAINTENANCE OF TRAFFIC
PHASE 2 TYPICAL SECTIONS

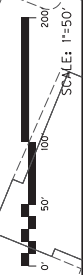
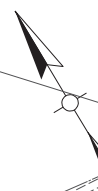
SCALE: 1"=10'

COUNTY OF	ITEM NO.	SHEET NO.
JEFFERSON	5-478.7	R144





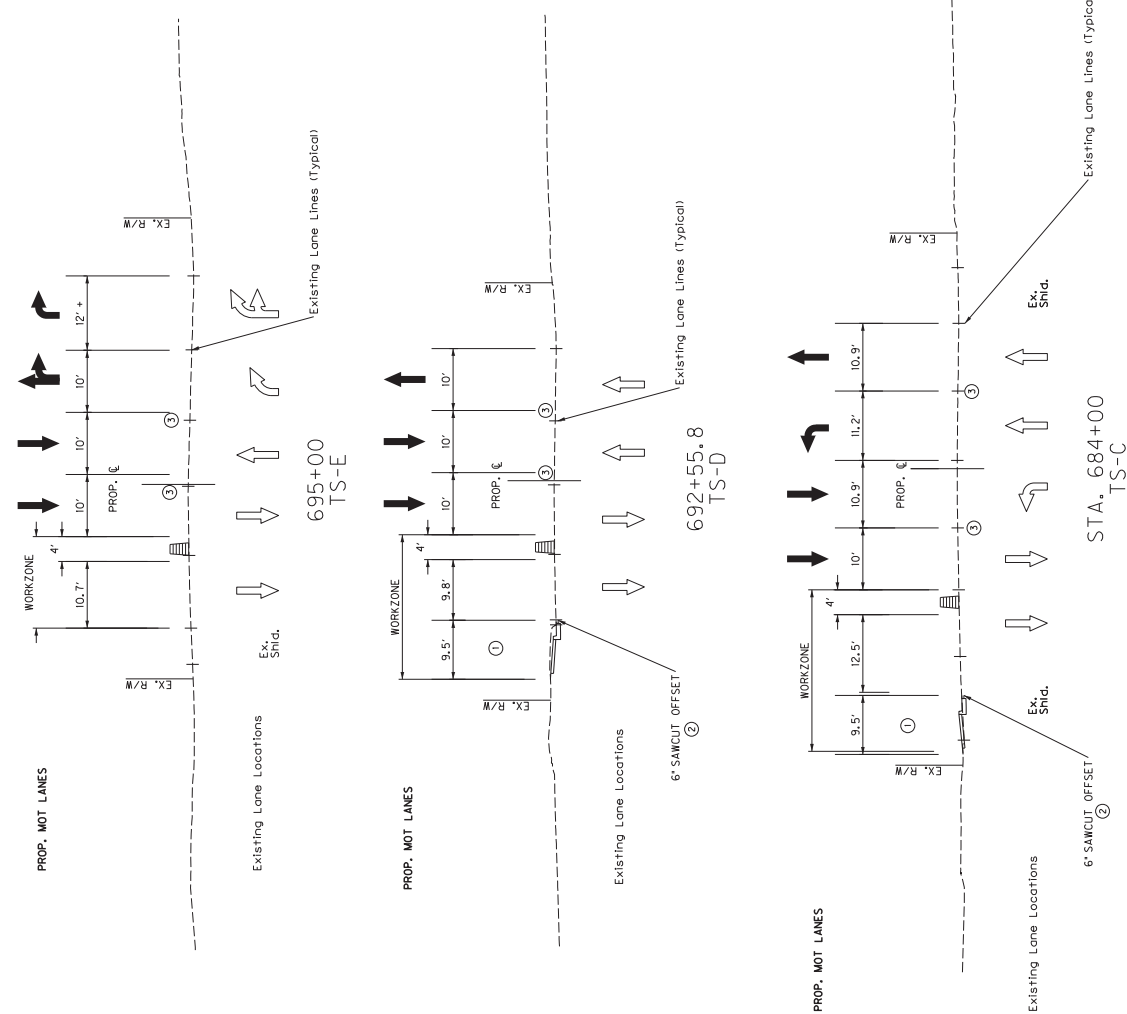
COUNTY OF	ITEM NO.	SHEET NO.
JEFFERSON	5-478.7	R145



TRANSFORMING DIXIE HIGHWAY
MAINTENANCE OF TRAFFIC PHASE 2
AREA 4 EXPANDED VIEW

COUNTY OF	ITEM NO.	SHEET NO.
JEFFERSON	05-478.7	RI46

MAINTENANCE OF TRAFFIC -- PHASE 2



LEGEND

↑ PROP. TRAFFIC LOCATIONS
⇄ EXISTING TRAFFIC LOCATIONS

GENERAL NOTES

- SEE PROPOSED TYPICAL SECTIONS
- LAYOUT OF PROP. LANE LINES WHICH IS OFFSET 6' FROM THE PROPOSED EDGE OF CURB.
- LANE LINES REMOVED & RESTRIPE TO MATCH EMERGENCY PATTERN.

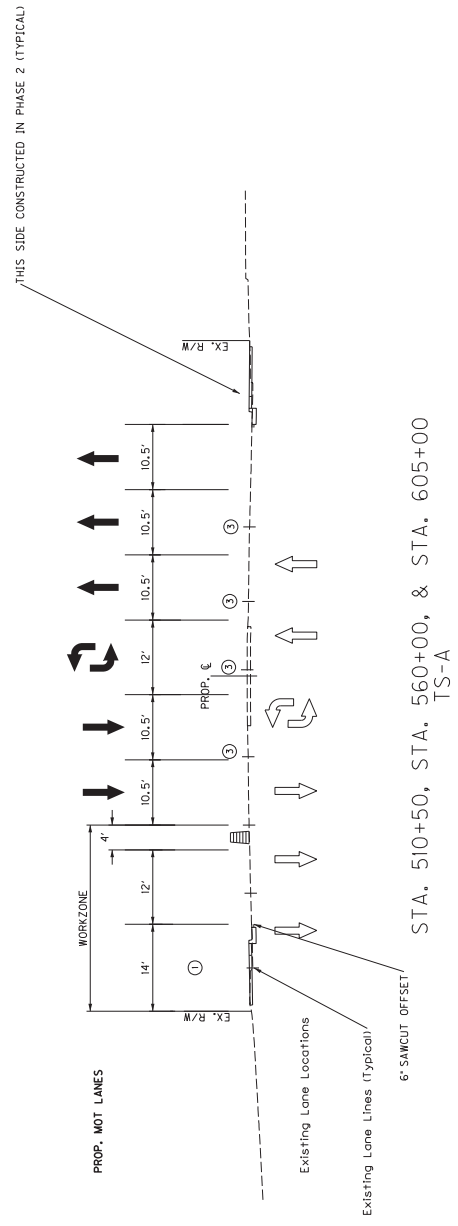
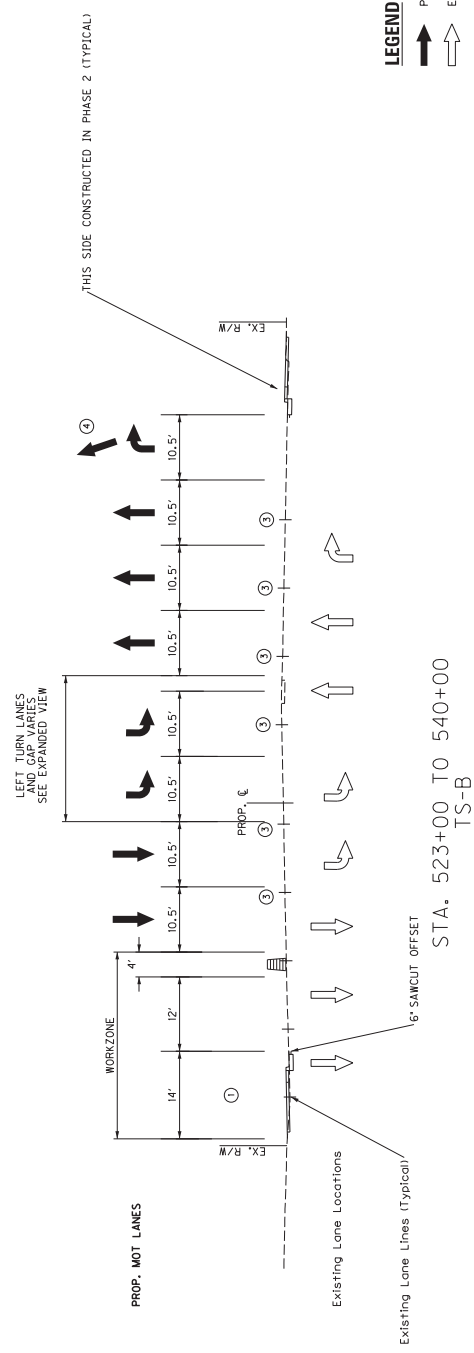
CONSTRUCTION AREA 4

TRANSFORMING DIXIE HIGHWAY
MAINTENANCE OF TRAFFIC
PHASE 2 TYPICAL SECTIONS

SCALE: 1"=10'

COUNTY OF	ITEM NO.	SHEET NO.
JEFFERSON	05-478.7	R147

MAINTENANCE OF TRAFFIC -- PHASE 3



LEGEND
 ↑ PROP. TRAFFIC LOCATIONS
 ⇨ EXISTING TRAFFIC LOCATIONS

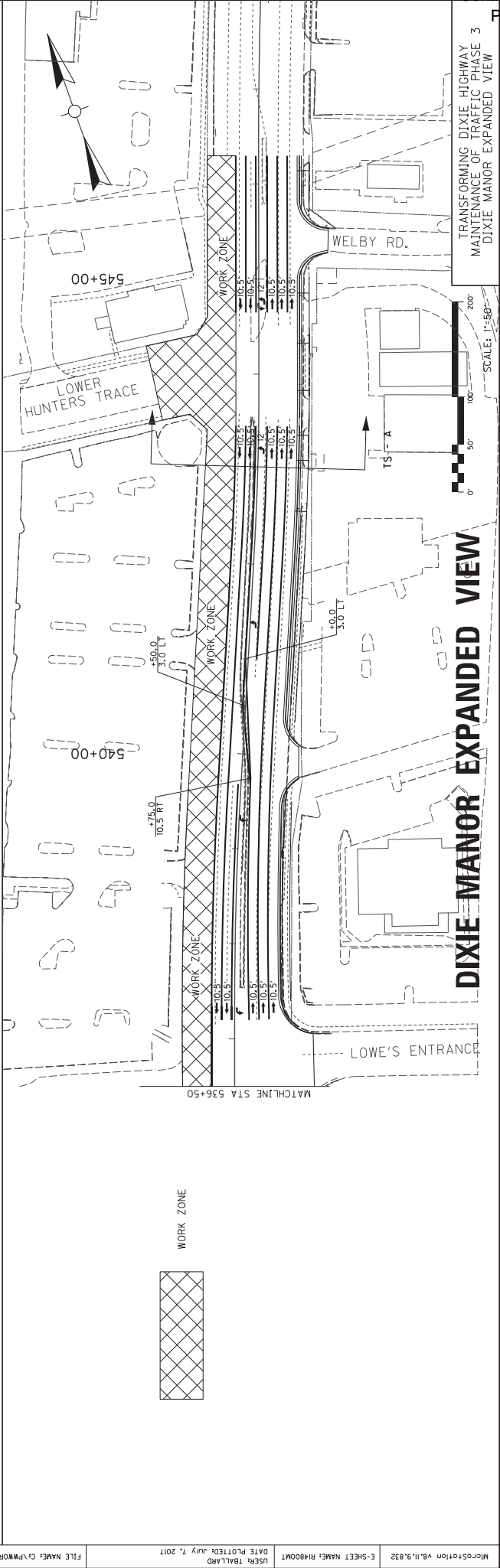
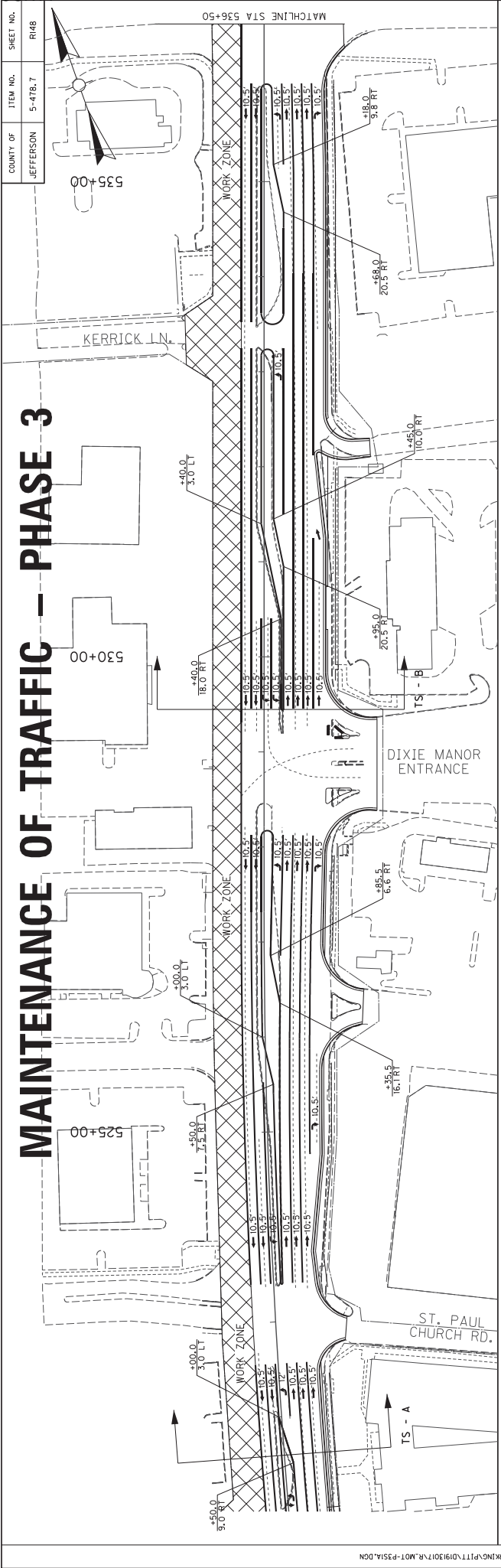
GENERAL NOTES
 ① SEE PROPOSED TYPICAL SECTIONS
 ② LAYOUT OF PROP. LANE LINES SHALL BE ON THE LOCATION WHICH IS OFFSET 6' FROM THE PROPOSED EDGE OF CURB.
 ③ LANE LINES REMOVED & RESTRIPED TO MATCH EMERGENCY PATTERN.
 ④ SEE DIXIE MANOR EXPANDED VIEW FOR LOCATIONS

CONSTRUCTION AREAS 1, 2, & 3

TRANSFORMING DIXIE HIGHWAY
 MAINTENANCE OF TRAFFIC
 PHASE 3 TYPICAL SECTIONS

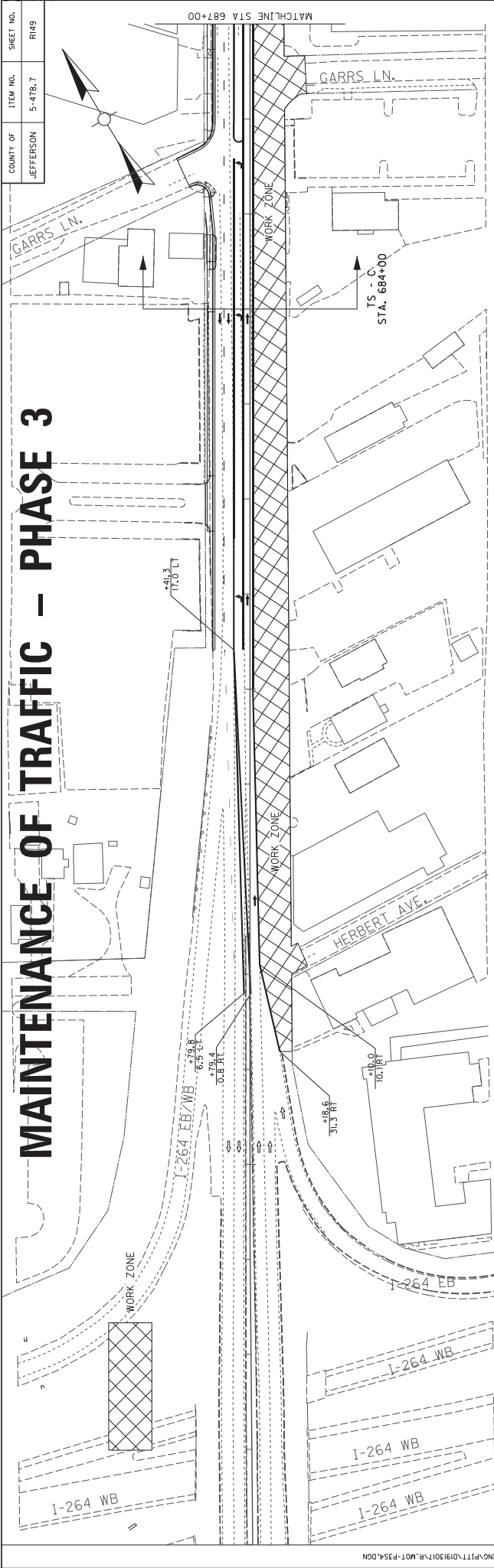
SCALE: 1"=10'

COUNTY OF	ITEM NO.	SHEET NO.
JEFFERSON	5-478.7	R148

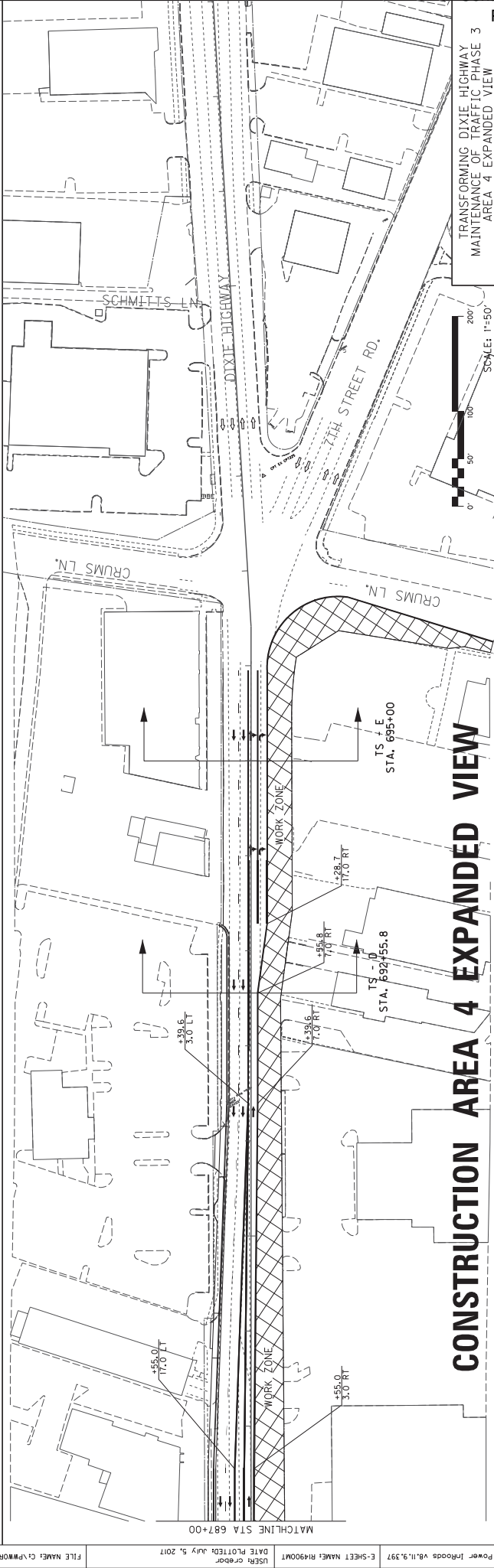


TRANSFORMING DIXIE HIGHWAY
MAINTENANCE OF TRAFFIC PHASE 3
DIXIE MANOR EXPANDED VIEW

COUNTY OF	JEFFERSON
ITEM NO.	5-478.7
SHEET NO.	RI49



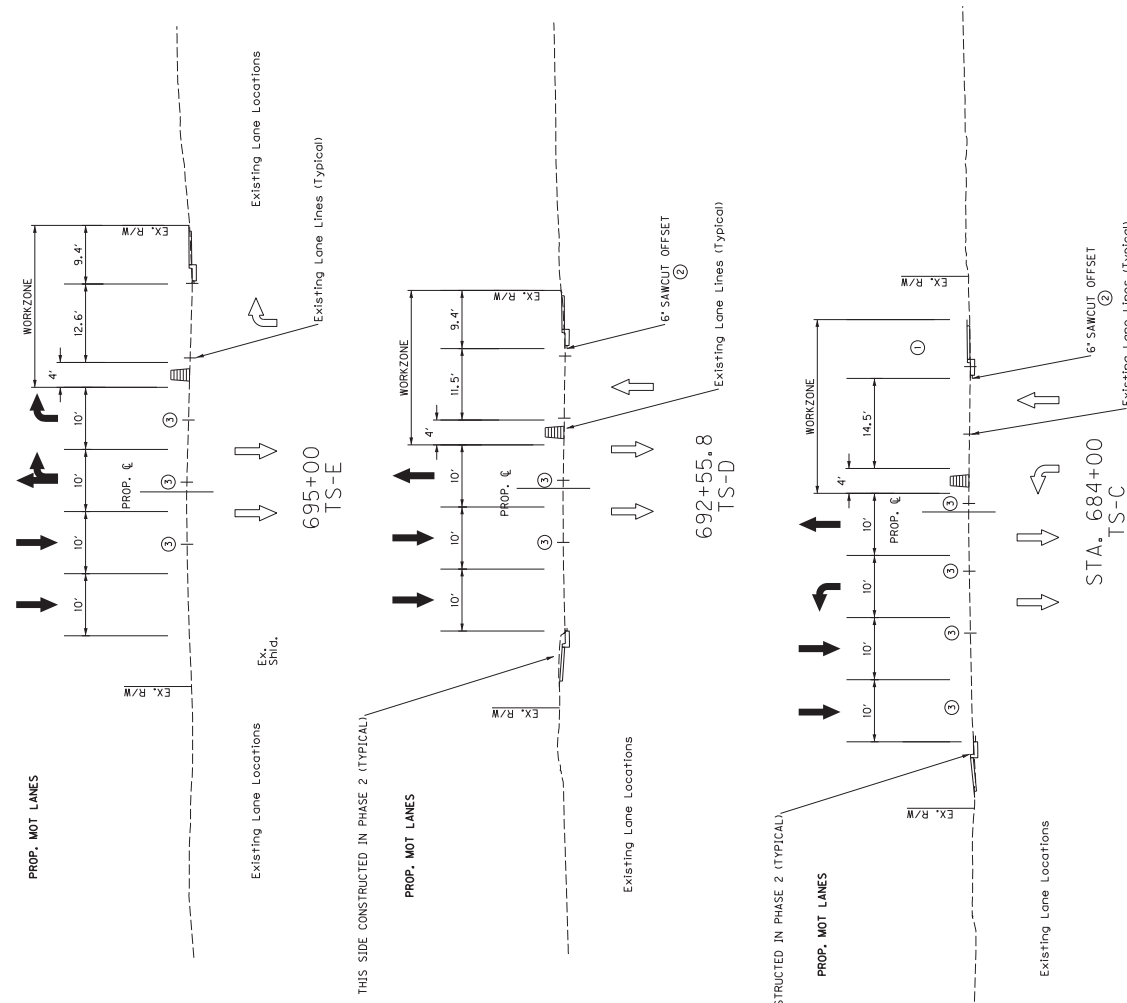
MAINTENANCE OF TRAFFIC - PHASE 3



CONSTRUCTION AREA 4 EXPANDED VIEW

COUNTY OF	ITEM NO.	SHEET NO.
JEFFERSON	05-478.7	R150

MAINTENANCE OF TRAFFIC - PHASE 3



LEGEND

↑ PROP. TRAFFIC LOCATIONS

⇄ EXISTING TRAFFIC LOCATIONS

GENERAL NOTES

- SEE PROPOSED TYPICAL SECTIONS
- LAYOUT OF PROP. LANE LINES WHICH IS ONE FOOT FROM THE PROPOSED EDGE OF CURB.
- LANE LINES REMOVED & RESTRIPTED TO MATCH TEMPORARY PATTERN.

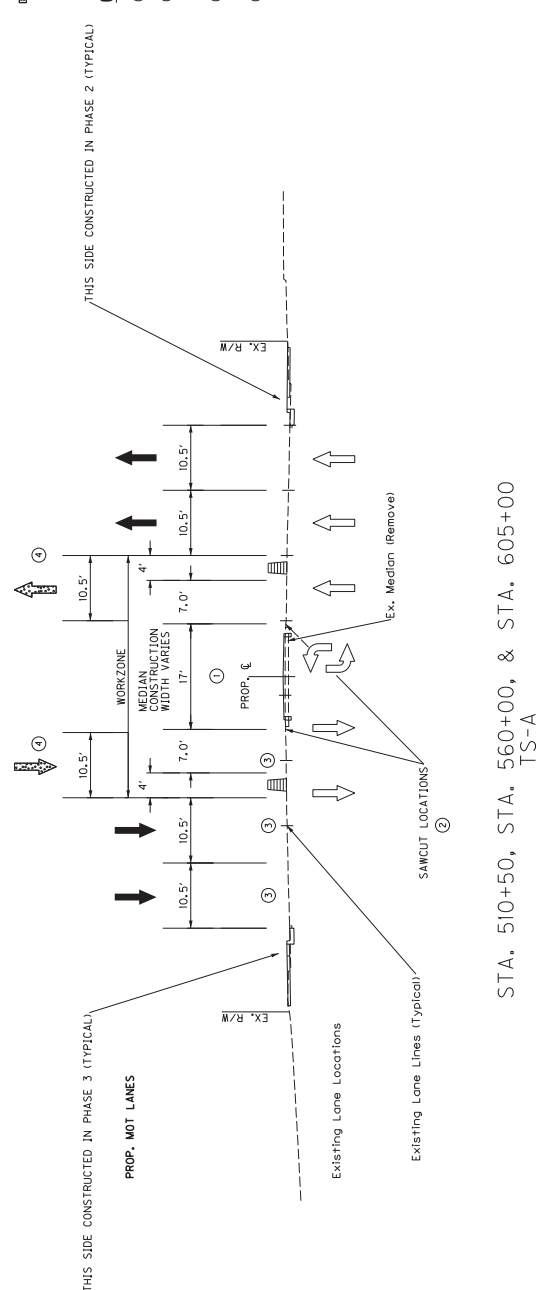
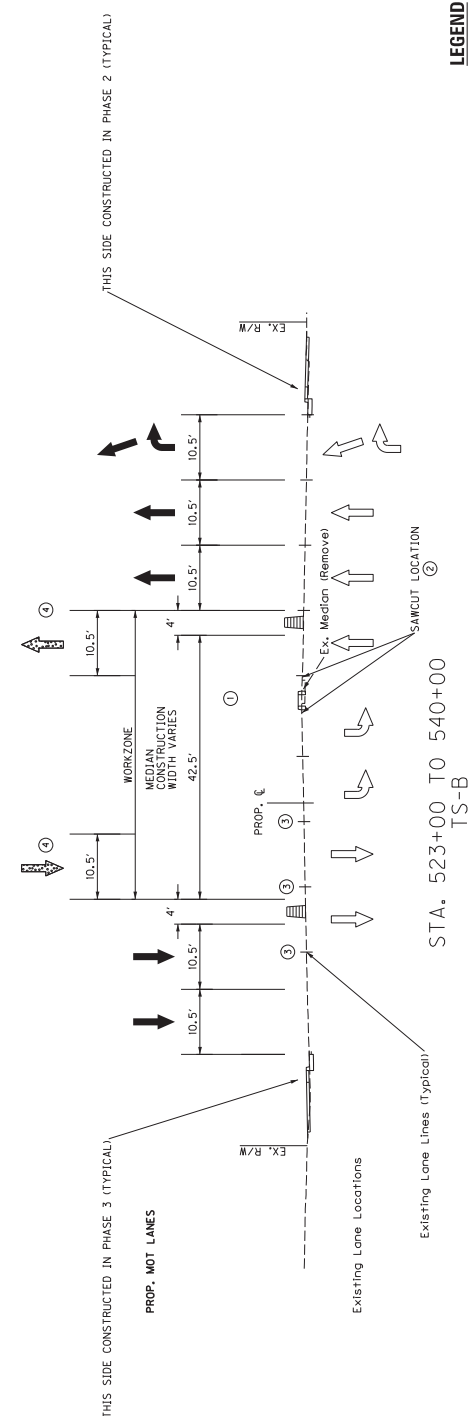
CONSTRUCTION AREA 4

TRANSFORMING DIXIE HIGHWAY
MAINTENANCE OF TRAFFIC
PHASE 3 TYPICAL SECTIONS

SCALE: 1"=10'

COUNTY OF	ITEM NO.	SHEET NO.
JEFFERSON	05-478.7	RIS1

MAINTENANCE OF TRAFFIC -- PHASE 4



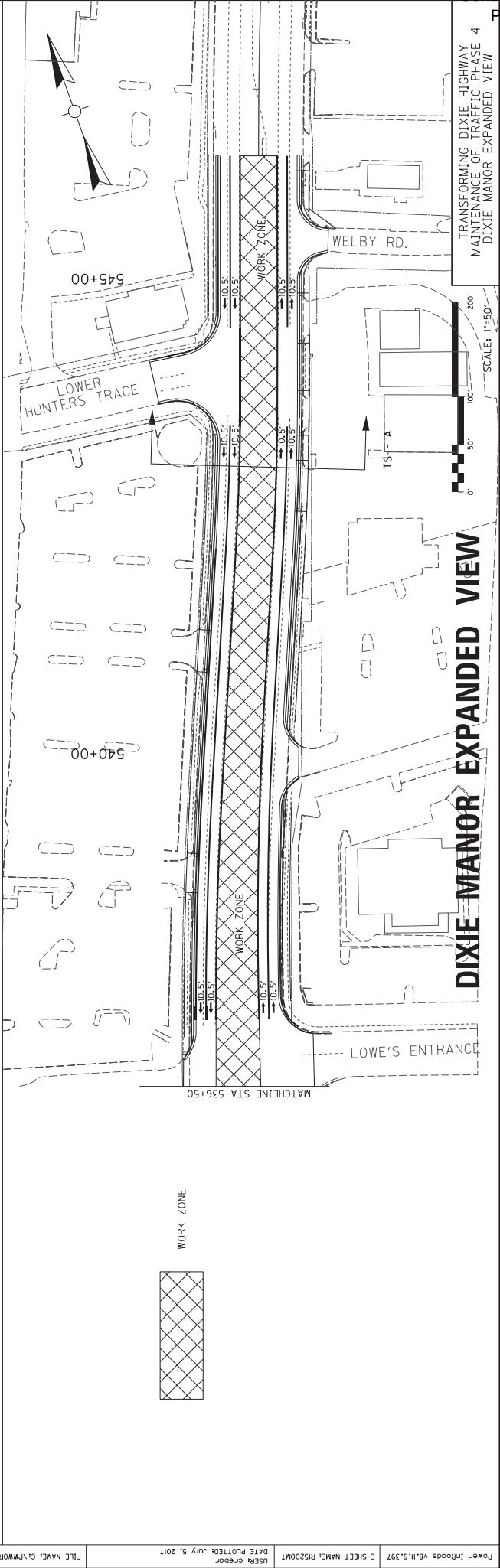
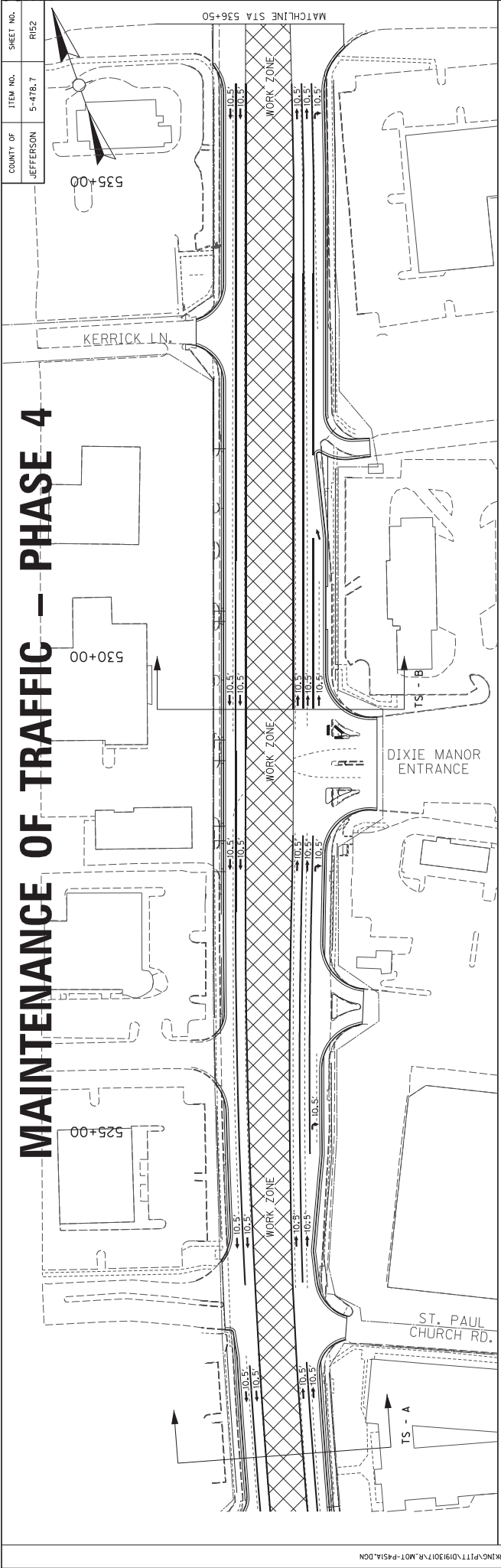
- LEGEND**
- ↑ PROP. TRAFFIC LOCATIONS
 - ⇄ EXISTING TRAFFIC LOCATIONS
 - ⇄ PROP. LANE THAT CAN BE CLOSED TO ALLOW MEDIAN CONSTRUCTION.

- GENERAL NOTES**
- 1 SEE PROPOSED TYPICAL SECTIONS
 - 2 SAW CUT LOCATION IS 6' OFFSET FROM THE EXISTING MEDIAN TO REMOVE THE EXISTING MEDIAN.
 - 3 LANE LINES REMOVED & RESTRIPTED TO MATCH TEMPORARY PATTERN.
 - 4 SEE LANE CLOSURE RESTRICTIONS NOTE 120 - MOT OVERVIEW SHEET

CONSTRUCTION AREAS 1, 2, & 3

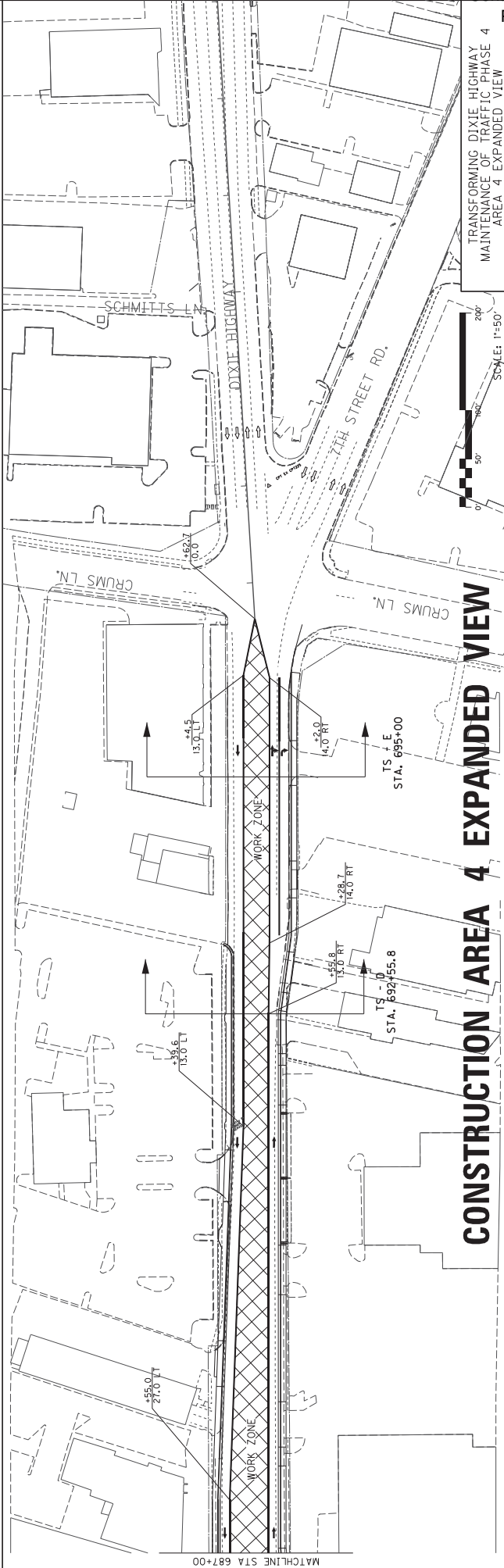
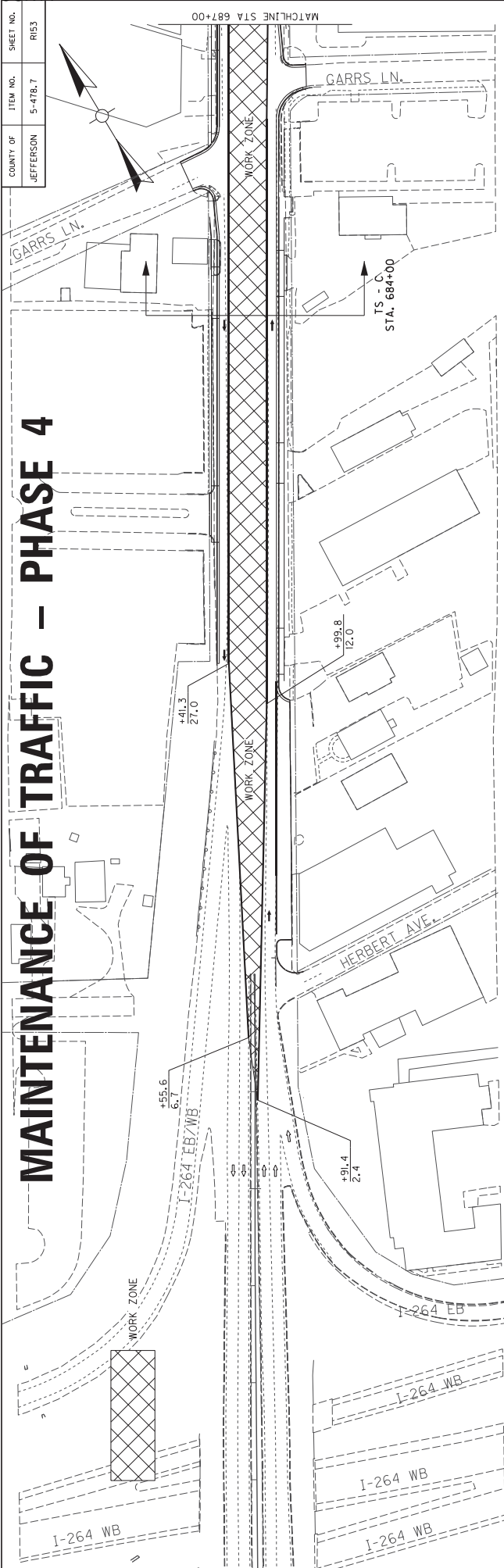
TRANSFORMING DIXIE HIGHWAY
MAINTENANCE OF TRAFFIC
PHASE 4 TYPICAL SECTIONS

SCALE: 1"=10'



TRANSFORMING DIXIE HIGHWAY
MAINTENANCE OF TRAFFIC PHASE 4
DIXIE MANOR EXPANDED VIEW

MAINTENANCE OF TRAFFIC - PHASE 4



COUNTY OF	ITEM NO.	SHEET NO.
JEFFERSON	5-478.7	R153

MATCHLINE STA 687+00

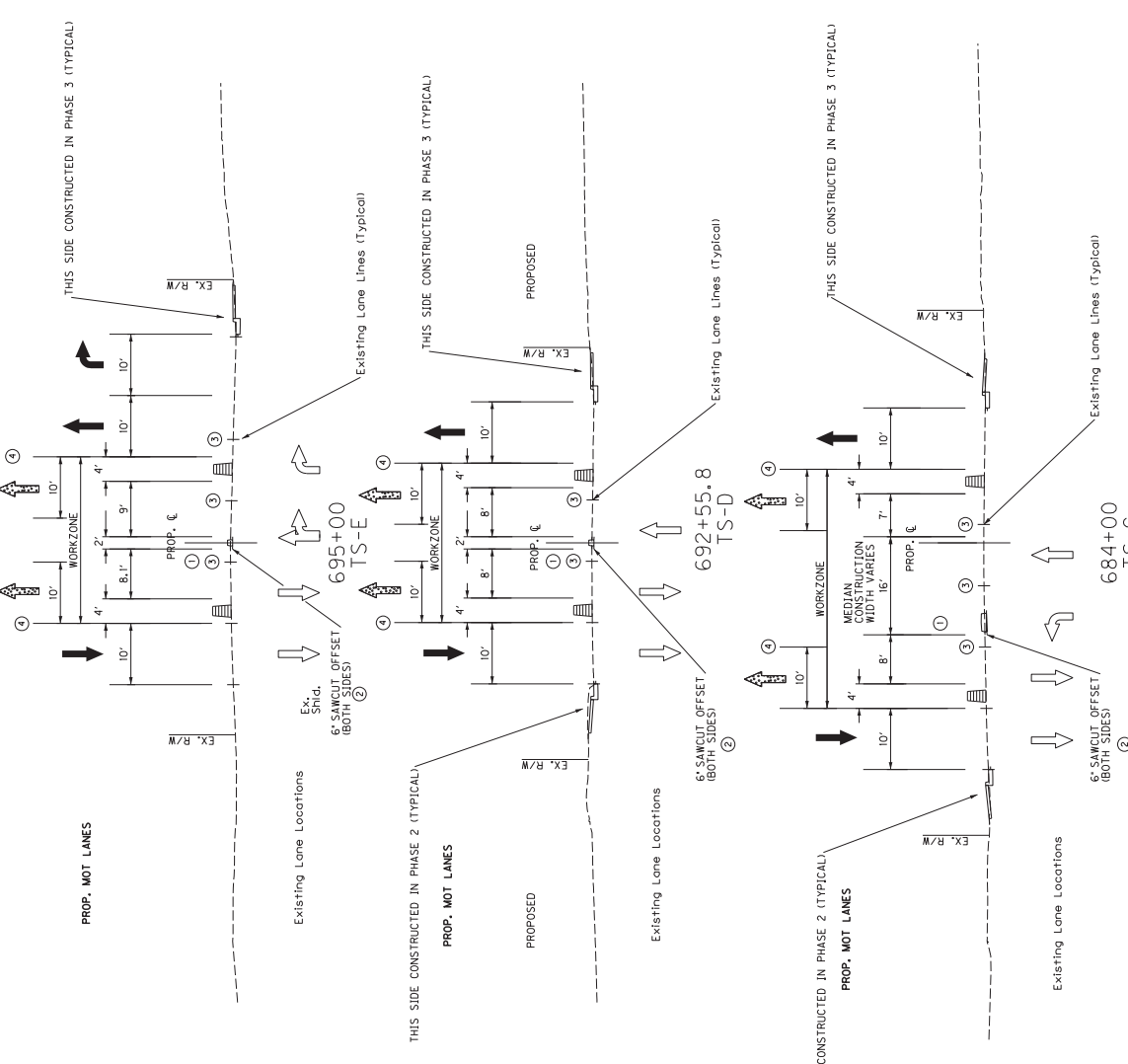
MATCHLINE STA 687+00

TRANSFORMING DIXIE HIGHWAY
MAINTENANCE OF TRAFFIC PHASE 4
AREA 4 EXPANDED VIEW

CONSTRUCTION AREA 4 EXPANDED VIEW

COUNTY OF	ITEM NO.	SHEET NO.
JEFFERSON	05-478.7	R154

MAINTENANCE OF TRAFFIC -- PHASE 4



LEGEND

- ➔ PROP. TRAFFIC LOCATIONS
- ➔ EXISTING TRAFFIC LOCATIONS
- ➔ PROP. LANE THAT CAN BE CLOSED TO ALLOW MEDIAN CONSTRUCTION.

GENERAL NOTES

- ① SEE PROPOSED TYPICAL SECTIONS
- ② SAW CUT LOCATION IS 6' OFFSET FROM THE EXISTING MEDIAN TO REMOVE THE EXISTING MEDIAN.
- ③ LANE LINES REMOVED & RESTRIPE TO MATCH TEMPORARY PATTERN.
- ④ SEE LANE CLOSURE RESTRICTIONS NOTE 120 - MOT OVERVIEW SHEET

CONSTRUCTION AREA 4

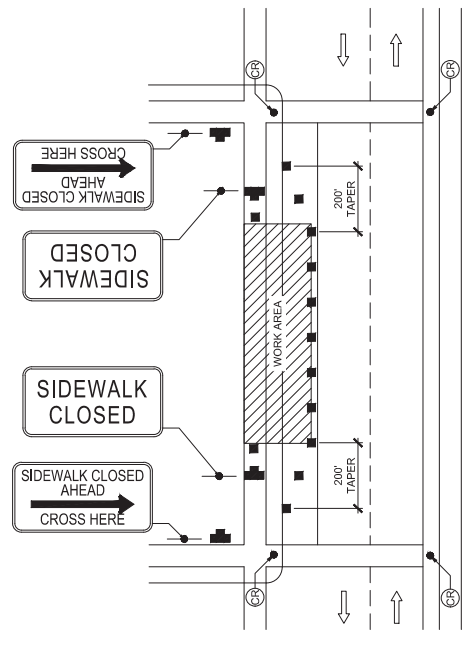
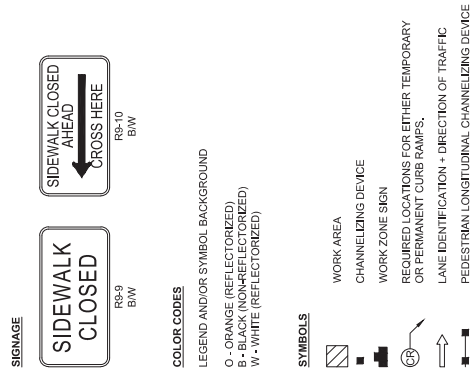
SCALE: 1"=10'

TRANSFORMING DIXIE HIGHWAY
MAINTENANCE OF TRAFFIC
PHASE 4 TYPICAL SECTIONS


COUNTY OF	JEFFERSON
ITEM NO.	5-478.7
SHEET NO.	R155

TRANSFORMING DIXIE HIGHWAY
PEDESTRIAN MOT PLAN

- NOTES:**
1. PEDESTRIAN MUST ALWAYS AVOID ANY VEHICLE EQUIPMENT WORKERS OR THEIR ACTIVITIES ENTOUCH ON THE SIDEWALK FOR A PERIOD OF MORE THAN 90 MINUTES ONLY WHERE SIDEWALKS CURRENT EXIST.
 2. AT ALL MAJOR INTERSECTIONS, ONLY ONE SIDE OF THE ROADWAY MAY BE CLOSED AT A TIME.
 3. ONLY SIGNS CONTROLLING PEDESTRIAN FLOWS ARE SHOWN. OTHER WORK ZONE SIGNS WILL BE NEEDED TO CONTROL TRAFFIC ON THE STREETS.
 4. MAXIMUM SPACING BETWEEN BARRICADES, VERTICAL PANELS, DRUMS OR TUBULAR MARKERS SHALL NOT BE GREATER THAN 25'.
 5. PEDESTRIAN TRAFFIC SIGNAL DISPLAY CONTROLLING CLOSED CROSSWALKS SHALL BE COVERED OR DEACTIVATED.
 6. POST MOUNTED SIGNS LOCATED NEAR OR ADJACENT TO A SIDEWALK SHALL HAVE A 7' MINIMUM CLEARANCE FROM THE BOTTOM OF SIGN TO THE SIDEWALK.
 7. TEMPORARY CROSSWALKS SHALL BE A MINIMUM OF 6' WIDE WITH A MAXIMUM 0.02 CROSS SLOPE AND A MAXIMUM 0.05 RUNNING SLOPE BETWEEN RAMPS. TEMPORARY RAMPS SHALL MEET THE REQUIREMENTS FOR CURB RAMPS AND BE PROTECTED FROM TRAFFIC BY BARRICADES, DRUMS, CONSTRUCTION EQUIPMENT, STORED HAZARDOUS SUCH AS HOLES, DEBRIS, MUD, CONSTRUCTION EQUIPMENT, STORED MATERIALS, ETC.
 8. TEMPORARY RAMPS AND TEMPORARY CROSSWALK MARKINGS SHALL BE REMOVED WITH REOPENING OF THE SIDEWALK, UNLESS OTHERWISE NOTED IN THE PLANS.
 9. FOR ADDITIONAL SIGNS AND DESIGN DETAIL INFORMATION REFER TO THE STANDARD HIGHWAY SIGNS MANUAL AS SPECIFIED IN THE MUTCD. SPECIAL SIGNS FOR TRAFFIC CONTROL PLANS WILL BE AS APPROVED BY THE STATE TRAFFIC PLANS ENGINEER. THE SIGN CODES SHOWN ON THIS SHEET ARE FOR THE STANDARD HIGHWAY SIGNS MANUAL. THE STANDARD HIGHWAY SIGNS MANUAL SHOULD BE REFERENCED FOR THE OFFICIAL SIGN CODES FOR USE IN THE DEVELOPMENT OF TRAFFIC CONTROL PLANS.
 10. TEMPORARY CONSTRUCTION SIGNS WILL BE PAID PER THE "TEMPORARY SIGNS" PAY ITEM.



1 SIDEWALK CLOSURE WITH TEMPORARY CROSSWALKS
SCALE: 1/2" = 1'-0"

	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		

<input checked="" type="checkbox"/> Original	<input type="checkbox"/> Re-Certification	RIGHT OF WAY CERTIFICATION	
ITEM #	COUNTY	PROJECT # (STATE)	PROJECT # (FEDERAL)
5-478.70	Jefferson	FD04 056 0031 013-016 & FD52 056 0031 004-020	TGR 0311 034

PROJECT DESCRIPTION

Transforming Dixie Hwy Project

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)


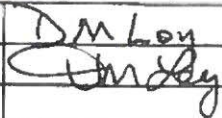
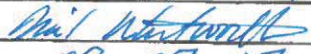
The right of way has not been fully acquired, the right to occupy and to use all rights-of-way required for the proper execution of the project has been acquired. Some parcels may be pending in court and on other parcels full legal possession has not been obtained, but right of entry has been obtained, 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	EXCEPTION (S) Parcel #	ANTICIPATED DATE OF POSSESSION WITH EXPLANATION
Number of Parcels That Have Been Acquired		
Signed Deed		
Condemnation		
Signed ROE		

Notes/ Comments (Use Additional Sheet if necessary)

LPA RW Project Manager		Right of Way Supervisor	
Printed Name		Printed Name	Tom Boylan
Signature		Signature	
Date		Date	6-8-17
Right of Way Director		FHWA	
Printed Name	DM Boy	Printed Name	DAVID WHITWORTH
Signature		Signature	
Date	07 June 2017	Date	07-07-17

UTILITIES AND RAIL CERTIFICATION NOTE

**JEFFERSON COUNTY, TGR 0311 034
056 0031 013-016 & 056 0031 004-020
TRANSFORMING DIXIE HIGHWAY
ITEM NO. 5-478.7**

GENERAL PROJECT NOTE ON UTILITY PROTECTION

Utility coordination efforts determined that there are utilities that will require relocation to accommodate this construction. The information provided below in these Special Notes for Utility Clearance, Impact on Construction may not be exact or complete. All existing utilities have been shown in the approximate location according to the best available information, equivalent to Subsurface Utility Engineering (SUE) quality level B and C, as indicated on the plans. The information provided is for the contractor's use in planning the execution of the work. It shall be the road contractor's responsibility to verify the completeness and/or accuracy of all such information being furnished. It is the responsibility of the contractor to keep all utilities marked prior to and during subsurface construction of foundations, drainage features, and other utilities.

In some locations on the plans, jacking and boring is called for. It is the contractor's responsibility to avoid existing utilities and create the final path for the proposed conduit. The design provided is schematic and is for the contractor's use in planning. We cannot guarantee existing utility locations. Therefore, it is the contractor's responsibility to field verify the proposed locations for utilities and proposed conduit placements are free of conflicts.

Contractor shall be responsible for relocating water conflicts in accordance with the water relocation plans and specifications contained herein. Contractor shall be responsible to reconnect affected services as soon as possible. All other utility owners will be responsible for relocating their lines and services.

Microtrenching is proposed in some areas throughout the project, as shown on the plans, to install the proposed 144 fiber line. Microtrenching is a low-impact trenching method that enables quick installation of underground fiber in trenches that are narrower and shallower than typical open trenches currently used in the industry. Moreover, microtrenching minimizes the risk of damage to existing utilities by excavation a narrower and shallower trench. The depth of the proposed microtrenching is 12". This should be shallow enough to avoid all utilities, however, it is still the responsibility of the contractor to locate all utilities prior to commencement of microtrenching activities.

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

The Contractor is not to disturb any utilities within the project disturb limits unless otherwise directed in the construction plans or in these utility notes.

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

UTILITIES AND RAIL CERTIFICATION NOTE

**JEFFERSON COUNTY, TGR 0311 034
056 0031 013-016 & 056 0031 004-020
TRANSFORMING DIXIE HIGHWAY
ITEM NO. 5-478.7**

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

List all applicable utilities whose facilities are being relocated at the time this note is written. List the Utility Type, Utility Size and Utility Location for each. If the utility's relocation work has not been completed at the writing of this note a completion date should be provided. If the work will not be completed by the letting date or it is uncertain whether the relocation work will be completed list the utility in the next block.

NOT APPLICABLE

THE UTILITIES DESCRIBED IN THIS SECTION HAVE BEEN IDENTIFIED AS HAVING POTENTIAL CONFLICTS AND REQUIRE FURTHER INVESTIGATION TO DETERMINE IF THEY MUST BE RELOCATED

It is the responsibility of the contractor to verify the potential conflicts listed within these notes (horizontally and vertically) to a SUE level A as a first order of business. This shall be done as soon as possible after the notice to proceed is issued on the construction contract. The contractor is to provide TARC a one week notice prior to starting SUE investigations in locations within the limits of existing bus stops. This contract will be responsible for the investigation of the potential underground utility conflicts listed within these notes. Contractor is to contact affected utility owners and project engineer once the utilities have been exposed and determine, with the utility and engineer's approval, if any real conflicts exist. If it is determined these utilities have no real conflict then they are not to be disturbed and shall remain in place. If a conflict exist, the utilities (other than LWC) will be responsible for relocating their lines at the utility owner's expense. While the utility is relocating its lines, the contractor can work on all other bus stations or roadway portions of the contract, or work in the affected bus stations as long as that work is not in the way of the utility owner that is relocating their line. No claims or schedule delays will be awarded for utility issues if the above procedure is not followed.

If a bus station site is not listed here or in the following sections for a known potential conflict, then it is considered clear of utility conflicts based on the information available. However, the contractor is still responsible for locating all utilities at each site to verify no conflicts exist. Listed below are the potential utility conflicts at the proposed bus station sites:

BUS STATION SITE 4

AT&T – Has an existing underground facility throughout this bus station including underneath the proposed pylon location at Station 367+65, 45' Lt.

UTILITIES AND RAIL CERTIFICATION NOTE

**JEFFERSON COUNTY, TGR 0311 034
056 0031 013-016 & 056 0031 004-020
TRANSFORMING DIXIE HIGHWAY
ITEM NO. 5-478.7**

BUS STATION SITE 8

LG&E Gas – An existing gas main 4CT (254058) runs parallel to Dixie Highway, 50' Lt of the centerline throughout this site. The most likely conflict would be near the proposed pylon at Station 494+10, 50' Lt. The existing gas main also runs underneath the proposed shelter.

BUS STATION SITE 10

AT&T – Has an existing underground facility that runs parallel to Dixie Highway including underneath the proposed pylon at Station 526+90, 50' Lt.

LG&E Gas – An existing gas main 4CT (254054) runs parallel to Dixie Highway, 50' Lt of the centerline throughout this site. It runs underneath the proposed pylon at Station 526+90, 50' Lt.

BUS STATION SITE 17

AT&T – Has an existing underground facility throughout this bus station including underneath the proposed pylon at Station 650+87, 50' Lt.

BUS STATION SITE 21

LG&E Gas – An existing gas main 2PL (419301) runs parallel to Dixie Highway, 50' Lt of the centerline throughout this site. The most likely conflict would be near the proposed pylon at Station 787+70, 34' Rt.

BUS STATION SITE 31

LG&E Electric – Has an existing underground facility that run parallel to W. Broadway, about 43' Lt of the centerline throughout this site. It runs underneath the proposed pylon at Station 143+16, 43' Lt.

BUS STATION SITE 32

SPECTRUM/TIME WARNER – Has an existing underground facility that runs parallel to 9th Street, 68' Rt of the centerline throughout this site. It runs near the proposed pylon at Station 70+30, 68' Rt.

LG&E Electric – Has an existing underground facility that runs parallel to 9th Street, 70' Rt of the centerline throughout this site. It runs underneath the proposed pylon at Station 70+30, 70' Rt.

BUS STATION SITE 33

LG&E Electric – Has an existing underground facility that runs parallel to 9th Street, 70' Lt of the centerline throughout this site. It runs adjacent to the proposed pylon at Station 70+02, 70' Lt.

UTILITIES AND RAIL CERTIFICATION NOTE

**JEFFERSON COUNTY, TGR 0311 034
056 0031 013-016 & 056 0031 004-020
TRANSFORMING DIXIE HIGHWAY
ITEM NO. 5-478.7**

BUS STATION SITE 34

AT&T – Has an existing underground copper and fiber optic conduit facility underneath this bus station, including underneath the proposed pylon at 9th Street Station 83+15, 95' Rt.

BUS STATION SITE 36

LG&E Gas – An existing gas main (8CT 267280) runs parallel to Jefferson Street, 36' Rt of the centerline throughout this site. It runs underneath the proposed pylon at Station 20+25, 36' Rt.

BUS STATION SITE 37

LG&E Gas – An existing gas main (8PL 447745) runs parallel to Market Street, 35' Rt of the centerline throughout this site. The most likely conflict would be near the proposed pylon at Station 132+90, 35' Rt.

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

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

List all applicable utilities whose facilities relocation either will not be completed prior to the letting date of the road construction or that will begin and be completed by the utility after the road contract letting date. During construction these areas are not to be disturbed by or conflict with road construction activities. List Owner, Utility Type, Utility Size, both current and proposed utility location and a firm completion date for each. A completion date MUST be provided for any such utility work.

BUS STATION SITE 15

AT&T – An existing overhead communications line is currently at 13.5' above grade. This wire needs to be relocated higher to provide a vertical clearance of 15' minimum throughout the bus station limits. This work is to be completed by April 30, 2018.

BUS STATION SITE 22

AT&T – An existing light pole within the limits of the proposed bus station pad at Sta. 818+09 Lt needs to be relocated to the paver verge area at Sta. 818+23.73, 31.27' Lt. This work is to be completed by April 30, 2018.

BUS STATION SITE 24

LG&E Gas – An existing gas main (4PL 417592) runs parallel to Dixie Highway, 25' Lt of the centerline throughout this site. The existing gas main is not deep enough to provide acceptable separation from the

UTILITIES AND RAIL CERTIFICATION NOTE

**JEFFERSON COUNTY, TGR 0311 034
056 0031 013-016 & 056 0031 004-020
TRANSFORMING DIXIE HIGHWAY
ITEM NO. 5-478.7**

proposed pylon. It runs underneath the proposed pylon at Station 836+94, 24' Lt. This gas main may also have a conflict with two of the proposed shelter posts and should be relocated as needed. This work is to be completed by April 30, 2018.

BUS STATION SITE 26

LG&E Gas – An existing gas main (4PL 381648) runs parallel to Dixie Highway, 25' Lt of the centerline throughout this site. The existing gas main is not deep enough to provide acceptable separation from the proposed pylon. It runs underneath the proposed pylon at Station 872+22, 25' Lt. This work is to be completed by April 30, 2018.

AT&T – An existing overhead communications line is currently at 14' above grade. This wire needs to be relocated higher to provide a vertical clearance of 15' minimum throughout the bus station limits. This work is to be completed by April 30, 2018.

The Department will consider submission of a bid as the Contractor's agreement to not make any claims for additional compensation due to delays or other conditions created by the operations of **AT&T, LG&E-Electric, LG&E-Gas, Louisville Water Company, Level 3 Communications and Spectrum/Time Warner**. Working days will not be charged for those days on which work on **AT&T, LG&E-Electric, LG&E-Gas, Louisville Water Company, Level 3 Communications and Spectrum/Time Warner** facilities is delayed, as provided in the current edition of the KY Standard Specifications for Road and Bridge Construction. Should a difference of opinion arise as to the rights of the Contractor and others working within the limits of, or adjacent to the project, the KYTC Resident Engineer will decide as to the respective rights of the various parties involved in order to assure the completion of the Department's work in general harmony and in a satisfactory manner, and his decision shall be final and binding upon the Contractor.

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

This section will be divided into two sections: existing water main relocations within the limits of proposed bus stations and existing water main relocations outside the limits of bus stations where the existing water main will be relocated to avoid conflicts from proposed drainage structures. For bus stations, the work is organized per each site as the other utility impacts in the preceding section. For other areas, station ranges and horizontal offset information will be provided with a brief description of the proposed work. For all proposed work, see the utility relocations plans for more information.

UTILITIES AND RAIL CERTIFICATION NOTE

**JEFFERSON COUNTY, TGR 0311 034
056 0031 013-016 & 056 0031 004-020
TRANSFORMING DIXIE HIGHWAY
ITEM NO. 5-478.7**

LOUISVILLE WATER COMPANY

BUS STATION RELOCATIONS

BUS STATION SITE 8 – This site has an existing 12" D.I. water main on the west side of Dixie Highway that runs through the length of the bus station. Approximately 70 L.F. of this main will be relocated around the proposed bus station beginning at about station 493+80, 50' Lt. The existing main will be replaced by the contractor as part of the roadway project as shown on the relocation plans by a 12" water main.

BUS STATION SITE 9 – This site has an existing 12" D.I. water main on the east side of Dixie Highway that runs through the length of the bus station. Approximately 60 L.F. of this main will be relocated around the proposed bus station beginning at about station 496+83, 50' Rt. The existing main will be replaced by the contractor as part of the roadway project as shown on the relocation plans by a 12" water main. The existing water meter at Sta. 529+57.98, 81.60' Rt. is also to be relocated out of the proposed sidewalk ramp as shown on the relocation plans.

BUS STATION SITE 10 – This site has an existing 12" D.I. water main on the west side of Dixie Highway that runs through the length of the bus station. Approximately 70 L.F. of this main will be relocated around the proposed bus station beginning at about station 526+68, 50' Lt. The existing main will be replaced by the contractor as part of the roadway project as shown on the relocation plans by a 12" water main.

BUS STATION SITE 11 – This site has an existing 12" D.I. water main on the east side of Dixie Highway that runs through the length of the bus station. Approximately 60 L.F. of this main will be relocated around the proposed bus station beginning at about station 530+25, 75' Rt. The existing main will be replaced by the contractor as part of the roadway project as shown on the relocation plans by a 12" water main.

BUS STATION SITE 12 – This site has an existing 12" D.I. water main on the west side of Dixie Highway that runs through the length of the bus station. Approximately 70 L.F. of this main will be relocated around the proposed bus station beginning at about station 590+10, 50' Lt. The existing main will be replaced by the contractor as part of the roadway project as shown on the relocation plans by a 12" water main.

BUS STATION SITE 13 – This site has an existing 12" D.I. water main on the east side of Dixie Highway that runs through the length of the bus station. Approximately 50 L.F. of this main will be relocated around the proposed bus station beginning at about station 593+65, 65' Rt. The existing main will be

UTILITIES AND RAIL CERTIFICATION NOTE

**JEFFERSON COUNTY, TGR 0311 034
056 0031 013-016 & 056 0031 004-020
TRANSFORMING DIXIE HIGHWAY
ITEM NO. 5-478.7**

replaced by the contractor as part of the roadway project as shown on the relocation plans by a 12" water main.

BUS STATION SITE 14 – This site has an existing 12" D.I. water main on the west side of Dixie Highway that runs through the length of the bus station. Approximately 75 L.F. of this main will be relocated around the proposed bus station beginning at about station 616+85, 50' Lt. The existing main will be replaced by the contractor as part of the roadway project as shown on the relocation plans by a 12" water main.

BUS STATION SITE 15 – This site has an existing 12" D.I. water main on the east side of Dixie Highway that runs through the length of the bus station. Approximately 50 L.F. of this main will be relocated around the proposed bus station beginning at about station 618+82, 75' Rt. The existing main will be replaced by the contractor as part of the roadway project as shown on the relocation plans by a 12" water main.

BUS STATION SITE 16 – This site has an existing 12" D.I. water main on the east side of Dixie Highway that runs through the length of the bus station. Approximately 55 L.F. of this main will be relocated around the proposed bus station beginning at about station 647+84, 50' Rt. The existing main will be replaced by the contractor as part of the roadway project as shown on the relocation plans by a 12" water main.

BUS STATION SITE 20 – This site has an existing 12" D.P.W. water main on the west side of Dixie Highway that runs through the length of the bus station. Approximately 45 L.F. of this main will be relocated around the proposed bus station beginning at about station 785+30, 40' Lt. The existing main will be replaced by the contractor as part of the roadway project as shown on the relocation plans by a 12" water main.

BUS STATION SITE 37 – This site has an existing 12" D.I. water main on the south side of Market Street that runs the length of the bus station about 25' Rt. of the centerline under the right travel lane. This main is to remain in place. The existing fire hydrant at Station 132+61, 32' Rt. is to be removed. A new fire hydrant assembly, and associated work, is to be installed at Station 132+99.39, 32.70' Rt. See the relocation plans for more information.

LOCATIONS WHERE EX. WATER MAIN IS TO BE RELOCATED DUE TO CONFLICTS WITH PROPOSED DRAINAGE STRUCTURES

UTILITIES AND RAIL CERTIFICATION NOTE

**JEFFERSON COUNTY, TGR 0311 034
056 0031 013-016 & 056 0031 004-020
TRANSFORMING DIXIE HIGHWAY
ITEM NO. 5-478.7**

DIXIE HIGHWAY STA. 498+17.56 TO STA. 502+94.87 LT. – An existing 12” D.I. water main shall be relocated within the indicated station limits because of several conflicts with proposed drainage structures. The existing 12” D.I. water main runs parallel to Dixie Highway approximately 43’ Lt. of the centerline. The existing main will be relocated by the contractor as part of the roadway project, as shown on the relocation plans, by going around the drainage structures with a 12” water main and tying back into the existing 12” water main. There are also seven existing service connections to reconnect.

DIXIE HIGHWAY STA. 555+11.76 – An existing water meter at Sta. 555+11.76, 53.04’ Lt. is located in the proposed curb line and is to be relocated to Sta. 555+11.76, 55.13’ Lt.

DIXIE HIGHWAY STA. 571+45.27 TO STA. 576+74.02 LT. – An existing 12” D.I. water main shall be relocated within the indicated station limits because of several conflicts with proposed drainage structures. The existing 12” D.I. water main runs parallel to Dixie Highway approximately 41’-43’ Lt. of the centerline. The existing main will be relocated by the contractor as part of the roadway project, as shown on the relocation plans, by going around the drainage structures with a 12” water main and tying back into the existing 12” water main. There are also six existing service connections to reconnect.

DIXIE HIGHWAY STA. 576+47.41 TO STA. 576+69.43 RT. – An existing 12” water main shall be relocated within the indicated station limits to a lower elevation to go below a proposed storm sewer junction box. The existing 12” D.I. water main runs parallel to Dixie Highway approximately 50’ Rt. of the centerline. The existing main will be relocated by the contractor as part of the roadway project, as shown on the relocation plans, maintaining the existing offsets but using 22.5 degree bends to dive below the junction box and then come back up to tie back into the existing main.

DIXIE HIGHWAY STA. 579+72.21 TO STA. 580+16.36 LT. – An existing 12” D.I. water main shall be relocated within the indicated station limits to go around a proposed drainage structure. The existing 12” D.I. water main runs parallel to Dixie Highway approximately 45’ Lt. of the centerline. The existing main will be relocated by the contractor as part of the roadway project, as shown on the relocation plans, using 45 degree bends to go around the proposed drainage structure and then tie back into the existing main.

DIXIE HIGHWAY STA. 582+32.77 TO STA. 582+69.98 LT. – An existing 12” D.I. water main shall be relocated within the indicated station limits to go around a proposed drainage structure. The existing 12” D.I. water main runs parallel to Dixie Highway approximately 45’ Lt. of the centerline. The existing main will be relocated by the contractor as part of the roadway project, as shown on the relocation plans,

UTILITIES AND RAIL CERTIFICATION NOTE

**JEFFERSON COUNTY, TGR 0311 034
056 0031 013-016 & 056 0031 004-020
TRANSFORMING DIXIE HIGHWAY
ITEM NO. 5-478.7**

using 45 degree bends to go around the proposed drainage structure and then tie back into the existing main.

DIXIE HIGHWAY STA. 582+65.35 TO STA. 582+87.37 RT. – An existing 12" water main shall be relocated within the indicated station limits to a lower elevation to go below a proposed storm sewer junction box. The existing 12" D.I. water main runs parallel to Dixie Highway approximately 49' Rt. of the centerline. The existing main will be relocated by the contractor as part of the roadway project, as shown on the relocation plans, maintaining the existing offsets but using 22.5 degree bends to dive below the junction box and then come back up to tie back into the existing main.

DIXIE HIGHWAY STA. 584+45.65 TO STA. 588+35.14 LT. – An existing 12" D.I. water main shall be relocated within the indicated station limits because of several conflicts with proposed drainage structures. The existing 12" D.I. water main runs parallel to Dixie Highway approximately 44'-46' Lt. of the centerline. The existing main will be relocated by the contractor as part of the roadway project, as shown on the relocation plans, by going around the drainage structures with a 12" water main and tying back into the existing 12" water main. There are also five existing service connections to reconnect.

DIXIE HIGHWAY STA. 597+01.33 TO STA. 601+49.96 LT. – An existing 12" D.I. water main shall be relocated within the indicated station limits because of several conflicts with proposed drainage structures. The existing 12" D.I. water main runs parallel to Dixie Highway approximately 43' Lt. of the centerline. The existing main will be relocated by the contractor as part of the roadway project, as shown on the relocation plans, by going around the drainage structures with a 12" water main and tying back into the existing 12" water main. There are also five existing service connections to reconnect.

DIXIE HIGHWAY STA. 681+26.21 TO STA. 681+56.86 RT. – An existing 12" D.I. water main shall be relocated within the indicated station limits to go around a proposed drainage structure. The existing 12" D.I. water main runs parallel to Dixie Highway approximately 24' Rt. of the centerline. The existing main will be relocated by the contractor as part of the roadway project, as shown on the relocation plans, using 45 degree bends to go around the proposed drainage structure and then tie back into the existing main.

DIXIE HIGHWAY STA. 692+12.29 RT - The existing fire hydrant at Station 692+12.29, 27.21" Rt. is to be removed. A new fire hydrant assembly, and associated work, is to be installed at Station 692+12.31, 31.72' Rt. See the relocation plans for more information.

UTILITIES AND RAIL CERTIFICATION NOTE

**JEFFERSON COUNTY, TGR 0311 034
056 0031 013-016 & 056 0031 004-020
TRANSFORMING DIXIE HIGHWAY
ITEM NO. 5-478.7**

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

No Rail Involved Minimal Rail Involved (See Below) Rail Involved (See Below)

Louisville & Indiana Railroad Co. (LIRC), Norfolk Southern Railway Co.(NS), and Paducah and Louisville Railway(PAL) all own crossings that will need to have fiber optic lines installed across their R/W.

Scope of work at each rail crossing:

15th and Broadway (LIRC): Install 144 strand Fiber Line under RR viaduct via existing duct bank.

Dixie and Standard (NS): Install 144 strand Fiber Line under RR viaduct via microtrenching (sawcutting roadway to a depth of 12" deep and approx.. 1.5" wide and install microduct bank). Backfill trench according to Louisville Metro Microtrenching spec.

Dixie and Appleton (PAL): Install 144 strand fiber line under the RR via jack and bore. Details of sizes contingent on specific RR requirements.

Dixie and Howard (LIRC): Install 144 strand fiber line under the RR via jack and bore. Details of sizes contingent on specific RR requirements.

The contractor shall not work on any Railroad right-of-way until all permits and agreements are in place. These agreements are being worked on now, and should be in place before the end of 2017.

Once the agreements are in place, Contractor shall coordinate with the Railroad for all utility work on or near Railroad right of way.

UNDERGROUND FACILITY DAMAGE PROTECTION – BEFORE YOU DIG

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

UTILITIES AND RAIL CERTIFICATION NOTE

**JEFFERSON COUNTY, TGR 0311 034
056 0031 013-016 & 056 0031 004-020
TRANSFORMING DIXIE HIGHWAY
ITEM NO. 5-478.7**

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

SPECIAL CAUTION NOTE – PROTECTION OF UTILITIES

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

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

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

AREA UTILITIES CONTACT LIST

<u>Utility Company/Agency</u>	<u>Contact Name</u>	<u>Contact Information</u>
1. LG&E KU (Electric) 820 West Broadway Louisville, KY 40202 LG&E Emergency Number (502) 589-1444 LG&E and KU Emergency Number 1-800-331-7370	Greg Geiser	work: (502) 627-3708 Greg.Geiser@LGE-KU.com

UTILITIES AND RAIL CERTIFICATION NOTE

**JEFFERSON COUNTY, TGR 0311 034
056 0031 013-016 & 056 0031 004-020
TRANSFORMING DIXIE HIGHWAY
ITEM NO. 5-478.7**

2. LG&E (Gas)
820 West Broadway
Louisville, KY 40202
Gas Emergency Number (502) 589-5511
LG&E and KU Emergency Number 1-800-331-7370

Greg Geiser
work: (502) 627-3708
Greg.Geiser@LGE-KU.com
3. Louisville Water Company
550 South Third Street
Louisville, KY 40202

Daniel Tegene, PE
(502) 569-3649
DTegene@LWCky.com
4. Louisville & Jefferson County MSD
700. W. Liberty Street
Louisville, KY 40203

David Johnson
(502) 540-6434
David.Johnson@louisvillemsd.org
5. Spectrum (Time Warner)
4701 Commerce Crossings Dr.
Louisville, KY 40229

Deano Barber
(502) 357-4376 – Office
Deano.Barber@spectrum.com
6. AT&T KY
3719 Bardstown Rd.
Louisville, KY 40218

Scott Roche
(502) 348-4528
sr8832@att.com
7. Level 3 Communications (Transmission)
715 S. 8th St.
Louisville, KY 40202

Kevin Webster
Kevin.Webster@Level3.com
502-777-8622
Cell (502)777-8622
Fax (502)561-6950

Level 3 Communications (Distribution)
962 South Third Street
Louisville, KY 40203

Mark Sewell
Mark.Sewell@Level3.com
Office (502)515-9142
Cell (502)295-0939

Relocations
Level3.networkrelocations@level3.com
Send to Relocations Email

UTILITIES AND RAIL CERTIFICATION NOTE

**JEFFERSON COUNTY, TGR 0311 034
056 0031 013-016 & 056 0031 004-020
TRANSFORMING DIXIE HIGHWAY
ITEM NO. 5-478.7**

- | | | |
|-----------|---|--|
| 8. | Marathon Pipeline, LLC
539 S Main St, Rm 7642
Findlay, OH 45840 | David Wisner
DSWisner@MarathonPetroleum.com
(419) 421-2211 |
| 9. | City of Shively, KY
4900 Mark Jones Way
Shively, KY 40216 | John Haywood
john.haywood@shivelyky.gov
(502) 449-4749 |

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

5-478.7- Transforming Dixie Highway- US 31W

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:

Louisville Water Company – requires pre-qualification in 4” to 16” Ductile Iron Water Mains

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

When the list of approved subcontractors for the utility work is not provided in these general notes, the utility work can be completed by the prime contractor. If the prime contractor chooses to subcontract the

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

CONTRACT ADMINISTRATION RELATIVE TO UTILITY WORK

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

SUBMITTALS AND CORRESPONDENCE

All submittals and correspondence of any kind relative to utility work included in the road contract shall be directed to the KYTC Section Engineer, a copy of which 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.

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

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

STATIONS AND DISTANCES

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

RESTORATION

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

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

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

MATERIAL

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

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

Louisville Water Company - No materials are being supplies by the Louisville Water Company. All material 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.

LWC PreQualified Contractors by Selected Category(ies)

Contractors Listed are prequalified in the Categories you requested:

<p>ALL of these designated Categories:</p>	<p>ANY of these designated Categories:</p> <p>4" - 16" Ductile Iron Water Mains</p>
---	--

Bid Number **Amount Required:**

\$1.00

Advanced Paving & Construction Co.

Mr. Daniel Lee
 P O Box 125 PO Box 125
 Eastwood KY 40018

MBE No **WBE** Yes **HBE** No
Phone Number (502) 245-8935
Fax Number (502) 244-3620
Email Address advancedpaving@aol.com

American Contracting & Services, Inc.

Mr. Roy Zimmerman
 6200 E. Highway 62, Building 2503
 Jeffersonville IN 47130

MBE No **WBE** No **HBE** No
Phone Number 8122854123
Fax Number (812) 280-4415
Email Address rzimmerman@hughesgrp.com

Basham Construction & Rental Co.

Mr. Randall Basham
 1102 South Park Road
 Fairdale KY 40118

MBE No **WBE** No **HBE** No
Phone Number (502) 961-9001
Fax Number (502) 961-0998
Email Address bashamconst@yahoo.com

Buky Golf, Inc. dba Buky Construction

Mr. Greg Buky
 522 Bethel Church Road P.O. Box 105
 Mount Washington KY 40047

MBE No **WBE** No **HBE** No
Phone Number 5025922367
Fax Number 5025383193
Email Address Gbuky@aol.com

C Squared, Inc.

Mr. Chris Eichberger
 7321 St. Andrews Church Road
 Louisville KY 40214

MBE No **WBE** No **HBE** No
Phone Number (502) 363-0069
Fax Number (502) 363-2333
Email Address Chris@csquaredinc.com

Cleary Construction Inc.

Mr. Ryan Cornwell
2006 Edmonton Road
Tompkinsville KY 42167
MBE No WBE No HBE No
Phone Number 270-487-1784
Fax Number 270-487-8029
Email Address ryancomwell@clearyconst.com

Cottongim Enterprises, Inc.

Ms. Sara Day
5010 E. State Road 56
Salem IN 47167
MBE No WBE No HBE No
Phone Number 8128836602
Fax Number 8128836668
Email Address sd@8836602.com

Culver & Associates, Inc.

Ms. Kim Culver
7212 Ridge Creek Road
Louisville KY 40291
MBE No WBE No HBE No
Phone Number 5025506054
Fax Number (502) 491-8099
Email Address sculver@twc.com

Dan Cristiani Excavating Co., Inc.

Mr. Dan Cristiani President
P O Box 2427
Clarksville IN 47131-2427
MBE No WBE No HBE No
Phone Number 5025581500
Fax Number (812) 282-9908
Email Address dan@dcexc.com

Debbie Sutherland Excavating

Ms. Debbie Sutherland
585 Browningtown Road
Shepherdsville KY 40165
MBE No WBE Yes HBE No
Phone Number (502) 955-7161
Fax Number (502) 543-3583
Email Address internet1921@windstream.net

Dirt Design Construction

Ms. Crystal C. Robison President
1214 Bells Mill
Shepherdsville KY 40165-8964
MBE No WBE Yes HBE No
Phone Number 5026648801
Fax Number 5029559363
Email Address robison.crystal@yahoo.com

Excel Excavating, Inc.

Mr. Mike Flynn
5710 Utica Sellersburg Road
Sellersburg IN 47172
MBE No WBE No HBE No
Phone Number 8122074884
Fax Number
Email Address mikeflynn@excelexcavating.com

E-Z Construction Company, Inc.

Mr. Timothy Dues Vice-President
7420 Distribution Drive
Louisville Ky 40258
MBE No WBE No HBE No
Phone Number (502) 937-6855
Fax Number (502) 937-9726
Email Address timdues@ezconst.com

Fer-Pal Construction USA, LLC

Mr. Frank Garcea
26187 Northline Road
Taylor MI 48180
MBE No WBE No HBE No
Phone Number 7349462034
Fax Number 7349462036
Email Address fgarcea@ferpalinfrastructure.com

Filcon Construction LLC

Mr. Tim Filiatreau
915 Deatsville Rd
Cox's Creek KY 40013
MBE No WBE No HBE No
Phone Number 502-349-3222
Fax Number 502-349-9110
Email Address filcon@bardstown.com

Flynn Brothers Contracting, Inc.

Mr. Jason Rice
P O BOX 32065
Louisville KY 40232
MBE No WBE No HBE No
Phone Number (502) 364-9100
Fax Number (502) 363-1646
Email Address jrice@flynnbrothers.com

G.B.M.C., Inc.

Ms. Leath White
564 Eastern Blvd.
Clarksville IN 47129
MBE No WBE No HBE No
Phone Number 8122827740
Fax Number 812-282-7773
Email Address GBMCINC82@AOL.COM

Garney Companies, Inc.

Mr. Stephen Ford
200 Crutchfield Avenue
Nashville TN 37210
MBE No WBE No HBE No
Phone Number 6153507975
Fax Number 6153506067
Email Address sford@garney.com

Hall Contracting of Kentucky, Inc.

Mr. Richard Shutt
3800 Crittenden Drive
Louisville KY 40209
MBE No WBE No HBE No
Phone Number 5029923724
Fax Number (502) 361-5771
Email Address rshutt@halky.com

Herrick Company, Inc.

Ms. Donna Herrick
1385 Tracy Rd.
Lawrenceburg KY 40342

MBE No WBE No HBE No
Phone Number 502-839-3484
Fax Number 502-839-0939
Email Address hci@dcr.net

Howell Contractors, Inc.

Mr. Paul Bricking
980 Helen Ruth Drive
Ft. Wright KY 41017

MBE No WBE No HBE No
Phone Number 8593315457
Fax Number 8593316768
Email Address pbricking@howellcontractors.com

Hubert Excavating & Construction

Mr. Lance Hubert
2590 Bondville Road
Salvisa KY 40372

MBE No WBE No HBE No
Phone Number 5026801281
Fax Number
Email Address hubertexcavating@gmail.com

Hussung Mechanical Contractors Inc. (HMC)

Mr. Floyd Springer
6913 Enterprise Drive, Suite B
Louisville KY 40214

MBE No WBE No HBE No
Phone Number 502-375-3500
Fax Number 5023752377
Email Address springerf@hussung.com

Infrastructure Systems, Inc.

Mr. Devin C. Schmidt
260 W. Vincennes St.
Orleans IN 47452

MBE No WBE No HBE No
Phone Number (812) 865-3309
Fax Number (812) 865-3009
Email Address dschmidt@netsurfusa.net

J. Fletcher Creamer & Son, Inc.

Mr. Robert A. Flock
1701 East Linden Ave
Linden NJ 07036

MBE No WBE No HBE No
Phone Number 9089865688
Fax Number 9089253350
Email Address rflock@jfcson.com

Jeff Robards Construction Inc.

Mr. Jeff Robards
4320 North Preston Highway
Shepherdsville KY 40165

MBE No WBE No HBE No
Phone Number 502-957-5909
Fax Number 5029575977
Email Address jrobards@jrc-inc.com

K. Hayes Limited

Mr. Kunte Hayes, President
431 S. Broadway, Suite 332
Lexington KY 40508
MBE Yes WBE No HBE No
Phone Number 8593338887
Fax Number 8594750170
Email Address kunte@khayeslimited.com

Kelsey Construction, LLC

Mr. Gobel Newsome
212 Cedar Grove Road
Shepherdsville KY 40165
MBE No WBE No HBE No
Phone Number (502) 955-1410
Fax Number (502) 921-9092
Email Address gobel@kelseyconstruct.com

Larry Clark Construction, Inc.

Mr. Larry Clark President
5427 Bardstown Road, Suite 2
Louisville KY 40291
MBE No WBE No HBE No
Phone Number (502) 239-8400
Fax Number (502) 231-1700
Email Address LCC5427@yahoo.com

Lawrence Construction & Leasing, Inc.

Mr. Timothy Mahoney,
460 Shortland Drive
Walton KY 41094
MBE No WBE No HBE No
Phone Number (859) 586-5758
Fax Number (859) 586-5594
Email Address lawrence.construction@outlook.com

Layne Heavy Civil, Inc. (FKA - Reynolds, Inc.)

Mr. Les Archer, President
4520 North State Rd. 37
Orleans IN 47452
MBE No WBE No HBE No
Phone Number (812) 865-3232
Fax Number (812) 865-3075
Email Address Mike.green@layne.com and lisa.sowder@layne.com

Louis D. Powell Excavating, Inc.

Ms. Vicky Powell
2200 Elder Park Road
LaGrange KY 40031
MBE No WBE No HBE No
Phone Number 5022229940
Fax Number 5022650155
Email Address powell.louis@twc.com

Louisville Paving Company, Inc.

Mr. Doug Wood
1801 Payne St.
Louisville KY 40206
MBE No WBE No HBE No
Phone Number (502) 583-1726
Fax Number (502) 583-6375
Email Address dougw@loupaving.com

MAC Construction & Excavating Inc.

Mr. Bryan Winslow
1908 Unruh Court
New Albany IN 47151-6787
PO Box 6787
New Albany IN 47151-6787
MBE No WBE No HBE No
Phone Number (812) 941-7895
Fax Number 8129410699
Email Address bryanw@macconstruction.com

Martin Contracting Inc.

Mr. Shawn Martin
2371 Irvine Road
Richmond KY 40475
President
shawn.martin@martincontracting.net
MBE No WBE No HBE No
Phone Number 8596230112
Fax Number 8596260822
Email Address shawn.martin@martincontracting.net

Miller Pipeline Corporation

Mr. Kevin Miller
8850 Crawfordsville Rd.
Indianapolis IN 46234
President
Kevin.Miller@millerpipeline.com
MBE No WBE No HBE No
Phone Number (317) 293-0278
Fax Number (317) 293-8502
Email Address Kevin.Miller@millerpipeline.com

PACE Contracting LLC

Mr. Tom Wood
200 Willinger Lane
Jeffersonville IN 47130
tomwood@pacecontractingllc.com
MBE No WBE No HBE No
Phone Number (812) 283-5784
Fax Number (812) 283-5795
Email Address tomwood@pacecontractingllc.com

Phillips Brothers Construction, LLC

Mr. Clifton Smith
120 Insanity Lane
Vine Grove KY 40175
estimating@phillipsdirt.com
MBE No WBE No HBE No
Phone Number 2708776303
Fax Number 2708776305
Email Address estimating@phillipsdirt.com

Phillips Construction, LLC

Mr. Robert Phillips
3649 Highway 41A
Henderson KY 42420
President
rphillips@phillipsllc.net
MBE No WBE No HBE No
Phone Number 2708306773
Fax Number 2708309866
Email Address rphillips@phillipsllc.net

RAM Engineering & Construction, Inc.

Mr. Richard Chilton,
3208 Woodland Avenue
Louisville KY 40251-0549
PO Box 11549
Chilton, KY 40251-0549
debbie.madden@chiltongroup.com
MBE No WBE No HBE No
Phone Number (502) 778-6484
Fax Number (502) 778-3551
Email Address debbie.madden@chiltongroup.com

Riley Contracting Inc.

Mr. Tavis Riley, OH 44857
2835 US HWY 250 South Norwalk
Norwalk
MBE No WBE No HBE No
Phone Number 4196688482
Fax Number 4196685083
Email Address tavis@rileytrenchless.com

S. J. Louis Construction, Inc.

Mr. Jaime Woods MN 56369-0459
1351 Broadway Street W P. O. Box 459
Rockville
MBE No WBE No HBE No
Phone Number 3202539291
Fax Number 3202533533
Email Address jaimew@sjlouis.com

Sang Corporation

Ms. Debra Silva KY 40213
4574 Melton Avenue
Louisville
MBE Yes WBE No HBE No
Phone Number (502) 368-0315
Fax Number (502) 367-0256
Email Address dsilva_sangcorp@yahoo.com

Scott & Ritter, Inc.

Mr. Luke Ritter KY 42102-0749
2385 Barran River Rd. P.O. Box 749
Bowling Green
MBE No WBE No HBE No
Phone Number 2707819988
Fax Number 2707823267
Email Address lukeritter@scottandritter.com

Sedam Contracting Co., LLC

Mr. Rod Kiefer, IN 47243
302 W. Lagrange Rd. Hanover
President
MBE No WBE No HBE No
Phone Number 8128665607
Fax Number 8128665625
Email Address linda@sedamllc.com

Smith Contractors, Inc.

Ms. Vondra Guffey, KY 40342
1241 Bypass North P O Box 480
Lawrenceburg
MBE No WBE No HBE No
Phone Number (502) 839-4196
Fax Number (502) 839-8348
Email Address vg@sci82.com

Southern Pipeline Construction Co.

Ms. Beverly Goebel KY 40219
1272 Old Fern Valley Road
Louisville
MBE No WBE Yes HBE No
Phone Number 5029665195
Fax Number 5029665122
Email Address BeverlyG@soupipe.com

S-Walk Inc. dba Seven Seas Construction

Mr. Soran Walker President
Louisville KY 40256 P.O. Box 16997
MBE Yes WBE Yes HBE No
Phone Number 5022317395
Fax Number 5024099582
Email Address swalker@sevensc.net

T & C Contracting, Inc.

Mr. Dave Amlung
Louisville KY 40272 PO Box 72398
MBE No WBE No HBE No
Phone Number 5029373433
Fax Number (502) 937-8636
Email Address dave@tcky.biz

Tom Brown Construction Co., Inc.

Mr. Tom Brown
Louisville KY 40214 7965 National Turnpike
MBE No WBE No HBE No
Phone Number 5023610666
Fax Number (502) 367-7049
Email Address BrownTomConstruc@bellsouth.net

TSI Construction

Mr. Ed Morris
New Albany IN 47151 2325 Green Valley Road, Suite 103
MBE No WBE No HBE No
Phone Number 8129486691
Fax Number 8129480266
Email Address emorris@tsiconstructioninc.com

United Construction & Design, LLC

Mr. Thomas Luetzow President
Louisville KY 40245 11112 Oakhurst Road
MBE No WBE No HBE Yes
Phone Number 5029040202
Fax Number 5029040239
Email Address T.Luetzow@ucd.cc

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

LOUISVILLE WATER COMPANY
TECHNICAL SPECIFICATIONS AND
STANDARD DRAWINGS FOR
PIPELINE CONSTRUCTION
2008



LOUISVILLE WATER COMPANY
LOUISVILLE, KENTUCKY

GREGORY C. HEITZMAN – PRESIDENT
JAMES H. BRAMMELL – VICE PRESIDENT, CHIEF ENGINEER

LOUISVILLE WATER COMPANY
TECHNICAL SPECIFICATIONS AND STANDARD DRAWINGS
FOR PIPELINE CONSTRUCTION
2008

The Technical Specifications and Standard Drawings are provided as a technical resource for the construction of water projects managed and contracted by the Louisville Water Company. The Technical Specifications and Standard Drawings will apply to water projects with 4-inch through 20-inch pipeline sizes. All work shall be performed in accordance with accepted workmanship practices and the Technical Specifications and Standard Drawings.

The Technical Specifications and Standard Drawings revisions shall become effective immediately upon formal adoption by the Chief Engineer of the Louisville Water Company and shall supercede all former Technical Specifications and Standard Drawings for water construction. Revisions are planned on a 5 year cycle. A copy of the current edition of the Technical Specifications and Standard Drawings may be obtained from the Chief Engineer at the 550 S. Third St. office or from the LWC Resource Coordinator, Construction Inspection Services at the 4801 Allmond Ave. office.

The Technical Specifications and Standard Drawings are under the direction of the President and Vice President / Chief Engineer on behalf of the Louisville Water Company and no part of the Technical Specifications and Standard Drawings may be reproduced or copied in any form without the written prior consent of the President or Vice President / Chief Engineer.

TABLE OF CONTENTS FOR TECHNICAL SPECIFICATIONS FOR PIPELINE CONSTRUCTION

<u>SECTION</u>	<u>PAGE</u>
1. General Requirements.....	T - 1
1.1 Pre-construction Valve Inspection.....	T - 1
1.2 Project Identification and Contractor Signs.....	T - 2
1.3 Traffic Control, Permits and Regulations.....	T - 2
1.3.1 Traffic Control.....	T - 2
1.3.2 Encroachment Permits.....	T - 3
1.3.3 Crossing of Roads.....	T - 4
1.3.4 Parking Meter Permit.....	T - 4
1.3.5 Soil Erosion and Sediment Control Permit.....	T - 4
1.3.6 Stream – Wetland Crossing Permit.....	T - 6
1.4 Project Drawings and Specifications.....	T - 7
1.4.1 General.....	T - 7
1.4.2 Combined Specification.....	T - 8
1.5 Daily Materials Installed Form.....	T - 8
1.6 Video Recording.....	T - 8
2. Conduct of Work.....	T - 8
2.1 Safety.....	T - 8
2.2 Jobsite / Work Area Cleanliness.....	T - 9
2.3 Cooperation.....	T - 9
3. Site Work.....	T - 10
3.1 Utilities.....	T - 10
3.1.1 General.....	T - 10
3.1.2 Utilities In Conflict with the Pipeline.....	T - 10
3.1.3 Utilities Parallel to the Pipeline.....	T - 11
3.1.4 Water/Sewer Main Separation.....	T - 11
3.1.5 Water Service Line depth and Water Service / Sewer Separation.....	T - 12
3.2 Laying Out the Work.....	T - 12
3.3 Stakes.....	T - 13
3.4 Temporary Contractor Facilities.....	T - 13
3.4.1 Power.....	T - 13
3.4.2 Heat and Enclosures.....	T - 13
3.4.3 Light.....	T - 13
3.4.4 Water.....	T - 14
3.4.4.1 Temporary Water Service.....	T - 14
3.4.4.2 Water Uses excluded in Temporary Water Service.....	T - 15
3.4.5 Temporary Toilets.....	T - 15
3.4.6 Temporary Fencing.....	T - 15
3.4.7 Contractor Communications.....	T - 15

4.	Pipeline Materials	T - 16
4.1	Pipe and Fittings.....	T - 16
4.1.1	Pipe and Fittings Furnished by the Company	T - 16
4.1.2	Pipe and Fittings Furnished by the Contractor.....	T - 16
4.2	Furnished to the Contractor.....	T - 16
4.2.1	Materials.....	T - 16
4.2.2	Requisition and Return of Materials	T - 17
4.2.3	Loading and Unloading Procedures	T - 18
4.2.4	Equipment	T - 18
4.3	Storage of Polyvinyl Chloride (PVC)_Pipe	T - 18
5.	Excavation	T - 19
5.1	Rock Excavation	T - 19
5.1.1	Definition of Rock	T - 19
5.1.2	Trench Dimensions	T - 19
5.2	Rock Soundings	T - 19
5.3	Rock Blasting Requirements.....	T - 19
5.4	Excavation in Streets and Parking Areas	T - 20
5.4.1	Procedure.....	T - 20
5.4.2	Twelve-Inch (12”) Cutback Requirement.....	T - 20
5.4.3	Plating	T - 21
5.4.3.1	Traveled Lanes	T - 21
5.4.3.2	Non-Traveled Lanes.....	T - 21
5.5	Trenching	T - 21
5.5.1	General	T - 21
5.5.2	Alignment and Grade	T - 22
5.5.3	Trench Width	T - 22
5.5.4	Trench Depth.....	T - 22
5.5.5	Minimum Clearances	T - 23
5.5.6	Contaminated Soil	T - 23
5.5.7	Preservation of Landscape	T - 24
5.5.8	Preservation of Historical Construction Materials	T - 24
5.5.9	Preservation of Boundary Monuments	T - 25
5.5.10	Archaeological	T -
25		
6.	Installation	T - 25
6.1	Handling Pipe and Appurtenances.....	T - 25
6.1.1	General	T - 25
6.1.2	PVC (polyvinyl chloride) Pipe.....	T - 26
6.2	Installing Pipe and Appurtenances.....	T - 26
6.2.1	General	T - 26
6.2.2	PVC (polyvinyl chloride) Pipe	T - 27
6.2.3	Ductile Iron Pipe	T - 27

6.3	Boring and Tunneling	T - 28
6.4	Mechanical and Push-on Joint Assembly	T - 29
6.4.1	General	T - 29
6.4.2	Mechanical Joint	T - 30
6.4.3	Push-on Joint	T - 30
6.4.4	Field Cut Pipe.....	T - 31
6.5	Tie-ins to Existing Mains.....	T - 32
6.6	Transition of Pipe Materials (Ductile Iron Pipe and PVC Pipe)	T - 32
6.7	Removal of Asbestos-Cement (AC or Transite) Pipe	T - 33
6.8	Setting Cast Iron Valves and Fittings	T - 33
6.9	Polyethylene Wrap for Ductile Iron Pipe and Fittings.....	T - 34
6.10	Installation of Tracing Wire and Identification Ribbon for PVC Pipe	T - 35
6.11	Cast Iron Frames and Lids	T - 35
6.12	Valve Boxes	T - 35
6.13	Plugging Ends of Pipe.....	T - 36
6.14	Thrust Anchors, Counterweights, and Restrained-Joint Hardware	T - 36
7.	Backfilling Procedures and Tamping	T - 37
7.1	General	T - 37
7.2	Acceptable Backfill Materials.....	T - 38
7.2.1	Pit Run Sand (Natural Sand).....	T - 38
7.2.2	Dense Grades Aggregate (Kentucky DGA or Indiana #73).....	T - 38
7.2.3	Flowable Fill (Controlled Low Strength Cementitious Material).....	T - 38
7.2.4	Manufactured Sand (Kentucky 3/8” Manufactured Sand).....	T - 39
7.2.5	Kentucky #57 Stone (or Indiana #8 Stone)	T - 39
7.2.6	Kentucky #3 Stone (or Indiana #2 Stone).....	T - 39
7.2.7	By-product of trench rock excavator.....	T - 39
7.3	Un-Acceptable Backfill Materials	T - 40
7.4	Bedding	T - 40
7.5	Initial Backfilling	T - 40
7.6	Final Backfilling	T - 41
8.	Placing Water Main In Service.....	T - 41
8.1	General	T - 41
8.2	Filling and Disinfection of the Water Main	T - 42
8.2.1	Filling of the Water Main.....	T - 42
8.2.2	Disinfection of the Water Main.....	T - 42
8.3	Pig Cleaning and Flushing the Water Main	T - 44
8.3.1	Pig Cleaning the Water Main.....	T - 44
8.3.2	Flushing the Water Main.....	T - 45
8.4	Discharge of Hyperchlorinated Water	T - 45
8.5	Pressure and Leakage Test.....	T - 46
8.6	Coliform Monitoring.....	T - 47
8.7	Air Relief Valves	T - 48

8.7.1	Automatic Air Relief Valves.....	T - 48
8.7.2	Manual Air Relief Valves	T - 48
8.8	Leak Detection By-Pass Meter at Underwater Crossings.....	T - 48
9.	Fire Hydrant.....	T - 49
9.1	Materials and Installation.....	T - 49
9.2	Drainage Pit.....	T - 51
9.3	Removal of Fire Hydrants.....	T - 51
9.3.1	Removal of Fire Hydrants on Active Water Mains	T - 51
9.3.2	Removal of Fire Hydrants on Abandoned Water Mains	T - 52
10.	Service Work	T - 52
10.1	Notification of Customers.....	T - 52
10.2	Service Installation - General.....	T - 52
10.3	Small Service Installation – Two Inches (2”) and Smaller.....	T - 53
10.3.1	Tapping Ductile Iron – Pressure Class 350 Pipe for Small Service Installation – Two Inches (2”) and Smaller	T - 54
10.3.2	Tapping PVC for Small Service Installation – Two Inches (2”) and Smaller	T - 55
10.3.3	Tapping Ductile Iron Class 54 & 56 Pipe and Cast Iron Pipe for Small Service Installation – Two Inches (2”) and Smaller.....	T - 56
10.4	Large Service Installation – Larger than Two Inches (2”)	T - 57
10.4.1	Tapping Ductile Iron – Pressure Class 350 Pipe for Large Service Installation – Larger than Two Inches (2”)	T - 57
10.4.2	Tapping PVC for Large Service Installation – Larger than Two Inches (2”)	T - 58
10.4.3	Tapping Ductile Iron Class 54 & 56 Pipe and Cast Iron Pipe for Large Service Installation – Larger than Two Inches (2”)	T - 59
10.5	Setting Meter Vaults	T - 59
10.6	Pressure Regulators (Pressure Reducing Valves).....	T - 60
10.7	Leak Testing the Service.....	T - 60
10.8	Relocate Service.....	T - 60
10.9	Renew Service.....	T - 61
10.10	Transfer Service	T - 62
10.11	Discontinue Service	T - 62
10.12	Service Excavation at Main	T - 63
10.13	Backfill Meter Vault	T - 63
10.14	Potential Shock Hazard.....	T - 64
10.15	Cutting Lead Pipe.....	T - 64
10.16	Flushing of Lead Services.....	T - 64
10.17	Lead Service Renewal Notification	T - 65
11.	Restoration	T - 65
11.1	General	T - 65

11.2	Bituminous Paved Surfaces (Asphalt)	T - 66
11.3	Asphalt Materials and Construction Methods.....	T - 67
11.4	Concrete Paved Surfaces (Portland Cement Concrete).....	T - 67
11.5	Concrete Materials and Construction Methods (Portland Cement Concrete)	T - 68
11.6	Unpaved Surfaces	T - 68
11.7	Site Clean Up	T - 69
12.	Warranty	T - 70
13.	Additional Contract Definitions, Abbreviations and Technical References	T - 70
13.1	Additional Contract Definitions.....	T - 70
13.2	Abbreviations	T - 71
13.3	Technical References	T - 72
14.	Technical Design and Construction Standards	T - 73
	Appendix of Standard Drawings for Pipeline Construction	T - 84

No part of the Drawings or Technical Specifications may be reproduced or copied in any form without the written prior consent of The Louisville Water Company.

TECHNICAL SPECIFICATIONS **FOR PIPELINE CONSTRUCTION**

1. GENERAL REQUIREMENTS

1.1 Pre-construction Valve Inspection

Prior to the beginning of construction, the Contractor shall be responsible for locating and inspecting all existing valves associated with the work to be done. Specific valves and locations are shown in the table and on the valve cards which are a part of the **SUPPLEMENTARY SPECIFICATIONS**. Inspection work to be done on these valves shall be included in the Contractor's base bid, and shall consist of the following:

- A. Locate the valve in the field. Valve boxes that are paved over or buried shall be uncovered and made accessible.
- B. Inspect keytubes and operating nut. Keytubes shall be cleared of debris and the operating nut made accessible. Gate Keys must be placed and turned on Gate Valve Operating Nuts to ensure the functional operation of the valve. Company Inspector must be present when operating gate valves.
- C. Valve boxes (round tops) and lids shall be raised to grade where necessary.

Any valve determined by the Company to be inoperative shall be excavated and repaired or replaced by the Contractor as deemed necessary by the LWC Project Manager. Unit costs shall be as submitted by the Contractor in the **BIDDER'S PROPOSAL** form.

Except in cases of emergency, the Contractor shall not operate any valve without the direct supervision of the LWC Project Manager or Company Inspector. In an emergency, the Company Inspector and Company Radio Room shall be immediately notified by the Contractor. The Company Radio Room Direct Phone Line is (502) 368-0127.

1.2 Project Identification and Contractor Signs

The Contractor is required to install a 4 ft. x 8 ft. double-faced sign on each end of the project limits, unless on dead end roads where only one sign will be required. The sign shall be furnished by the Company and consist of a 4 ft. x 8 ft. sheet of one quarter inch (¼") corrugated plastic board. The Contractor shall supply the materials to install the sign using two (2) – four inches (4") x four inches (4") x ten feet (10') posts set in concrete anchors (eighteen inches (18") diameter and three feet (3') depth, primed and painted white.

The Contractor shall supply the materials to mount the sign to the posts using three (3) – two and one-half inches (2 ½") galvanized lag bolts with one inch (1") diameter galvanized washers on each post. A sign shall be mounted on both sides of the posts visible from traffic in both directions. The Contractor must install the signs prior to beginning any work and not remove the signs until final restoration is approved. Project Identification signs may not be required on new development projects on non-public roadways.

The Contractor is required to display LWC Contractor magnetic signs on both sides of all licensed vehicles when performing LWC project contract work. Company Inspectors will assign and collect magnetic signs on a project basis.

1.3 Traffic Control, Permits, and Regulations

1.3.1 Traffic Control

Wherever the excavation is in paving, the Contractor shall so conduct their operations that at least one lane of traffic is kept open at all times. Where the excavation is performed in an intersection, the work shall be completed in one work day, including backfilling and temporary bituminous pavement; temporary paving restoration shall be adequately maintained until permanent pavement is placed.

Traffic control shall be in accordance with the Federal Highway Administration Part VI of the Manual on Uniform Traffic Control Devices (MUTCD) latest edition.

Traffic control on streets shall be in accordance with requirements of appropriate City or County jurisdiction.

Traffic control on County streets shall be approved by the County Engineer.

Specific signing and traffic control is incidental to this project and will be set up at the pre-construction conference with representatives from the appropriate agencies. No extra payment will be made for placement of these traffic controls.

1.3.2 Encroachment Permits

Applicable permits shall be obtained by the Company from the appropriate agency: Louisville / Jefferson County Metro Government-Metro Works, Louisville and Jefferson County Metro Parks, Bullitt County Public Works Department, Oldham County Public Works Department, and / or Kentucky Department of Highways for installing water mains in public thoroughfares. The Contractor shall coordinate their time schedule for performing this work with the LWC Project Manager in order that the appropriate authority can be notified of the progress of construction. Special attention is directed to the working hours as specified by any of these traffic control departments in their respective permit.

A minimum fourteen (14) day advance notice of the need for a permit shall be provided to the LWC Project Manager. Copies of the permit(s), along with the approved traffic control plan, shall be on-site, readily available, legible and displayed in construction vehicles used at the project site. The Contractor will be responsible for obtaining appropriate permits for Joint-Bid Projects (i.e. Kentucky Transportation Cabinet (KTC) Projects, MSD Projects, or Developer Installed Projects, etc.)

The Contractor shall submit a traffic control plan to the LWC Project Manager with the request for the permit. As a minimum, the traffic control plan shall include lanes to be blocked, "No Parking" zones to be created, parking meters to be "bagged", method of controlling traffic, designated work hours, and proposed work schedule. Contractors must use certified traffic control devices and not deviate from the approved Traffic Control Plans unless directed by the Jurisdictional Authority and any such deviation shall be documented.

Unless specifically approved by the Permitting Agency, all roadways (including side roads) shall remain open, with traffic maintained in a safe manner. Outside the designated work hours, all travel lanes shall be temporarily restored and reopened to traffic, and all construction vehicles, equipment, and personnel removed from the roadway.

1.3.3 Crossing of Roads

With respect to all roadways, any and all water main crossings, fire hydrant crossings, and/or service crossings shall be bored, jacked, or tunneled as specified within these Contract Documents. Any alteration(s) to the above shall require written approval from both the Louisville Water Company and the Jurisdictional Authority prior to the work being performed. Any additions and/or deletions in roadway bores/jacks/tunnels from those included in the project's scope of work shall require compensation adjustment in accordance with the **BIDDER'S PROPOSAL** form's Supplementary Unit Prices (if applicable) or with **CHANGES IN THE WORK**, in the **TERMS AND CONDITIONS** (if said Supplementary Unit Prices are not applicable).

1.3.4 Parking Meter Permit

The Contractor shall arrange for and pay for a permit as required by Louisville / Jefferson County Metro Government Ordinance Title VII Traffic Code: Chapter 72: Parking Regulations for the bagging of all parking meters affected by the construction. Issuance and enforcement are administered by the Louisville / Jefferson County Metro Government. Information may be obtained at the following address. All costs shall be included in the Contractor's base bid.

Louisville / Jefferson County Metro Government
Department of Metro Works
531 Court Place
Fiscal Court Building
Louisville, Kentucky 40202

1.3.5 Soil Erosion and Sediment Control Permit

The Contractor shall abide by and shall arrange for and pay for any and all permits involving the Kentucky Division of Water regulations pertaining to erosion and sediment control requirements as administered by the Louisville and Jefferson County Metropolitan Sewer District (MSD) where required. The Contractor shall comply with the applicable provisions of KRS Chapters 220 and 224 of the State Water Pollution Control Laws and other applicable statutes relating to the prevention and/or abatement of water pollution.

Projects involving disturbed areas of more than one (1) acre shall

require the Contractor to submit a "Notice of Intent" Letter to the Kentucky Division of Water, as well as an "Erosion and Sediment Control" plan submitted to MSD for MSD's approval where required.

In any event, regardless of the size of the project, the Contractor shall: exercise every reasonable precaution at all times to prevent water pollution by the erosion and deposition of sediment in streams, lakes, and reservoirs; conduct and schedule operations so as to avoid or minimize the muddying or siltation of areas adjacent to the construction site including streets, storm sewers, vacant lots, etc.; and not leave partially completed areas of work in a manner that will contribute to erosion during the period in which work is suspended.

For each stream crossing (a "stream" being defined as a so-called blue-line stream, either solid or broken, as shown on the United States Geological Survey (USGS) quadrangle map), the Louisville Water Company shall apply for a construction permit, or for an exemption thereto, from the Kentucky Division of Water, if applicable, (see Section 1.3.6). In any event, the Contractor shall: utilize adequate and environmentally-responsible construction practices, placing silt control prior to the start of construction and maintaining it until vegetation has been established; revegetate all disturbed areas upon completion of construction; maintain at least three and one-half feet (3 ½') of cover over the top of pipe with respect to the stream bed elevation; and obtain approval from MSD where required, prior to the start of construction, of an "Erosion and Sediment Control" plan.

LWC hereby gives notice to Contractors (and, Contractors are directed to provide notice to their employees, agents, assigns and Contractor's subcontractors, their employees, agents and assigns, and Contractor's suppliers, their employees, agents and assigns on the project site) that LWC holds an Erosion Prevention Sediment Control Plan General Permit issued by MSD, pursuant to the Louisville/Jefferson County Metro Government Code of Ordinance No. 186, Series 2007 (amending Jefferson County Ordinance Chapter 159), Erosion Prevention and Sediment Control, and, that certain activities require additional Individual Site Disturbance Permits, also issued by MSD, pursuant to the Louisville/Jefferson County Metro Government Code of Ordinance No. 186, Series 2007, Erosion Prevention and Sediment Control.

Pursuant to the requirements of that General Permit where required and any required individual site disturbance permits, LWC further gives notice to Contractors of the County's Erosion Prevention and Sediment Control Ordinance. LWC hereby expressly requires Contractors, their employees, agents, and assigns and Contractor's subcontractors, their employees, agents and assigns, and Contractor's suppliers, their employees, agents and assigns on the project site to comply with the provisions of that Ordinance and all permits, General and Individual, as part of the required compliance with "any federal, state or local government statute, ordinance, regulation and law which controls or limits in any way the actions of persons working on the project and which affects the purchase, installation, or disposition of any materials related to the project" set out in **CONTRACTOR'S RESPONSIBILITIES**, in the **TERMS AND CONDITIONS**.

This Contractor responsibility for compliance with the Erosion Prevention and Sediment Control Ordinance is in addition to those set out in **CONTRACTOR'S RESPONSIBILITIES**, in the **TERMS AND CONDITIONS**.

See Standard Drawing: 4501 in Appendix of Drawings.

1.3.6 Stream – Wetland Crossing Permit

The Kentucky Division of Water (KDOW) requires a General Water Quality Certification (W.Q.C.) Permit #12 for the crossing of streams or wetlands. It is not necessary to apply for an individual General Water Quality Certification (W.Q.C.) Permit #12 unless the stream is classified as an Outstanding, Exceptional, or Cold Water stream (Special Waters) by the KDOW. Listings of streams with these classifications can be found on the KDOW webpage:

http://nrepcapps.ky.gov/special_waters/specialwaters.htm.

For subfluvial (streams and rivers) pipe crossings, a flood plain construction permit will not be required pursuant to KRS 151.250 if the following requirements of 401 KAR 4:050 Section 2 are met:

- No material shall be placed in the stream or in the flood plain of the stream to form construction pads, coffer dams, access roads, etc. during construction of pipe crossings.
- Crossing trenches shall be backfilled as closely as possible to the original contour.

- All excess material resulting from construction displacement in a crossing trench shall be disposed of outside the flood plain.
- For erodible channels, there must be at least three and one half (3.5) feet of backfill on top of all pipe or conduit (casing) points in the crossing.
- For non-erodible channels, pipes or conduits (casing) in the crossing shall be encased on all sides by at least six (6) inches of concrete with all pipe or conduit (casing) points in the crossing at least six (6) inches below the original contour of the channel.

For subfluvial (streams and rivers) pipe crossings greater than fifteen (15) feet in width:

- The water main shall be of special construction, having flexible, restrained, or welded watertight joints.
- Valves shall be provided at both ends of the water crossings so that the section can be isolated for testing or repair.
- Valves shall be easily accessible, not subject to flooding, and if closest to the supply source, be in a manhole with permanent taps made on each side of the valve to allow insertion of a small meter to determine leakage and for sampling purposes.

See Standard Drawing: 1608 in Appendix of Drawings.

1.4 Project Drawings and Specifications

1.4.1 General

The Contractor shall make available a set of record plans and specifications at the job site at all times.

1.4.2 Combined Specification

This specification discusses the installation of ductile iron pipe, PVC (polyvinyl chloride) pipe, ductile iron appurtenances, and other project specified piping and materials.

The type of pipe to be installed is specified in the **SUPPLEMENTARY SPECIFICATIONS**. The sections "PIPELINE MATERIALS", "INSTALLATION", and "SERVICE WORK" reference pipe of either type. Whenever pipe of one type is referenced, the specification pertains to this type only. When the type of pipe is not distinguished, the specification pertains to both.

1.5 Daily Materials Installed Form

The Contractor shall maintain the Daily Materials Installed forms supplied by the Company as a record of the pipe, fittings, and valves installed each day, and shall provide same to the Company Inspector daily. Pipeline materials shall be listed on the form in the same sequence as installed.

1.6 Video Recording

Prior to the start of construction, the Contractor shall provide one (1) original walking, narrative continuous video, or equal method approved by the LWC Project Manager, of any project along existing public roads, representative of the complete project area.

The video should include narration of the video footage, verbal descriptions of the locations shown, and at a speed which clearly shows the condition of all areas which could be effected by the project construction. The video recording must be acceptable to the LWC Project Manager.

2. **CONDUCT OF WORK**

2.1 Safety

Wherever necessary, to prevent caving during the excavating of sand, gravel, sandy soil, or other unstable material, the trench shall be adequately sheeted, braced, and drained. The trench shall be maintained in accordance with OSHA regulations so that workers may work thereon safely and efficiently and vehicular and pedestrian traffic, livestock, and animals are protected at the worksite. It is essential that the trench pumps discharge into natural drainage channels or drain toward storm drains in compliance with regulatory agency requirements.

Any excavated materials to be stockpiled, shall be piled in a manner that will not endanger personnel, property, adjacent properties and pedestrians,

and will not obstruct driveways, sidewalks, or thoroughfares. Drainage lines shall not be obstructed.

With respect the entry of and/or working within confined spaces, the Contractor shall abide by the KOSHA Standards referenced by 803 KAR 2:300 thru 2:320 for General Industry and 803 KAR 2:240 thru 2:423 for Construction Standards, plus any and all additional related regulations required by the Commonwealth of Kentucky.

For questions or concerns relating to this matter, the Contractor shall contact the KOSHA–Kentucky Occupational Safety & Health Program, (phone (502) 564-3070).

2.2 Jobsite / Work Area Cleanliness

The Contractor shall routinely and regularly remove all dirt and rubbish resulting from its operations, and shall keep the jobsite or work area neat and tidy.

When its work is complete, it shall at once remove from the premises all tools and machinery belonging to the Contractor and all rubbish in connection with the work and render the jobsite or work area clean and free from all obstructions, delivering the work at completion whole, clean, tight, and ready for use, with the grounds in a neat and presentable condition.

2.3 Cooperation

The Contractor shall cooperate with local governing agencies, Kentucky Department of Highways, the Louisville Water Company, other utilities, and other Contractors to cause as little interference as possible, to avoid inconvenience and delay, and to facilitate prompt completion of the work.

The Contractor shall make special arrangements with the Company for valving off mains in the case of each connection or change in existing mains, and will conduct the work to cause the shortest possible interruption of service.

3. **SITE WORK**

3.1 Utilities

3.1.1 General

The Louisville Water Company has endeavored to locate sub-surface obstructions from available records, and such structures are shown on the project drawings. The Louisville Water Company does not guarantee the accuracy of the information there shown, although it has undertaken to present available data. The project drawings do not show the size or location of services.

Wherever the Contractor deems it necessary to determine the exact location of existing pipe, valve, or other underground structures, the Contractor may make any examinations that it may determine desirable in advance of the work and no added compensation will be paid. Only in the event that the LWC Project Manager by written order directs the Contractor to make additional exploration and excavation will extra compensation be allowed.

The Contractor's attention is directed to the Kentucky 811 (811 or 1-800-752-6007), which has been established to provide accurate locations of below-ground utilities.

The Contractor shall notify the Kentucky 811 two (2) business days in advance of any construction on this project. Additional information for Kentucky 811 can be found at www.kentucky811.org.

3.1.2 Utilities In Conflict with the Pipeline

In excavating trenches and installing pipe, where any existing utilities (including water pipe, sewer pipes, inlets and drains, gas pipes, electric lines and conduits, telephone lines and conduits, cable television lines and conduits, communication – fiber optic lines and conduits, service connections from these utilities, trolley tracks used for cathodic protection, traffic signal loop detector system or street light system), cross the trench, they shall be protected, supported, and maintained in service and restored to the condition in which they were found, all at no additional cost to the Company.

Where because of location or grade, such utilities cannot be replaced to occupy their original location, they shall be changed at no additional cost to the Company and as directed by the LWC Project Manager and utility owner to accomplish their original

purpose with adequate provision for drainage over or under the pipe as circumstances require.

Where any utility facility, including service connections, is touched or endangered by the work, the utility management shall be notified by the Contractor, and the Contractor shall cooperate with the utility and pay the cost of protection and repair if damaged.

The Contractor shall protect all abandoned trolley tracks. If abandoned trolley tracks are damaged, contact Pipeline Integrity Group of Louisville Gas and Electric Company, at (502) 627-4427, prior to the repair of any cut or damaged rail. Repair, if required, shall be as directed by Louisville Gas and Electric Company.

3.1.3 Utilities Parallel to the Pipeline

Where utilities exist parallel to the water main and at a location which will interfere with its installation, they shall be handled as follows:

A. The affected utility shall be notified at least five days in advance, if possible, of the time necessary to do the work. The cost of temporary hook-up and any charges from the utility will be paid by the Contractor unless previously authorized by the Louisville Water Company.

B. Gas, sewers, telephone, or electric facilities shall be gently uncovered, and personnel from the pertinent utility must remove its facility after accomplishing a temporary hook-up to prevent loss of service. After the water main has been placed, the utility line will be reinstalled near its original location and grade by the utility personnel, and the Contractor will complete the necessary backfill.

3.1.4 Water/Sewer Main Separation

Water mains shall be installed in accordance with Kentucky Division of Water regulations and Recommended Standards for Water Works (Ten States Standards).

Water mains shall be installed at a minimum of ten feet (10') horizontally from any existing or proposed non-storm sewer main or non-storm sewer manhole; measured from the outside diameters. ("Non-storm sewer" is defined as sanitary sewer, combined sewer,

septic tank, or subsoil treatment system.)

When crossing over or under a non-storm sewer main, the water main shall maintain one and one-half feet (1.5') vertical separation with one (1) full length of the water pipe located so that both joints of the water pipe will be as far from the non-storm sewer as possible. Special structural support for the non-storm sewer and water pipes may be required.

When ten feet (10') of horizontal separation or one and one-half feet (1.5') of vertical separation cannot be maintained, the LWC Project Manager must be notified for resolution. There shall be no deviation from the above ten feet (10') horizontal and one and one-half feet (1.5') vertical separation requirements when water pipes are crossing non-storm sewer force mains. Only in the event that the LWC Project Manager directs the Contractor by written order may changes be made to these minimum separations.

3.1.5 Water Service Line Depth and Water Service/Non-storm sewer Separation

Water service lines shall be installed at the standard depth of forty two inches (42"). Service lines crossing over or under a non-storm sewer shall maintain a minimum vertical separation of one and one-half feet (1.5').

See Standard Drawing: 1000 in Appendix of Drawings.

3.2 Laying Out the Work

The exact location of the work will be fixed by lines and elevations furnished by the LWC Project Manager on project drawings or specifications. The Contractor shall layout its own work, lines, measurements, bench marks, levels and grades, right-of-way and easement lines. The Contractor shall contact the LWC Project Manager prior to entering a property on which the pipeline is being installed in an easement to ensure that the easement has been obtained.

Unless otherwise directed by the Company Inspector, the Contractor shall complete each block of water main installation or, in the absence of intersecting streets, every 500 feet of water main installation in urban areas, every 1000 feet of water main installation in suburban / residential areas, and 1500 feet in rural areas before proceeding.

This includes chlorination, pressure testing, service work, and permanent restoration of all areas affected by the construction.

The pipelines shall be installed throughout the public rights-of-way or in

easements as indicated on the project drawings. Generally, all work must be confined to the public way or easement provided; however, the Contractor may make arrangements for more operating room at its own expense and responsibility.

The Contractor will obtain written permission for use of private property by the property owner and furnish an affidavit to the LWC Project Manager that proper arrangements are made prior to occupation of the property. Otherwise, the Contractor shall conduct its operations in a manner that will not interfere with adjacent property owners.

3.3 Stakes

The Contractor shall furnish and set all stakes necessary in laying out the location of lines and grades, shall protect all stakes by suitable guard stakes, and shall be responsible for maintenance of all stakes after set.

3.4 Temporary Contractor Facilities

3.4.1 Power

The Contractor shall arrange and pay for all power required for construction purposes.

3.4.2 Heat and Enclosures

The Contractor shall furnish at its own expense, all temporary heat and/or enclosures that may be deemed necessary.

3.4.3 Light

The Contractor shall provide and pay for temporary electric light necessary for the execution of the work. This will include all necessary wiring, fixtures, and electric bulbs. Torches or other sources of light which cause damage by fire or by smoke shall not be used.

3.4.4 Water

The Contractor shall purchase water from the Company for use in construction operations. The Contractor shall include the cost of Temporary Water Service, and cost of water purchased, in the base

bid.

3.4.4.1 Temporary Water Service

Water used by the Contractor or Company for disinfection, flushing, pressure testing, and leakage testing will be supplied by the Company.

To obtain a temporary water service meter, an application, with deposit, must be completed in Metering Services offices at 4801 Allmond Avenue between the hours 8:00am to 3:00pm Monday through Friday.

Routine questions regarding a temporary service meter or billing concerns may be directed to our Call Center, (502) 583-6610.

Use of temporary services must comply with all LWC Service Rules and Regulations. The Louisville Water Company prohibits the unauthorized use of fire hydrants and will work with law enforcement officials to pursue each incident to the extent allowed by law.

The Contractor is responsible to protect the fire hydrant meter assemblies and fire hydrant wrenches from loss and theft. Fire hydrant meter assemblies must be dismantled when not in use to protect from theft or freezing weather. Fire hydrant wrenches shall never be left unattended on a fire hydrant.

Fire Hydrants must be turned on completely open to prevent flooding through hydrant drain holes. Flow shall be regulated by the temporary meter assembly valve. The Contractor must notify the LWC Radio Room (569-3600, ext. 2700 & 2701) of all hydrants flowed between December 1 and March 15 so the hydrant can be winterized after use to prevent freezing. Some fire hydrants have a locking device attached to prevent unauthorized use.

The Contractor shall notify the LWC Project Manager or Company Inspector 48 hours in advance of the need to use such a fire hydrant so the lock can be removed by LWC personnel.

The Contractor shall immediately notify the LWC Project Manager or Company Inspector when the fire hydrant is no longer needed so the lock can be re-installed. It is the responsibility of the Contractor to properly protect the fire hydrant meter assembly, and to ensure that proper replacement techniques be applied, including placement of gasket to prevent water loss upstream of the meter.

3.4.4.2 Water uses excluded in Temporary Water Service

Any water from a fire hydrant must be metered. In some instances, the Company Inspector may approve non-metered water use (e.g. filling the main, flushing of hyper-chlorinated or potable water where practical.)

See Standard Drawing: 3600 in Appendix of Drawings.

3.4.5 Temporary Toilets

The Contractor shall provide in the vicinity of the work at locations satisfactory to the Company, and maintain in a sanitary condition, suitable temporary toilets for the use of the workers and Company personnel.

Upon completion of the work, the temporary toilets shall be removed and the premises left in a sanitary condition. The temporary toilets shall be satisfactory to the governing Board of Health jurisdiction.

3.4.6 Temporary Fencing

The Contractor shall supply and install temporary fencing when necessary to control livestock or property owner animals requiring containment. The Contractor shall make arrangements with the property owners for removal / containment of the animals during any removal of existing fencing and placement of the temporary fencing.

3.4.7 Contractor Communications

The Contractor shall supply a communication device such as a telephone, cellphone or mobile radio at the project site to allow direct communication with the LWC Project Manager or Company Inspector.

4. PIPELINE MATERIALS

4.1 Pipe and Fittings

4.1.1 Pipe and Fittings Furnished by the Company

Pipe to be furnished by the Company for this construction shall be as specified in the **SUPPLEMENTARY SPECIFICATIONS**, either PVC

(polyvinyl chloride) pipe or cement-lined ductile iron pipe, each having push-on joints, or other materials as specified by the LWC Project Manager. Fittings will be ductile iron with mechanical joints.

4.1.2 Pipe and Fittings Furnished by the Contractor

Materials provided for "Furnish and Install" projects shall be specified in the **SUPPLEMENTARY SPECIFICATIONS** and approved by the LWC Project Manager prior to installation.

The Company Inspector shall verify all materials meet project specifications prior to installation and shall so certify in writing.

The Contractor retains ownership of all Contractor furnished materials under "Furnish and Install" contracts and materials not installed cannot be returned to the Louisville Water Company.

4.2 Furnished to the Contractor

4.2.1 Materials

All PVC (polyvinyl chloride) or ductile iron pipe, bends or elbows, reducers, adapters, restraining tie rods, sleeves, rubber gaskets and other joint materials, tee bolts and gaskets for mechanical joint and special fittings, gate valves, butterfly valves, air relief valves of all sizes and descriptions including corporation cocks, copper service lines, fittings, concrete blocks, valve boxes, casing pipe, polyethylene wrap, cleaning pigs, and fire hydrants will be furnished by the Company. The Contractor shall requisition and haul, on appropriate vehicles, these materials from the Company warehouse to the points of their respective installation.

The Contractor shall protect pipe and fittings to avoid vehicle exhaust, debris, and damage during transit from the LWC warehouse to being installed.

As referenced in the current edition of the Company's "Process for Job Site Delivery of Line Pipe" Document, a copy of which is available from the LWC Project Manager, pipe delivery from the pipe manufacturer to the jobsite is available if the Contractor makes arrangements as stated in said Document.

4.2.2 Requisition and Return of Materials

The Contractor shall requisition and return materials on the

Company provided forms or warehouse computer software program, and shall account for or promptly return all materials so requisitioned.

Any unused materials shall be returned within five (5) working days after the date of completion of the work as specified by the Company Inspector. The cost of any unused materials not returned to the warehouse by this date shall be billed to the Contractor.

Below is a list of guidelines to draw or return materials from the Company's Allmond Avenue warehouse:

- A. Call (502) 569-3600, extension 3633 to make an appointment with the Warehouse. Appointments are scheduled for 30 minutes in length. Fax a copy of the materials list to the warehouse at 569-0812.
- B. Appointments, including standing appointments, will be scheduled on a first-come first-served basis. Appointments are not required for emergency situations, but must be approved by the LWC Project Manager.
- C. Issues and returns would be considered equal in regard to scheduling.
- D. Warehouse office hours are 7:30 a.m. - 4:00 p.m., Monday thru Friday (except Company holidays). Appointments are scheduled from 8:00 a.m. - 2:00 p.m.
- E. All returned material must be in the same condition as it was when issued - clean and with all accessories. Returns of dirty, corroded, and/or rusted material, and/or fittings missing accessories, or otherwise damaged shall not be accepted.
- F. The Contractor shall not return cut pieces of pipe to the LWC Warehouse. Contractors shall make best use of pipe, minimize cut pieces of pipe and shall not install more than two (2) pieces of cut pipe adjacent in a straight run. Only whole – uncut pipe may be returned to the LWC Warehouse and it must be clean and in good condition.

4.2.3 Loading and Unloading Procedures

Refer to **PIPE AND PIPE APPURTENANCES FURNISHED**

BY THE COMPANY, in the **TERMS AND CONDITIONS**.

4.2.4 Equipment

For pressure and leakage testing, the Company shall issue a test pump and meter kit to the Contractor. Contractors may furnish their own test pump if equipped with a quick-connect coupling to allow placement of the Company Inspector's pressure gauge.

The Contractor is to: notify the Gate Shop (502) 569-3600, ext. 2766, at the Warehouse at least two days in advance of the day of intended use; pick up the test pump kit between the hours to 7:30 a.m. and 3:30 p.m.; have the test pump kit for 48 hours at no charge (Saturdays and Sundays are excluded from the allowed time frame); and return the test pump kit to the Gate Shop within 48 hours of pick-up.

If outstanding for more than two days, beginning on the third day, a \$50.00/day rental fee will be charged to the Contractor; this fee shall be waived only if the Company Inspector notifies the Warehouse Office or the Gate Shop at the Warehouse of special circumstances.

The Contractor shall be held responsible for the test pump and all test kit contents, and shall be invoiced for all cleanup and/or repair costs. The Company does not loan or lease hoses and/or tools, including tapping machines.

4.3 Storage of PVC (Polyvinyl Chloride) Pipe

When storing PVC (polyvinyl chloride) pipe, caution should be exercised to avoid compression, damage, or deformation to the pipe, including the bell ends. Insure that the weight of the upper units does not cause deformation to the lower units. All pipe must be stored in a manner to prevent dirt, debris, foreign objects, or any other substance from entering the pipe.

5. **EXCAVATION**

5.1 Rock Excavation

5.1.1 Definition of Rock

Rock, for the purpose of this contract, shall mean boulders, pieces of concrete or masonry exceeding 300 pounds in weight, and solid ledge rock (usually limestone) which, in the opinion of the LWC Project Manager, requires: drilling and blasting; wedging and blasting; wedging, sledging, or barring; or breaking up with a

power operated tool for its removal. All rock shall be Unclassified. Unclassified rock shall mean any rock which has to be removed for construction and the cost of removal shall be included in the base bid price.

5.1.2 Trench Dimensions

Trench rock excavation shall be based on a trench width of eighteen inches (18") wider than the nominal diameter of the pipe, equally spaced at nine inches (9") on each side of the pipe and a trench depth of six inches (6") below the outside bottom of the pipe.

5.2 Rock Soundings

The Louisville Water Company does not know or pretend to know, nor does it undertake to state, the nature of all materials which will be necessary to excavate, in order to construct the work contemplated herein. The Contractor is advised to perform rock soundings or subsurface investigations where feasible on all projects prior to bid.

The Contractor shall assume all risks arising from, or out of, the nature of all forms of materials necessary to be excavated, except as otherwise specified.

5.3 Rock Blasting Requirements

All blasting for excavations shall be conducted by a blaster licensed in the State of Kentucky in compliance with provisions of KRS 351 and KAR 803 and 805. Blasting will be permitted only after securing the approval of the LWC Project Manager and only when proper precautions are taken for the protection of persons or property. Any damage caused by blasting, including damaged or raised pavement, shall be repaired by the Contractor at their expense.

The Contractor shall abide by all Federal, State, and Local laws and regulations regarding the storage and use of blasting materials (KRS 351 and KAR 803 and 805). The hours of blasting will be fixed by the LWC Project Manager. A blasting log must be kept and a copy furnished to the Company.

5.4 Excavation in Streets and Parking Areas

5.4.1 Procedure

Wherever the excavation is in paving, whether in the streets or in

parking lots, the Contractor shall so conduct their operations that at least one lane of traffic is kept open at all times. Where the excavation is performed in a traveled lane, the trench shall be made safe during non-working hours by installing backfill and temporary bituminous pavement, backfill and concrete subbase, or plates (see "Plating" Section 5.4.3).

Where the excavation is performed in an intersection, the work shall be completed in one work day, including backfilling and temporary bituminous pavement. Temporary paving restoration shall be adequately maintained until permanent pavement is placed.

Traffic warning signs shall be placed and maintained on the streets being crossed, in accordance with the applicable agency as described in "Traffic Control" (Section 1.3.1).

5.4.2 Twelve-Inch (12") Cutback Requirement

The Contractor shall make two pairs of straight paving cuts of uniform width: the first pair being along the edges of the anticipated trench location, to be performed prior to excavating the pipe trench; and the second pair being along the anticipated twelve-inch (12") cutback locations, to be performed upon completion of trench backfill placement up to the subbase bottom elevation and prior to subbase placement.

Sawcuts shall be of sufficient penetration of the pavement base to insure straight edges during pavement removal. Irregular edges shall be sawcut to provide straight edges at a uniform width.

Twelve-Inch (12") Cutback Requirement is not required when backfilling the trench with flowable fill (Controlled Low Strength Cementitious Material).

5.4.3 Plating

5.4.3.1 Traveled Lanes

In traveled lanes, the Contractor shall provide plates recessed flush with the pavement for any excavation and trenches must be backfilled to subbase prior to placing plates. Any lane that is open to the traffic at any time during the day is defined as a traveled lane.

5.4.3.2 Non-Traveled Lanes

In non-traveled lanes, the Contractor shall also provide recessed plates where required by the LWC Project Manager and as described in the SUPPLEMENTARY SPECIFICATIONS. Otherwise, for non-traveled lanes and parking lots, surface mounted plates, properly secured to pavement, shall be provided.

Recessed and surface mounted plates shall have a minimum thickness of one inch (1") and shall be placed on a minimum bearing area of one foot of pavement bordering the perimeter of the excavation.

All plates, whether or not in a traveled lane, are to have 45-degree beveled edges along the entire perimeter. All plates must have readily identifiable markings to reflect Contractor ownership.

All plates are to be recessed from November 1st thru March 31st, so as to minimize the potential hazards to snow removal vehicles.

If plates are unable to be recessed and must be pinned due to other utility encumbrances, the appropriate Road Maintenance Agency must be notified immediately.

See Standard Drawing: 4000 and 4100 in Appendix of Drawings.

5.5 Trenching

5.5.1 General

The Contractor shall make all excavations for pipe, blow-off connections, valves and vaults, etc. which may be required for this project. All excavations shall be backfilled or plated overnight with open pipe ends plugged or capped.

5.5.2 Alignment and Grade

The trench shall be excavated to the alignment and depth required and only so far in advance of pipe installation as the Company Inspector shall permit. All pipe shall be installed and maintained to the lines and grades shown on the project drawings.

5.5.3 Trench Width

The trench width shall be as narrow as practicable to permit the pipe to be installed and jointed properly with a minimum of nine inches (9") of separation between outside of the pipe and each

sidewall of the trench. Trench width must allow for the backfill to be placed and compacted around the pipe. Vertical trench sides are desired where the nature of the excavated material and depth of trench will permit.

A trench width of eighteen inches (18") plus nominal pipe diameter shall be the pay width for any items of work for which compensation is made where trench width is a factor in computing the value of work done.

5.5.4 Trench Depth

The pipe trench shall be excavated to such depth as to provide for six inches (6") of depth under and a minimum forty-two inches (42") of cover over the outside of the pipe barrel. Unless otherwise specified, the trench shall have a flat bottom conforming to this grade. The trench bottom shall be so excavated at the bells, so that the barrel of the pipe will have a bearing for its full length.

Any part of the trench excavated below grade (grade being six inches (6") under the pipe) shall be backfilled to grade with the same backfill material used to bed the pipe or other material approved by the LWC Project Manager, and compacted to ninety percent of Modified Proctor as required in "BACKFILLING PROCEDURES AND TAMPING" (Section 7).

Unstable soil material shall be excavated from the trench, removed from the site, and backfilled and compacted as described above.

Depth of cover beyond that required above shall be provided where indicated on the project drawings with no additional compensation.

The pipe trench shall not be excavated to exceed five feet (5') of cover over the outside of the pipe barrel under normal conditions unless indicated on the project drawings.

Variations from these required depths will be allowed only on written authority from the LWC Project Manager.

5.5.5 Minimum Clearances

Boulders, large stones, and rock (including shale) shall be removed to provide a clearance of at least six inches (6") below all parts of the pipe, valves, or fittings and to provide a clear width of at least nine inches (9") on each side of all pipe and appurtenances.

Bell holes of ample dimension shall be dug to permit jointing to be made properly and to insure that the pipe is evenly supported throughout in length rather than on bells or couplings.

5.5.6 Contaminated Soil

In the event the Contractor suspects encountering contaminated soil (i.e., soils containing asbestos, PCBs, petroleum products, hazardous waste, radioactive material, and/or any other substance that presents a potential danger to persons or property exposed thereto), the Contractor shall take the following steps:

- immediately secure the work site to prevent access by unauthorized personnel;
- notify the Kentucky Department for Environmental Protection, if reportable, (reportable is when an actual spill or release of a hazardous material occurs or when there appears to be a threat of severe environmental harm), at (502) 564-2380 or 1-800-928-2380;
- immediately notify "Emergency Response" at 911;
- immediately stop all work in the vicinity of the contaminated soil, and notify the Company Inspector, the LWC Project Manager or the Company Radio Room at 569-3600 ext. 2700 or 2701; or 368-0127
- follow the instructions from the Kentucky Department for Environmental Protection for disposal of excavated soils which are contaminated.
- water lines installed or replaced in areas of organic contamination or in areas within 200 feet of underground or petroleum storage tanks or petroleum pipelines require ductile iron or other non-permeable materials and shall be used in all portions of the water line installation or replacement as approved by the LWC Project Manager.
- resume work on unaffected elements of the project.

5.5.7 Preservation of Landscape

In lawn, parks, and private property, the existing sod may, at the Contractor's option, be stripped and rolled to be saved and re-laid, or replaced with new sod of equal quality as existing. See

"RESTORATION" (Section 11).

If trenching machines are used, care shall be taken to avoid damage to trees or existing structures above or below ground.

Trees and shrubs shown on the project drawings and labeled "PROTECT, DO NOT DAMAGE" are to be protected from any damage both above and below ground, and the property owner is to receive full remuneration for any damage. Trees at other locations shall not be damaged or removed without explicit instructions from the LWC Project Manager and owner or agency responsible therefore.

The project drawings may call for certain shrubs and trees in private roadways or easements to be transplanted until operations are completed and replaced in their original location or replaced with new stock.

5.5.8 Preservation of Historical Construction Materials

When historical construction materials (such as cobblestones, large brick, granite blocks, limestone, or other large stone building blocks used in the course of pavement, curbs, and sidewalks) are encountered in public streets or alleys, they shall be replaced with like material. The Contractor may request a waiver when this is not possible from the LWC Project Manager for approval.

5.5.9 Preservation of Boundary Monuments

Contractors shall be responsible for the location and protection of any boundary monuments locating property lines, property corners or right-of-way lines within project limits. If any monuments are removed or disturbed during construction, the Contractor will be responsible for replacement of the monuments by a Professional Land Surveyor of the State of Kentucky.

5.5.10 Archaeological

Contractors shall immediately stop work, if during the prosecution of work; they encounter any unidentified archaeological artifacts, skeletal remains, abandoned cemeteries or burial grounds within the work area and immediately notify the LWC Project Manager or

Company Inspector.

6. INSTALLATION

6.1 Handling Pipe and Appurtenances

6.1.1 General

Proper equipment, tools, and facilities satisfactory to the LWC Project Manager shall be provided and used by the Contractor for the safe and convenient progression of the work. Slings used in handling the pipe shall be made of non-abrasive materials such as nylon. Chains or any sharp abrasive material shall not be used to lift or move pipe. Pipe fittings, valves, and other accessories shall at all times be handled with care to avoid damage.

The method of handling, hauling, and placing pipe in the trench shall be such as in no way will injure or damage the ductile iron pipe and coating or the PVC (polyvinyl chloride) pipe. All damage to pipe and/or appurtenances shall be paid for by the Contractor.

In loading and unloading, pipe shall be lifted in such manner as to avoid shock. Under no circumstances shall they be dropped. Forklifts' forks or other tools and equipment shall not be inserted into the barrels of pipe, valves or other fittings to lift or move them.

6.1.2 PVC (polyvinyl chloride) Pipe

When handling PVC (polyvinyl chloride) pipe, the Contractor shall avoid abrasion damage and gouging or cutting by metal surfaces or rocks, and any stressing of bell joints and damage of bevel ends.

Avoid severe impact, particularly in subfreezing temperatures. In subfreezing temperatures, caution is advised in handling to prevent impact damage.

6.2 Installing Pipe and Appurtenances

6.2.1 General

All pipe installation shall be done under the supervision of an

experienced superintendent who will be constantly on the job to supervise the installation of all pipe and making of all joints.

All pipe, fittings, and valves shall be carefully lowered into the trench, piece by piece, in such a manner as to prevent damage.

Unless shown otherwise on the project drawings, PVC (polyvinyl chloride) and Ductile Iron pipe joints will be rubber ring gasketed bell end type.

The Contractor shall furnish all equipment and materials necessary to make all joints completely assembled, except as described in "Furnished to the Contractor" (Section 4.2).

All pipe shall require a six inch (6") undercut and a six inch (6") compacted depth layer of backfill to insure proper bedding for the pipe. These requirements are described in the sections "Trenching" and "BACKFILLING PROCEDURES AND TAMPING" (Sections 5.5 and 7, respectively).

The interior of all pipe, fittings, and other accessories shall be kept free from dirt and foreign material at all times. All pipe shall be clean and kept clean.

The exposed ends of pipe in the trench shall be closed by a suitable plug at all times when pipe installation is not actually in progress.

Pipe collars furnished by the Company may be used in areas under pavement where future service tapping locations are identifiable and required. Pipe collars shall have weep holes in the bottom section to allow drainage from the pipeline.

6.2.2 PVC (Polyvinyl Chloride) Pipe

All PVC (polyvinyl chloride) pipe installation shall be in accordance with AWWA Manual No. M23 "PVC Pipe - Design and Installation", unless otherwise specified herein.

Wherever either horizontal or vertical curves or angles are shown on the project drawings, or found to be needed, appropriate ductile iron bends shall be used with PVC (polyvinyl chloride) pipe.

Under no circumstances will the bending of PVC pipe be allowed.

Backfilling procedures and mechanical tamping of backfill material shall be strictly adhered to as specified in the "BACKFILLING PROCEDURES AND TAMPING" (Section 7) of these specifications.

6.2.3 Ductile Iron Pipe

All ductile iron pipe installation shall be in accordance with the current edition of AWWA Standard Specification C600, "AWWA Standard for Installation of Ductile Iron Water Main and Their Appurtenances", unless otherwise specified herein.

Wherever either horizontal or vertical curves or angles are shown on the project drawings, or found to be needed, appropriate ductile iron bends shall be used with ductile iron pipe.

When installing ductile iron pipe, joint openings not exceeding four degrees (4°) will be allowed.

Backfilling procedures and mechanical tamping of backfill material shall be strictly adhered to as specified in the "BACKFILLING PROCEDURES AND TAMPING" (Section 7) of these specifications.

Maximum Deflection for Full Length Ductile Iron Pipe @ 4 degrees
(Push -on Joint Pipe)

Pipe Size (inches)	Maximum Offset (inches)	Maximum Offset (inches)	Approx. Radius of Curve Produced by Succession of Joints (feet)	Approx. Radius of Curve Produced by Succession of Joints (feet)
	Pipe Length = 18 ft.	Pipe Length = 20 ft.	Pipe Length = 18 ft.	Pipe Length = 20 ft.
4 in.- 20 in.	15 in.	16 in.	255 ft.	285 ft.

6.3 Boring and Tunneling

When boring is required, the Contractor shall use a boring tool of the proper size to form a tunnel for the purpose of installing the pipe from one excavation to the other without disturbing the surface. Steel casing pipe shall be provided to the Contractor by the Louisville Water Company. Where such methods are used, a plug or suitable closure shall be inserted in the end of the pipe to exclude any earth from the inside of said pipe.

Where it is necessary to cut the paved surfaces to accomplish the above boring beyond the limits of the excavation necessary to make the tap, the cost of making such pavement repairs shall be borne by the Contractor.

When the boring of trees is required as specified on the project drawings or specifications, the Contractor shall be responsible for the survival of the trees disturbed by the installation for a period of two (2) years after final contract payment for the project.

Whenever water main is to be installed through casing pipe, the water main shall be ductile iron pipe with restrained joints. Steel casing pipe and ductile iron restrained in the pipe, both to be installed by the Contractor, will be furnished by the Louisville Water Company at its Allmond Avenue warehouse.

When ductile iron restrained-joint pipe is installed in casing pipe, casing runners shall be used to prevent damage during installation and to provide long term support. Pipe shall not rest on bells. Casing runners shall provide sufficient height between bell joint and casing wall and should be fastened securely to the pipe.

Unless otherwise stated in the **BIDDER'S PROPOSAL** form and/or the **SUPPLEMENTARY SPECIFICATIONS**, there shall be three (3) casing runners for each typical 18-foot pipe length, to be placed at the 3-foot, 9-foot, and 15-foot locations. Ends of casing pipes must be grouted or End Seals installed to prevent debris and seepage from entering the casing pipe and extend a minimum of five (5) feet beyond the edge of pavement.

Pipe may be installed in the casing using winch-drawn cable or jacking. Exercise care to avoid damage to the pipe, bell joints, and polywrap.

For ease of installation, use a lubricant such as flax soap or drilling mud between casing runners and casing. Do not use petroleum products such as oil or grease.

Any rock encountered in the construction of bore pits and/or receiving pits shall be unclassified.

If voids shall develop or if the excavation is greater than the outside

diameter of the casing pipe or tunnel liner by more than approximately one inch (1"), they shall be filled by pressure grouting. In the case where sections of casing pipe are field welded in order to meet the plan requirements, the Contractor shall weld the casing pipe fully around the entire circumference of the casing pipe and make the casing pipe available for weld inspection prior to installation of the water main.

All interior weld beads or slag shall not extend more than 3/32 inch from the interior pipe face.

See Standard Drawing: 1500 in Appendix of Drawings.

6.4 Mechanical and Push-on Joint Assembly

6.4.1 General

All rubber-gasket joints for Ductile Iron pipe shall be made in accordance with the current edition of AWWA Standard Specifications C111 "Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings", as recommended by the manufacturer, and as described in the following Sections: 6.4.2; 6.4.3; and 6.4.4.

All rubber-gasket joints for PVC (polyvinyl chloride) pipe shall be made in accordance with the current edition of AWWA Standard Specification C900 "Polyvinyl Chloride (PVC) Pressure Pipe, 4-inch Through 12-inch, for Water Distribution", as recommended by the manufacturer, and as described in the following Sections: 6.4.2; 6.4.3; and 6.4.4.

6.4.2 Mechanical Joint

The inside of the bell and the outside spigot end shall be thoroughly cleaned to remove oil, grit, excess coating, and other foreign matter from the joint, and then painted with a manufacturers approved lubricant.

The ductile iron gland shall then be slipped on the spigot end of the pipe with the lip extension of the gland toward the joint. The rubber gasket shall be painted with the lubricant and placed on the spigot end with the thick edge toward the gland. The entire section of pipe shall be pushed forward to seat the spigot end in the bell.

The gasket shall then be pressed into place within the bell with care being taken so that the gasket shall be evenly located around the entire joint.

The ductile iron gland shall then be moved along the pipe into

position for bolting, all of the bolts inserted, and the nuts screwed up tightly, with the fingers. Nuts spaced 180 degrees apart shall be tightened alternately, in order to produce an equal pressure on all parts of the gland.

The torque applied for various sizes of bolts shall be as follows:

Mechanical Joint Bolt Torque Table:

5/8"	45-60 ft.-lbs
3/4"	75-90 ft.-lbs
1"	100-120 ft.-lbs
1-1/4"	120-150 ft.-lbs

Any mechanical joint restraints or gripper rings shall be retightened to Bolt Torque Table specifications no sooner than thirty (30) minutes after initial tightening.

6.4.3 Push-on Joint

The inside of the bell and the outside of the spigot end shall be thoroughly cleaned to remove oil, grit, excess coating, and other foreign matter. If placement of the gasket occurs in the field, the circular rubber gasket shall be flexed inward and inserted in the gasket recess of the bell socket. A thin film of gasket lubricant shall be applied to the spigot end of the pipe.

Lubricant shall be applied evenly over the entire surface requiring lubrication, but avoid using an excess amount. Use only lubricant supplied by the pipe manufacturer. Failure to do so may promote bacterial growth or damage to the gaskets or the pipe.

Correct alignment of the pipe is essential for ease of assembly. The spigot end of the pipe shall be entered into the socket with care to keep the joint from contacting the ground.

The PVC (polyvinyl chloride) pipe shall be inserted into the bell or coupling by application of firm and steady pressure by hand or by block assembly until the spigot end slips through the gasket. PVC pipe shall be assembled by hand or with the use of bar and block. The spigot end of the pipe is marked by the manufacturer to indicate the correct depth of insertion. Over-insertion (over-belling) of the pipe shall not be permitted and can cause rolled gaskets, split bells, failure of hydrostatic pressure test, and damage to previously assembled joints.

Ductile iron pipe joints shall be completed by forcing the spigot

end to the bottom of the socket using a pry bar, backhoe, jack-type tool, or other device approved by the LWC Project Manager. Field cut pipe shall be insertion depth marked and end beveled before assembly to assure that the spigot end is inserted to the full depth of the joint.

6.4.4 Field-Cut Pipe

Push-On Assembly: Field-cut ductile iron or PVC (polyvinyl chloride) pipe requires a square cut for proper assembly of mechanical joint or push-on joint. It is recommended that the pipe be marked around its entire circumference prior to cutting to insure a square cut.

The end shall be beveled by using a beveling tool, rasp or grinder as appropriate to assemble the push-on joint. Round-off any sharp edges on the leading edge of the bevel. Reinstall depth mark using original mark by manufacturer as a guide.

Mechanical Joint Assembly: When field-cut PVC (polyvinyl chloride) pipe is to be inserted into a mechanical joint end, the bevel shall not be reinstalled. The above-stated requirements for a square cut, rounding off sharp edges, and establishing a correct-depth marker shall be performed.

6.5 Tie-ins to Existing Mains

The Contractor shall install the necessary pipe and fittings for the connections to the existing mains, as shown on the project drawings, and shall make the connections complete, ready-for-use.

It is imperative that the sequence of work involving an interruption of service be such that all operations be completed and the new pipeline ready to be connected prior to shutting off existing mains that are serving customer connections. Except for filling of the main, tie-ins shall not be accomplished until the main has passed pressure testing and disinfection.

All pipe, fittings and materials installed for tie-ins or taps not exposed to pipeline dechlorination shall be disinfected with an adequate chlorine solution.

When connections to existing pressurized PVC water mains are to be made with a tapping sleeve and gate valve, the tapping sleeve and gate shall be installed a minimum distance of twenty-four inches (24") from any fitting end or pipe end.

The Contractor shall make that tap only after a hydrostatic pressure test of 125 psi is applied for fifteen (15) minutes with no leakage to the tapping sleeve and gate valve assembly. Before cutting an existing main under pressure, the Contractor shall ensure the adjacent existing valve and fittings are sufficiently secure.

The Contractor shall be responsible to provide the tapping coupon to the Company Inspector. The Contractor shall be responsible for a minimum advance notification of forty-eight (48) hours to the Company Inspector to make connections to existing mains.

The Contractor shall be responsible to make up to three (3) connection attempts in situations due to circumstances outside of their control such as inoperable valves or unavailable LWC personnel assistance.

Subsequently, water mains abandoned in-place shall be capped at all open ends as shown on the project drawings or as directed by the LWC Project Manager.

6.6 Transition of Pipe Materials (Ductile Iron Pipe and PVC Pipe)

All pipe material transitions (locations where ductile iron pipe is connected to PVC (polyvinyl chloride) pipe or vice versa) shall be made at a ductile iron fitting (tee, valve, coupler, sleeve, bend reducer, etc.). The joining of pipe ends by inserting the spigot to bell of different pipe materials will not be allowed.

6.7 Removal of Asbestos-Cement (AC or Transite) Pipe

Any required cutting or tapping of asbestos-cement pipe shall be performed by qualified Louisville Water Company personnel, and shall be in compliance with all OSHA requirements. Pieces of asbestos concrete resulting from the work shall be double bagged, placed in a rigid container and disposed of in an approved landfill. This work shall be coordinated by the Contractor through the Company Inspector.

6.8 Setting Cast Iron Valves and Fittings

Valves, air valves, blow offs, and drains shall be assembled, and joints made up, both flanged and mechanical joint, as indicated on the project drawings. Valves twelve inches (12") and larger on ductile iron pipe, all valves on PVC (polyvinyl chloride) pipe, and all reducers must be anchored by coated and deformed reinforcing bars, as detailed per LWC Standard Drawing 1400, wrapped around each end of the valve or reducer, and cast in a cast-in-place concrete anchor block under each valve.

The weight of each valve shall be supported by solid pre-cast concrete bricks. Bricks should not be removed prior to concrete placement. Cast-in-place concrete shall then be poured up to the bottom of the valve. In no instance shall the weight of the valve be supported by the adjacent pipe.

If PVC pipe is used with iron fittings, the weight of each fitting shall be supported by a two feet (2') x two feet (2') width x one foot (1') depth cast-in-place concrete support block; rod anchorage is required at vertical bends which require the placement of the thrust block under the fitting.

The concrete support block shall bear against undisturbed earth, as shall the other above-mentioned types of concrete blocking.

The LWC Project Manager shall have the authority to direct the Contractor to add line valves if they are needed to facilitate the project and/or to keep service outages to an absolute minimum. In cases where the water main must be put into service as soon as possible, very early strength concrete can be specified by the LWC Project Manager for thrust restraint.

See Standard Drawing: 1400 in Appendix of Drawings.

6.9 Polyethylene Wrap for Ductile Iron Pipe and Fittings

Polyethylene wrap shall be installed in accordance with the current edition of AWWA Standard Specification C105 (ANSI A21.5) for American National Standard for Polyethylene Encasement, unless otherwise specified herein.

Polyethylene wrap will be furnished by the Company in 500 foot rolls. The Contractor shall cut the roll in tubes 2 feet (2') longer than the standard length of pipe. Each tube shall be slipped over the length of ductile iron pipe, with centering to allow a one foot 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. Each length of ductile iron pipe shall receive two separate polyethylene wraps as described above.

Ductile iron pipe shall not be wrapped for more than 5 days in advance of placement into the trench. Pipe to be wrapped shall include ductile iron and ductile iron restrained-joint pipe and iron fittings.

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 appurtenances and bringing it up around the item to be wrapped. Seams will be made by bringing the edges together, folding twice, and taping down. Each appurtenance shall receive two separate polyethylene wraps as described above.

Care will be taken when backfilling to prevent damage to the polyethylene wrapping. Sections of wrapping having cuts, tears, punctures, or other damage shall be repaired or replaced.

PVC (polyvinyl chloride) pipe requires no polyethylene wrap.

AWWA Standards for installing polyethylene wrap and manufacturers' recommended methods for installing polyethylene wrap are available for review at the office of the Louisville Water Company's Resource Coordinator, Construction Inspection Services, 4801 Allmond Avenue. See Standard Drawing: 1200 A-C in Appendix of Drawings.

6.10 Installation of Tracing Wire and Identification Ribbon for PVC Pipe

The Contractor shall install insulated #12 solid copper wire along with the PVC pipe. This wire shall be installed directly over the water main.

At each and every valve: the wire shall be directly connected to one of the valve joint bolts, and shall extend upward along the outside of the keytube but inside the round top frame. The wire shall be looped upward along the outside of the keytube to maintain the wire continuity. This wire shall be taped securely to the top of the pipe at the midpoint and bell of each section of pipe.

The wire shall also be connected to each end of the water main. The tracing wire shall be wrapped once around each copper or ductile iron service line. The wire shall be stripped of insulation and connected or wrapped with each valve, and service line.

Along with this wire, the Contractor shall also install a thin identification ribbon. Under paved or unpaved surfaces, this ribbon shall be installed eighteen inches (18") below the surface or finished grade and directly over the water main. Both wire and ribbon shall be supplied by the Louisville Water Company.

6.11 Cast Iron Frames and Lids

The Contractor shall set all cast iron frames and lids for valves, air valves, and vaults. These frames and lids shall be set to grade and maintained in the proper position for the duration of the period covered by this contract.

Cast iron frames and lids shall be removed on all discontinued vaults, and surfaces shall be restored in accordance with the appropriate requirements of the sections "BACKFILLING PROCEDURES AND TAMPING" and "RESTORATION" (Sections 7 and 11, respectively).

All out-of-ground cast iron frames and lids shall be returned to the Allmond Avenue warehouse.

6.12 Valve Boxes

Standard valve boxes consisting of keytubes, extension pipes, and round tops and lids shall be furnished by the Company and installed on all valves by the Contractor. These boxes shall be centered about the operating nuts, shall be vertical, shall be set to grade, shall be placed and maintained in the proper position, and shall be free of dirt or other matter for the duration of the period covered by this contract.

Styrofoam collars or polywrap tape may be placed around each valve box before placement of concrete and in such a manner to allow the valve box to be raised to grade without demolishing the concrete subbase.

Valve extensions shall be placed on gate valves operating nuts to reach not less than two feet (2') or more than three feet (3') of ground elevation. Valve extensions may be welded together to reach the appropriate length. Valve extensions are available at the LWC warehouse.

Cast iron screw type (two (2) piece Buffalo style) valve box, round top, and cover may be required in areas of vehicular traffic per project drawings.

In areas of bituminous pavement, round top shims shall be furnished by the Company and installed by the Contractor under the round tops. The shims shall be installed after the subbase has cured, and before placement of the bituminous pavement.

Round tops and lids on all valves that are to be abandoned shall be removed and returned to the Allmond Avenue warehouse. The keytube shall be filled and surfaces restored in accordance with the appropriate requirements of the sections "BACKFILLING PROCEDURES AND TAMPING" and "RESTORATION" (Sections 7 and 11, respectively).

6.13 Plugging Ends of Pipe

When work is stopped at the end of a day, a cast iron plug shall be installed in place in the open end of the pipe to maintain a water tight seal. If trench water or debris enters the pipeline, it shall be removed from the pipe before work proceeds. Permanent plugs or caps shall be inserted where shown on the project drawings, and shall be securely braced as shown on the thrust anchor details included on the detail sheet of the project drawings. Plastic tape over pipe ends will only be permitted on non-standard / oversized pipe with Company Inspector approval.

6.14 Thrust Anchors, Counterweights, and Restrained-Joint Hardware

The Contractor shall install concrete thrust anchors or counterweights (3,500 psi concrete) at all bends (11¼, 22½, 45, and 90 degrees), reducers, tees, offsets, gate valves and plugs to withstand maximum test pressure. The Contractor shall provide all labor and material to construct the thrust anchors, piers, and counterweights, for all fittings, both horizontal and vertical. These concrete thrust anchors shall be minimum dimensions and size as indicated on the thrust anchor schedule shown on the detail sheet in the project drawings.

If field conditions prevent standard concrete thrust anchors placement as shown detailed in project drawings, the LWC Project Manager must approve any modification. Concrete thrust anchors in solid rock trenches may be modified with LWC Project Manager approval.

The Company Inspector may require forming (plywood or steel) in order to properly locate and position concrete thrust anchors. Company-supplied restrained-joint hardware is not intended to be used in lieu of concrete thrust anchors and counterweights. Such hardware is to be used ONLY when it is necessary to return a water main to service immediately, as when making tie-ins or at the specific instructions of the Company.

Whenever restrained-joint hardware is used to restrain fittings, the Contractor must also pour a concrete thrust block. In no instances, shall restrained-joint hardware alone be accepted as a permanent thrust restraint. See Standard Drawing: 1400 in Appendix of Drawings.

7. **BACKFILLING PROCEDURES AND TAMPING**

7.1 General

In general, trench dimensioning and backfill materials shall be as follows: six inches (6") of vertical clearance with the bottom of the trench, and the subsequent layered placement of pit run sand, DGA or manufactured sand

bedding along the bottom of the pipe; nine inches (9") of horizontal clearance with each side of the trench, and the subsequent layered placement of pit run sand, DGA, or manufactured sand backfill along each side of the pipe; the layered placement of pit run sand, DGA, or manufactured sand to the elevation of twelve inches (12") above the crown of the pipe; and, if in a lawn area, the remainder of the backfill to be common (but acceptable) fill, or, if in a paved and/or a to-be-paved area, the remainder of the backfill to be the layered placement of pit run sand, DGA, manufactured sand, #57 stone or flowable fill up to the bottom elevation of the respective pavement restoration scheme.

All bedding and backfill material shall be uniform and continuous for the entire trench excavation limits.

The total depth of cover (i.e., the vertical distance from crown-of-pipe to ground/pavement surface) shall be at least forty-two inches (42"). The cost of applicable backfill material, backfilling, and required tamping shall be covered in the base bid as shown on the **BIDDER'S PROPOSAL** form.

All backfill (except flowable fill) shall be properly compacted by pneumatic, vibratory, or other approved compaction equipment. A backhoe bucket is not an approved compaction device. Degree of compaction shall be at least ninety percent (90%) of Modified Proctor (ASTM D-1557), and the compaction effort shall be performed in a uniform and consistent manner. The Company reserves the right to conduct compaction testing and such testing will not relieve the Contractor of any future warranty responsibilities. When instructed by the LWC Project Manager, the Contractor shall excavate backfilled material to a particular grade for testing. Backfilled areas which do not pass this test shall be excavated and re-compacted until they meet compaction specifications. Areas excavated for testing shall be re-compacted in accordance with this compaction specification. The cost of this work shall be included in the base bid.

Appropriate and sufficient backfill material shall be furnished by the Contractor to replace material deemed unsatisfactory by the LWC Project Manager or the Company Inspector.

Unsatisfactory material includes unsuitable soil as described in "FINAL BACKFILLING" (Section 7.6) and frozen or exceptionally wet backfill material, and may include backfill material excavated for testing purposes or backfill material excavated for failure to meet compaction requirements.

See Standard Drawing: 4300 in Appendix of Drawings.

7.2 Acceptable Backfill Materials

7.2.1 Pit Run Sand (Natural Sand)

Pit Run Sand is sand resulting from the natural degradation of rock and shall meet the material and gradation requirements of Section 804 Fine Aggregates of the current edition of the Kentucky Department of Highways “Standard Specifications for Road and Bridge Construction”.

7.2.2 Dense Graded Aggregate (Kentucky DGA or Indiana #73)

Dense Graded Aggregate shall meet the material and gradation requirements of Section 805 Coarse Aggregates of the current edition of the Kentucky Department of Highways “Standard Specifications for Road and Bridge Construction”.

7.2.3 Flowable Fill (Controlled Low Strength Cementitious Material).

Flowable fill, a quick-setting, cementitious, self-compacting, shrinkless fill material, may only be used with the prior written approval of the LWC Project Manager.

The mix design must be approved prior to placement by the LWC Project Manager. The 28-day compression strength of said fill shall not exceed 150 psi, and the minimum strength shall be 25 psi. The mix shall include sand, cement, fly ash with water not included as part of the volume mix. Fly ash shall have a ph value of no less than 7.0 and no greater than 12.5. The pipe shall be enveloped with pit run sand, manufactured sand or dense graded aggregate and backfilled in accordance with “Initial Backfilling” (Section 7.5).

7.2.4 Manufactured Sand (Kentucky 3/8” Manufactured Sand)

Manufactured Sand shall be the material resulting from the crushing and classification by screening, or otherwise, of rock and gravel. Manufactured Sand shall be washed and contain no fine particles and or dust.

The Contractor shall be responsible for all dust control associated with the use of Manufactured Sand. Manufactured Sand shall meet the material and gradation requirements of Section 804.08 Pipe Bedding of the current edition of the Kentucky Department of Highways “Standard Specifications for Road and Bridge Construction”.

7.2.5 Kentucky #57 Stone (or Indiana #8 Stone)

Kentucky #57 Stone shall not be used as bedding or initial backfilling for pipe. Kentucky #57 Stone shall meet the material and gradation

requirements of Section 805 Course Aggregates of the current edition of the Kentucky Department of Highways "Standard Specifications for Road and Bridge Construction".

7.2.6 Kentucky #3 Stone (or Indiana # 2 Stone)

Kentucky #3 Stone shall only be used for Fire Hydrant Drainage Pits. (See Section 9.2 Drainage Pit). Kentucky #3 Stone shall meet the material and gradation requirements of Section 805 Coarse Aggregates of the current edition of the Kentucky Department of Highways "Standard Specifications for Road and Bridge Construction".

7.2.7 By-product of trench rock excavator

The by-product of trench rock excavator equipment may be acceptable for pipe bedding and/or backfill material if prior written approval is granted by the LWC Project Manager.

The LWC Project Manager must review the material and be assured of the compaction ability of the material. The Contractor must wash the material thoroughly (i.e., no dust particles); and to sieve the material thoroughly so that no individual rock pieces exceed sieve size of one inch (1") (25.0mm).

7.3 Un-Acceptable Backfill Materials

Un-washed Manufactured sand, Black sand (coal or coke by-products), slag, or foundry by-products will not be allowed as pipe bedding and / or backfill material.

7.4 Bedding

For the entire length of the trench, the excavation shall provide a six inch (6") space below the pipe, which shall be placed and firmly compacted with approved backfill materials, pit run sand, manufactured sand or Dense Graded Aggregate, as specified by the Kentucky Transportation Cabinet Department of Highways Standard Specification for Road and Bridge Construction, (latest edition) "Fine Aggregates" or "Coarse Aggregates," to form a bedding for the pipe.

The bedding shall be excavated at bells, valves, and fittings so the barrel of the pipe will have a bearing for its full length.
See Standard Drawing: 4300 in Appendix of Drawings.

7.5 Initial Backfilling

Initial backfill should occur as soon as possible after the installation of pipe, so as to prevent the pipe from shifting. After the pipe has been placed on the bedding, pit run sand or Dense Graded Aggregate, shall be deposited in the trench by mechanical equipment and distributed in six inch (6") layers on both sides of the pipe for the full width of the trench, the trench width having nine inches (9") of horizontal clearance along each side of the pipe.

The pit run sand or Dense Graded Aggregate shall be tamped in six inch (6") layers and thoroughly compacted under the centerline and on each side of the pipe. Backfill shall be placed and tamped to a height of at least twelve inches (12") above the top of the pipe.
See Standard Drawing: 4300 in Appendix of Drawings.

7.6 Final Backfilling

When not under paved surfaces or surfaces where paving is intended, the remainder of the trench shall be backfilled with soil free from brush or vegetative matter, rocks larger than fist-size, pieces of concrete larger than fist-size, cinders, or any other matter which could prevent proper consolidation.

When under paved surfaces or surfaces where paving is intended, the remainder of the trench shall be backfilled for the full depth with pit run sand, Dense Graded Aggregate, or #57 stone as specified by the Kentucky Department of Highways Standard Specification for Road and Bridge Construction, (latest edition) "Fine Aggregates" or "Coarse Aggregates." At pavement crossings, this pavement backfill shall extend five feet (5') beyond each end of the paving or proposed paving.

Whether under paved or unpaved surfaces, the final backfill shall be tamped by pneumatic or other approved tamping equipment in successive layers of six inches (6") or less in height to finish grade or pavement restoration as required.

If Hydra-Hammer or Hoe-Pack type compactors are approved by the LWC Project Manager, compaction shall be performed in successive layers eighteen inches (18") or less in height to finish grade or pavement restoration. Backfill must be a minimum of two feet (2') above the water main before Hydra-Hammer or Hoe-Pack type compactors may be used. Water jetting will not be allowed except by written approval by the LWC

Project Manager.

The total depth of cover (i.e., the vertical distance from crown-of-pipe to ground/pavement surface) shall be at least forty two inches (42") and no more than fifty-four inches (54") unless approved prior to installation by the LWC Project Manager.

See Standard Drawing: 4300 in Appendix of Drawings.

8. PLACING WATER MAIN IN SERVICE

8.1 General

After a section of main has been properly installed and valved, the main shall be filled, disinfected, pig cleaned, flushed, and pressure and leakage tested before being placed in service.

The Contractor shall provide adequate personnel to assist the Company Inspector on site for placing the water main in service.

The cleaning pig shall be inserted into the pipeline at the time of installation. Pipe soap shall not be applied directly to cleaning pigs. Pigs shall be supplied by Louisville Water Company.

Disinfection, cleaning, and flushing of the water main must result with subsequent water samples passing all Louisville Water Company water quality tests.

8.2 Filling and Disinfection of the Water Main

8.2.1 Filling of the Water Main

The main shall be chlorinated prior to beginning the pigging operation and shall be filled from downstream of the pig. Contractors must use Temporary Service Meters for filling mains to account for water usage and backflow prevention.

The main shall be filled with hyperchlorinated water for at least 24-hours prior to the beginning of flushing operations.

When the disinfection method is granular calcium hypochlorite (HTH or equal), the granular calcium hypochlorite (HTH or equal) must be applied into each section of pipe during installation and prior to filling the water main. See Section 8.2.2.

When the pipe is filled, air shall be expelled through fire hydrants, air valves, or flushing connections.

All flushing connections, fill connections, and discharge connections shall be installed by the Contractor at locations indicated on the project drawings or as directed by the LWC Project Manager or Company Inspector if a fire hydrant or service connection cannot be utilized.

If not specified to be furnished by the Company, particular components of flushing/discharge hardware shall be furnished by the Contractor.

8.2.2 Disinfection of the Water Main

New or relocated water mains shall be disinfected in accordance with the requirements of the Kentucky Division of Water, Natural Resources and Environmental Cabinet and AWWA Standard C651 upon completion of construction and before being placed in service.

The method to be used to achieve these requirements will be application of chlorine or chlorine compounds (calcium hypochlorite granules - HTH or equal) to each pipe length at the time of installation, or liquid sodium hypochlorite or other LWC Project Manager approved method.

The Contractor shall supply granular calcium hypochlorite or sodium hypochlorite as needed. Granular calcium hypochlorite shall conform to ANSI / AWWA B300 and contain a minimum of 65% per cent available chlorine by weight and be stored in a cool, dry, and dark environment to minimize its deterioration.

Granular calcium hypochlorite must meet NSF /ANSI Standard 60 requirements. Certified Manufacturers are listed on the NSF Product and Service Listings internet site at:
<http://www.nsf.org/Certified/PwsChemicals/Listings.asp?ChemicalName=Calcium+Hypochlorite&>

Sodium hypochlorite liquid shall conform to ANSI / AWWA B300 and contain a minimum of 15% per cent available chlorine by volume and the storage conditions and time must be controlled to minimize deterioration.

Sodium hypochlorite liquid must meet NSF /ANSI Standard 60 requirements. Certified Manufacturers are listed on the NSF Product and Service Listings internet site at:
<http://www.nsf.org/Certified/PwsChemicals/Listings.asp?ChemicalName=Sodium+Hypochlorite&>

The Contractor shall equally apply calcium hypochlorite granules (HTH or equal) throughout the entire section of pipeline during the installation or sodium hypochlorite to produce a concentration of at least fifty (50) ppm and a residual of at least twenty-five (25) ppm at the end of 24 hours, to be followed by thorough flushing; this is in compliance with 401 KAR 8:150 "Disinfection and Filtration", Sections 4(1) and 4(2).

The following amounts of calcium hypochlorite granules (HTH or equal) or sodium hypochlorite liquid (@ 12.5 %), per 100 linear feet of pipeline, should produce fifty (50) ppm of chlorine:

Amount of Granular Chlorine (HTH OR EQUAL) or Sodium Hypochlorite per 100 Linear Feet of Pipeline:

Pipe Size	Weight of Granular Chlorine (HTH or equal)	Volume of Granular Chlorine (HTH or equal)	Volume of Sodium Hypochlorite @ 12.5% solution
4"	0.75 ounce	1/8 cup	0.031 gallons
6"	1.50 ounces	1/4 cup	0.072 gallons
8"	2.75 ounces	3/8 cup	0.126 gallons
12"	6.00 ounces	7/8 cup	0.286 gallons
16"	10.75 ounces	1-1/2 cups	0.501 gallons
20"	16.75 ounces	2-1/2 cups	0.787 gallons

After the disinfection procedure has begun, the Contractor shall tag-out and not operate any valves, including those newly installed, without consent and presence of the LWC Project Manager or Company Inspector.

The Contractor shall perform the chlorination under the complete control of the LWC Project Manager or Company Inspector.

8.3 Pig Cleaning and Flushing the Water Main

8.3.1 Pig Cleaning the Water Main

When beginning the pigging operation, after opening the downstream (outlet) valve, the valve upstream of the pig shall be opened allowing the pig to move at approximately one (1) foot per second (FPS).

Hyperchlorinated water shall be discharged through the end of the pipeline from which the pig shall be removed in accordance with the requirements of Section 8.4, "DISCHARGE OF HYPERCHLORINATED WATER".

8.3.2 Flushing the Water Main

With respect to flushing, the Company's standard operating procedure is as follows. The flushing assembly is to be checked-out from the Company's meter shop by the Contractor with an initial meter reading taken and shall be returned by same after flushing operations have been completed.

The meter/check valve portion of the flushing assembly is not to be installed until after the completion of pigging operations (so as to protect the meter/check valve from internal damage caused by debris). Upon the completion of pigging operations and prior to the start of flushing operations, the meter/check valve is to be installed.

The Contractor is to supply a two inch (2") hose to be used during flushing operations. Upon the completion of flushing operations, a final meter reading will be taken when returned to the Company's meter shop.

No flushing device, blow-off, or air relief valve shall be directly connected to any non-storm sewer, storm sewer, or storm drain, and shall be located at a distance greater than ten (10) feet from any non-storm sewer.

See Standard Drawing: 1601, 1602, and 1603 in Appendix of Drawings.

8.4 Discharge of Hyperchlorinated Water

Discharge of hyperchlorinated water can be directed to combined or sanitary sewer facilities only after the LWC Project Manager has received approval from the Permit Section Supervisor of the Louisville and

Jefferson County Metropolitan Sewer District or jurisdictional sewer agency authority. Flushing outside the Louisville and Jefferson County Metropolitan Sewer District service area shall be in accordance with Kentucky Division of Water requirements.

The Contractor shall provide 72 hours notice to the LWC Project Manager of intended discharge of hyperchlorinated water. In locations where discharge of hyperchlorinated water is restrictive, LWC Project Managers may approve tanker truck transportation for disposal at other sites. If the discharge of hyperchlorinated water can not be to a combined or sanitary sewer, the hyperchlorinated water shall be neutralized to a chlorine concentration of less than 0.019 ppm (mg/L) before discharge to a storm drain or onto the ground surface in a manner which will not violate 401 KAR 5:031 Surface Water Standards.

The Contractor shall be responsible for all chlorinated water disposal (neutralized to acceptable levels per regulations prior to release) and adherence to "LWC Best Management Practice & Procedures on Chlorinated Water Disposal" and 401 KAR 5:031 and 401 KAR 8:020. Contractor disposal methods must have LWC Project Manager approval.

The Company shall furnish all dechlorination hardware necessary for the dechlorination operation. The Contractor will be responsible to furnish hoses and fittings required for the flushing operation.

The LWC Project Manager or Company Inspector shall reserve the right to postpone the dechlorination operation in the event of an anticipated major rain event.

The LWC Project Manager shall reserve the right to dechlorinate water with calcium thiosulfate (Captor), sodium bisulfate, or other approved method supplied by the Company.

8.5 Pressure and Leakage Test

Before the hydrostatic test is begun, the Contractor shall: backfill all pipe; provide all temporary and permanent thrust anchor blocking; and install taps for releasing air at all points of highest elevation where no fire hydrant or flushing connection has been installed. All valves within the test area shall be fully open including valves on fire hydrant supply pipes.

It shall be the Contractor's responsibility to locate and repair any and all leaks that may develop.

The water main (ductile iron and PVC) and appurtenances shall be discharged of hyperchlorinated water, flushed and filled with potable

water prior to performing the pressure and leakage test.

The water main shall then be subject to a hydrostatic pressure of 200 PSI for ductile iron pipe, 200 PSI for PVC DR-14, and 150 PSI for PVC DR-18 or at a pressure specified by the LWC Project Manager at the lowest point along the section being tested for a period of two (2) hours with the test pressure not dropping more than 5 PSI during the test. At elevated sections of the pipeline the minimum test pressure shall be 75% of the hydrostatic test pressure.

In conjunction with the hydrostatic test, a leakage test shall be conducted at the same pressure and for the same period of time.

The Contractor may furnish a test pump if approved by the Company Inspector. The test pump must be equipped with a quick-connect coupling to allow the connection of the Company Inspector's pressure gauge.

The leakage allowed will be as given by the following table. All of this testing shall be accomplished in the presence of the LWC Project Manager or Company Inspector.

Allowable Leakage per 1000 feet of Ductile Iron or PVC Pipeline in gallons/hour. (Average Test Pressure @ 200 PSI for Ductile Iron and PVC DR-14 or 150 PSI for PVC DR-18)

Pipe Diameter(inches)	4"	6"	8"	12"	16"	20"
D.I. or PVC - DR14 Leakage @ 200 PSI (gallon/hour)	0.38	0.57	0.76	1.15	1.53	1.91
PVC – DR 18 Leakage @ 150 PSI (gallon/hour)	0.33	0.50	0.66	0.99	1.32	1.66

All pipe, fittings, and other materials found to be defective under test shall be removed and replaced. These tests shall be repeated until satisfactory to the LWC Project Manager and Company Inspector. All visible leaks shall be repaired regardless of the amount of leakage.

The required testing apparatus, consisting of a gasoline motor driven pump, valves, pressure gauge, meter, test pump hose, and connections, shall be picked up and returned to the Company yard, the day the test is to be run.

The Contractor shall be responsible for all phases of testing the water

main.

8.6 Coliform Monitoring

The water main shall be placed in service only after coliform monitoring (sampling and analysis) applicable to the line does not show the presence of coliform. If coliform is detected, repeat flushing of the line and coliform monitoring. If coliform is still detected, repeat disinfection and flushing as if the line has never been disinfected. Continue the described process until monitoring does not show the presence of coliform. The presence or absence of total coliform monitored by sampling and analysis as needed shall be determined for new, cleaned, repaired or relocated water line(s).

Water samples shall be taken within 1200 feet of each connection point to existing lines, at one (1) mile intervals, and at dead ends without omitting any branch of the new, cleaned, repaired or relocated water line(s).

Sample bottles shall be clearly identified with a unique project identification note and delivered to the LWC Water Quality Laboratory. The test results will be submitted to the cabinet (KDOW) on a monthly basis, no later than the 10th day of the following month. These results will include chlorine residual and total coliform negative results.

8.7 Air Relief Valves

Air relief valves or hydrants shall be placed at necessary high points in water mains where air can accumulate. The Contractor shall install air relief valves at all locations as identified on project plans. Additional air relief valves that may be required by the LWC Project Manager or Company Inspector will be compensated as described in **CHANGES IN THE WORK**, in the **TERMS AND CONDITIONS**.

Corporation stops for air relief valves shall be installed with tapping saddles to minimize pig damage when pig cleaning the pipe line.

8.7.1 Automatic Air Relief Valves

Where practical, the open end of an air relief pipe from automatic valves shall be extended a minimum distance of one foot (1') above grade and provided with a screened, downward-facing elbow.

Automatic air relief valves shall not be installed in situations where the flooding of the manhole or chamber may occur.

See Standard Drawing: 1603 in Appendix of Drawings.

8.7.2 Manual Air Relief Valves

The open end of an air relief pipe from a manually operated valve shall be extended to the top of the pit and provided with a screened, downward-facing elbow if drainage is provided for the manhole.

Use of manual air relief valves is recommended wherever possible.
See Standard Drawing: 1602 in Appendix of Drawings.

8.8 Leak Detection By-Pass Meter at Underwater Crossings

Leak Detection By-Pass Meters are required at all underwater crossings which are greater than fifteen feet (15') in width.

Water main valves shall be installed at both sides of the water crossing so that section can be isolated for testing or repair. The valves and meter vault shall be easily accessible and not subject to flooding. The valve closest to the supply source shall have permanent taps on each side to allow the installation of a meter to determine leakage and for sampling purposes.

See Standard Drawing: 1608 in Appendix of Drawings.

9. **FIRE HYDRANT**

9.1 Materials and Installation

The fire hydrant installation shall consist of the following items, and shall be as shown on the detail sheet of project drawings.

The field location of fire hydrants shall be approved by the Company's Inspector prior to installation. Fire hydrants shall be installed to allow proper drainage. Fire hydrants located on project drawings in areas of poor drainage shall contact the LWC Project Manager or Company Inspector for movement to a suitable location.

The fire hydrant anchor tee and gate valve shall be installed as the main is installed. A tapping sleeve and gate valve shall be installed if the main is in service. Fire hydrant supply pipe (pipe, fittings, gate valve, and fire hydrant) must be secured to the water main for proper thrust restraint. All joints in the fire hydrant supply pipe (between fire hydrant and the main to which it is connected) shall be installed using a restrained joint method.

The fire hydrant supply pipe shall be ductile iron pipe, in all cases, regardless of the type of main being connected to. The fire hydrant supply pipe shall be a minimum diameter of six (6) inches and connected to a main with a minimum diameter of six (6) inches.

The fire hydrant shall be that furnished by the Company, designed for proper depth of bury, shall have a drain hole, and shall be so installed that the barrel will properly drain.

The fire hydrant shall be set plumb, and shall have the pumper nozzles set facing perpendicular to the curb. The bottom of the break-away flange bolts shall be located from two inches (2") to five inches (5") above finished grade, with the center of the nozzle eighteen inches (18") to thirty inches (30") above finished grade.

The fire hydrant shall be set to established grade, with the center of the barrel two feet (2') back of the face of the curb line (eighteen inches (18") behind the back edge of the curb for rolled curbs) or as directed, or in the absence of a curb approximately five feet (5') to fifteen feet (15') from the edge of the pavement, no more than fifteen feet (15') from a hard traveled surface, in accordance with governing fire department ordinances and accessible to the fire department. The base of the fire hydrant shall be set on a precast concrete block. The back of the elbow shall be well anchored against undisturbed earth by means of precast concrete blocks.

Two layers of polyethylene wrapping shall be installed from the fire hydrant anchor tee to the base elbow of the fire hydrant, including the fire hydrant valve, connecting pipe, and thrust restraints. The wrapping shall not impede the drain holes located near the bottom of the fire hydrant barrel.

Fire hydrant barrel extension kits shall not be used for new fire hydrant installations unless approved by the Company Inspector prior to requisitioning from the LWC Warehouse. No more than one (1) fire hydrant barrel extension kit shall be used on an existing fire hydrant when raising is required. All fire hydrant barrel extension kits must be installed in the presence of a Company Inspector.

Fire hydrant wrenches shall never be left unattended on a fire hydrant.

Fire Hydrants must be turned on completely open to prevent flooding through hydrant drain holes. Flow shall be regulated by the temporary meter assembly valve. The Contractor must notify the LWC Radio Room (569- 3600, ext. 2700 & 2701) of all hydrants flowed between December 1 and March 15 so the hydrant can be winterized after use to prevent freezing.

Some fire hydrants have a locking device attached to prevent unauthorized use. The Contractor shall notify the LWC Project Manager or Company Inspector 48 hours in advance of the need to use such a fire hydrant so the lock can be removed by LWC personnel. The Contractor shall immediately notify the LWC Project Manager or Company Inspector when the fire hydrant is no longer needed so the lock can be re-installed.

The Contractor shall notify the Company Inspector of any "Out of Service" fire hydrants. "Out of Service" fire hydrant tags shall be placed on the nozzle of all inoperable or "Out of Service" fire hydrants.

The Contractor shall paint fire hydrants after installation at the Company Inspector's request to cover scraped or chipped areas on the fire hydrant. Fire hydrant paint will be supplied by the LWC Warehouse. Fire hydrant attachment number labels shall not be painted over.

Fire hydrant attachment number labels shall be installed by Company personnel.

See Standard Drawing: 2000 in Appendix of Drawings

9.2 Drainage Pit

Whenever a fire hydrant is set, a drainage pit shall be excavated below each fire hydrant elbow and filled compactly with washed #3 stone under and around the elbow of the fire hydrant and to a level of two feet (2') above the base of the elbow. Dimensions of the pit shall be three (3) ft. long x three (3) ft. wide x four (4) ft. deep, with the pit centered about the barrel of the fire hydrant. Once the fire hydrant is installed and prior to filling the pit with washed #3 stone, the fire hydrant shall be pressurized, the drains flushed and then depressurized to ensure that the fire hydrant drains properly.

The top of the entire drainage pit shall be covered with geotextile fabric (four (4) fire hydrant blankets) before backfilling. Before this dry well (drainage pit) is covered with backfill, the Contractor shall notify the Company Inspector in order that each drainage system may be inspected.

Fire hydrant drainage pits shall not be connected to or located within ten (10) feet of non-storm sewers, storm sewers, or storm drains.

See Standard Drawing: 2000 in Appendix of Drawings

9.3 Removal of Fire Hydrants

Fire hydrants that are discontinued, abandoned or replaced shall be

removed and returned with caps to the Allmond Avenue Warehouse. Surfaces shall be restored in accordance with Section 11: "RESTORATION".

9.3.1 Removal of Fire Hydrants on Active Water Mains

All discontinued Fire Hydrants shall be abandoned by turning off the Fire Hydrant connecting valve, excavating and removing the Fire Hydrant either by disconnecting and removing both the supply and Fire Hydrant at the Fire Hydrant gate valve or by removing the Fire Hydrant from the supply at the elbow of the Fire Hydrant.

If the supply pipe is removed from the gate valve, the gate valve shall be turned off and a mechanical joint plug installed on the gate valve.

If the fire hydrant is removed from the supply pipe at the elbow, a mechanical joint cap shall be installed on the abandoned Fire Hydrant supply pipe.

If a Mechanical Joint Cap will not fit on the fire hydrant supply pipe, the supply pipe may be sealed with concrete.

9.3.2 Removal of Fire Hydrants on Abandoned Water Mains

Fire hydrants which are abandoned with the water main, in lieu of removal by excavation and with approval of the LWC Project Manager, the fire hydrant may be cut off no less than one foot (1') below finished grade, the abandoned barrel filled with concrete, the fire hydrant gate valve turned off, round top and lid removed, and keytube filled with concrete.

10. SERVICE WORK

10.1 Notification of Customers

Notification of customers is the Contractor's responsibility with coordination of LWC Personnel. It is the intent of the Company not to interrupt service to existing customers, unless absolutely necessary. When it is necessary to interrupt service, all customers affected by shut-off shall be notified in person, or in cases where the customer cannot be contacted, by a LWC notification tag attached to the front door of their premises by the Contractor.

Such notification shall be made twenty-four hours prior to shut-off and with Company approval, allowing sufficient time for the customer to draw and reserve an ample supply of water. Notification tags are available from the Company.

10.2 Service Installation - General

A service installation is defined to include all work necessary to install the copper tubing or pipe and all related items from the main to the property line. The installation shall include, the following: tapping of the main; installing the corporation stop or gate valve; service line tubing or pipe; meter vault; cast iron frame and lid; water meter assembly; backfilling and restoring of paved and unpaved surfaces and flushing. Installation may require reconnection to existing service lines.

Excavation, backfilling, and restoring paved and unpaved surfaces shall be done in accordance with "Service Excavation at Main" (Section 10.12).

All taps in water mains shall be made by the Contractor, and corporation stops shall be inserted by means of a tapping machine in such manner that will permit continued conditions of water flow and pressure within these mains. The Contractor shall use care in inserting and tightening the corporation stop, and shall reimburse the Company for any damage or expense caused by any of their activities under this contract.

Wet tapping of water mains shall be required on all pipe.

10.3 Small Service Installation - Two Inches (2") and Smaller

During installation of corporation stops, the corporation stop shall not be turned using a pipe wrench. The corporation stop must be turned using a smooth jaw, adjustable crescent type wrench or open end wrench.

Special care shall be observed in handling the copper tubing so as not to kink, mash, or otherwise damage it. No such damaged tubing shall be installed. No bend shall be made in the tubing with a radius less than four inches (4"). Where under pavement, tubing shall be installed continuously and in one piece without intermediate joints or couplings except at the terminals and except where the continuous length to be installed exceeds one hundred feet (100') for 3/4" and 1" sizes.

All intermediate and terminal joints for 3/4" and 1" sizes of copper tubing shall be the flared type or compression type, using the proper tools for the sizes of tubing and types of fittings involved.

Service connections shall be installed so that the outlet is at an angle of 45° above the horizontal. A bend in the service line shall be provided to ensure flexibility and to accommodate the effects of loads.

Tubing shall extend from the meter setting assembly to the property line and thoroughly flushed for one (1) minute prior to connection to the

customer service line.

For Double Setter meters the tail pipes of a service installation (where two meters are to be installed in one vault), shall be installed parallel for their entire length and at least eight inches (8") apart, and in no event shall they cross one another.

Long services are defined as services to meters on the opposite side of the street of the water main to which it is connected and shall be bored or jacked under pavements unless an open cut is approved by the LWC Project Manager.

The Contractor must verify the service size with the LWC Project Manager or Company Inspector where any service length is greater than one hundred feet (100').

Short services are defined as services to meters on the same side of the street as the water main to which it is connected.

See Standard Drawings: 3002, 3003, 3004, 3400, 3401, 3403, 3404, 3420, 3430, 3200, and 3202 in Appendix of Drawings

10.3.1 Tapping Ductile Iron –Pressure Class 350 Pipe for Small Service Installation - Two Inches (2") and Smaller

In the location where Ductile Iron –Pressure Class 350 Pipe will be tapped, the pipe shall be wrapped with three (3) layers of polyethylene compatible tape completely around the pipe to cover the area where the tapping machine and chain is mounted. The tap shall install the corporation stop directly through the tape and polywrap.

After the tap is completed on mains with polyethylene wrap, the Contractor shall repair and replace the polyethylene wrap to completely cover the main and corporation stop in accordance with the details in the Appendix of Drawings.

The service line shall be flushed for two (2) minutes through the meter stop before connecting to the meter. Once the corporation stop has been turned on, and prior to backfilling, the corporation barrel set nut may need to be securely tightened to prevent leakage.

The corporation stop and a minimum distance of three feet (3') of the copper service line shall be wrapped with polytape.

For ductile iron pipe Pressure Class 350 service outlets shall be made per the table below:

Service Installation Guide for Pressure Class 350 Ductile Iron Pipe

Pipe Size (inches)	Tap Size (inches)				
	3/4	1	1 1/2	2	>2
4"	tap	saddle	saddle	saddle	Requires Tapping
6"	tap	tap	saddle	saddle	Sleeve or Fitting
8"	tap	tap	saddle	saddle	" "
12"	tap	tap	saddle	saddle	" "
16"& 20"	tap	tap	tap	tap	" "

All direct taps require the installation of 2 to 3 layers of 3-mil thread sealant tape on the corporation stop. This guide is based on either a direct tap method or tapping saddle using an AWWA standard taper thread Corporation Stop.

See Standard Drawings: 3002, 3003, 3004, 3400, 3401, 3403, 3404, 3420, 3430, 3200, 3202 and 3804 in Appendix of Drawings

10.3.2 Tapping PVC Pipe for Small Service Installation - Two Inches (2") and Smaller

For PVC (polyvinyl chloride) pipe, service outlets of three quarter inch (3/4") through two inches (2") shall be made with a tapping saddle.

Tapping saddle bolts shall be tightened with a torque wrench according to the saddle manufacturers' torque recommendations.

When installing a service to PVC, the Contractor shall use a shell cutter that is designed for DR14 (pressure class 200, AWWA C900) or DR18 (pressure class 150, AWWA C900) and one that will remove the material and retain the coupon. No twist drills will be

allowed. The cutting tool must be sharp and without damage. The coupon must be delivered to the Company Inspector.

When tapping the PVC pipe under pressure, the pipe temperature shall be between 32° and 90° F.

The taps shall be located a minimum of twenty-four inches (24") from the joint of the PVC pipe, and, if installing more than one tap in one length of PVC pipe, the taps shall be staggered and a minimum of eighteen inches (18") apart, measured longitudinally. Taps shall not be made in an area of PVC pipe that shows damage.

The service line shall be flushed for two (2) minutes through the meter stop before connecting to the meter. Once the corporation stop has been turned on, and prior to backfilling, the corporation barrel set nut may need to be securely tightened to prevent leakage.

Tapping sleeves shall be assembled according to the manufacturers' instructions and must be supported independently of PVC pipe by precast concrete blocks during the tapping operation. The support shall be left in place, filling any voids such that the pad is bearing against undisturbed earth, and thrust blocks behind tapping sleeves shall be used as with other fittings.

When a service tap is made on a PVC water main, No. 12 copper tracer wire will be connected to the No. 12 copper tracer wire on the main and then wrapped, with insulation removed, around the copper service line or affixed to the tapping saddle.
See Standard Drawings: 3002, 3003, 3004, 3400, 3401, 3403, 3404, 3420, 3430, 3200, and 3202 in Appendix of Drawings

10.3.3 Tapping Ductile Iron Class 54 & 56 Pipe and Cast Iron Pipe for Small Service Installation - Two inches (2") and smaller

For ductile iron pipe Class 54 & 56 and cast iron pipe, service outlets of three quarter inch (3/4") through two inches (2") shall be made by direct tapping.

All direct taps require the installation of 2 to 3 layers of 3-mil thread sealant tape on the corporation stop. This guide is based on either a direct tap method or tapping saddle using an AWWA standard taper thread Corporation Stop.

In direct tapping of iron pipe, the tap threads must match the

corporation stop's AWWA threads. The pipe and corporation stop shall be examined to insure acceptability for direct tapping.

In the location where Ductile Iron Class 54 & 56 Pipe will be tapped, the pipe shall be wrapped with three (3) layers of polyethylene compatible tape completely around the pipe to cover the area where the tapping machine and chain is mounted.

The tap shall install the corporation stop directly through the tape and polywrap.

After the tap is completed on mains with polyethylene wrap, the Contractor shall repair and replace the polyethylene wrap to completely cover the main and corporation stop in accordance with the detail in the Appendix of Drawings.

The service line shall be flushed for two (2) minutes through the meter stop before connecting to the meter. Once the corporation stop has been turned on, and prior to backfilling, the corporation barrel set nut may need to shall be securely tightened to prevent leakage.

The corporation stop and a minimum distance of three feet (3') of the copper service line shall be wrapped with polytape.

See Standard Drawings: 3002, 3003, 3004, 3400, 3401, 3403, 3404, 3420, 3430, 3200, 3202, and 3804 in Appendix of Drawings

10.4 Large Service Installation – Larger than Two Inches (2")

Service outlets of larger than two inches (2") shall be made with a ductile iron tee or stainless steel or ductile iron tapping sleeve and gate as directed by LWC Project Manager or Company Inspector on new ductile iron or PVC pipe. There shall be no tapping of same size on same size pipe with tapping sleeve and gate, a tee must be installed.

Long services are defined as services to meters on the opposite side of the street of the water main to which it is connected and shall be bored or jacked under pavements unless an open cut is approved by the LWC Project Manager. The Contractor must verify the service size with the LWC Project Manager or Company Inspector where any service length is greater than one hundred feet (100'). Short services are defined as services to meters on the same side of the street as the water main to which it is connected.

10.4.1 Tapping Ductile Iron –Pressure Class 350 Pipe for Large Service Installation - Larger than Two Inches (2")

Service outlets of larger than two inches (2") shall be made with a ductile iron tee or stainless steel or ductile iron tapping sleeve and gate valve as directed by LWC Project Manager or Company Inspector on ductile iron – Pressure Class 350 pipe.

There shall be no tapping of same size on same size pipe with tapping sleeve and gate, a tee must be installed.

After the tap is completed on mains with polyethylene wrap, the Contractor shall repair and replace the polyethylene wrap to completely cover the main and fittings in accordance with the detail in the Appendix of Drawings.

The service line shall be flushed for two (2) minutes through the meter stop before connecting to the meter.

See Standard Drawings: 3203 and 3601 in Appendix of Drawings

10.4.2 Tapping PVC Pipe for Large Service Installation – Larger than Two Inches (2")

Service outlets of larger than two inches (2") shall be made with a ductile iron tee or stainless steel or ductile iron tapping sleeve and gate valve as directed by LWC Project Manager or Company Inspector on PVC (polyvinyl chloride) pipe.

There shall be no tapping of same size on same size pipe with tapping sleeve and gate, a tee must be installed.

When installing a service to PVC, the Contractor shall use a shell cutter that is designed for DR14 (pressure class 200, AWWA C900) or DR18 (pressure class 150, AWWA C900) and one that will remove the material and retain the coupon. No twist drills will be allowed. The cutting tool must be sharp and without damage. The coupon must be delivered to the Company Inspector.

When tapping the PVC pipe under pressure, the pipe temperature shall be between 32° and 90° F. The taps shall be located a minimum of twenty-four inches (24") from the joint of the PVC pipe. Taps shall not be made in an area of PVC pipe that shows damage.

Tapping sleeves shall be assembled according to the manufacturers' instructions and must be supported independently of PVC pipe by precast concrete blocks during the tapping operation. The support shall be left in place, filling any voids such

that the pad is bearing against undisturbed earth, and thrust blocks behind tapping sleeves shall be used as with other fittings.

When a service tap is made on a PVC water main, No. 12 copper tracer wire will be connected to the No. 12 copper tracer wire on the main and then wrapped, with insulation removed, around the service line gate valve and extend to the top of the keytube.

The service line shall be flushed for two (2) minutes through the meter stop before connecting to the meter.

See Standard Drawings: 3203 and 3601 in Appendix of Drawings

10.4.3 Tapping Ductile Iron Class 54 & 56 Pipe and Cast Iron Pipe for Large Service Installation – Larger than Two Inches (2")

Service outlets of larger than 2" shall be made with a ductile iron tee or stainless steel or ductile iron tapping sleeve and gate valve on existing ductile iron Class 54 & 56 pipe and Cast Iron Pipe. There shall be no tapping of same size on same size pipe with tapping sleeve and gate, a tee must be installed.

After the tap is completed on mains with polyethylene wrap, the Contractor shall repair and replace the polyethylene wrap to completely cover the main and fittings in accordance with the detail in the Appendix of Drawings.

The service line shall be flushed for two (2) minutes through the meter stop before connecting to the meter.

See Standard Drawings: 3203 and 3601 in Appendix of Drawings

10.5 Setting Meter Vaults

Meter vaults shall be set either to the existing grade, or as indicated on the service order or to the grade given by a stake card. Earth shall be firmly tamped by pneumatic, vibratory or other approved compaction device and backfilled per Section 7: "BACKFILLING PROCEDURES AND TAMPING" around the vault and cover, the lid locked in and the meter setting centered in the middle of the vault and at the proper depth below grade, as shown on the drawing in the Appendix of Drawings.

Meter vaults shall not be installed in areas subject to vehicular traffic if avoidable. When directed to be installed in areas subject to vehicular traffic, the meter vault shall be of the heavy duty concrete type with heavy

duty frame and cover.

See Standard Drawings: 3002, 3003, 3004, 3400, 3401, 3403, 3404, 3420, 3430, 3200, 3202, 3203, and 3601 in Appendix of Drawings

10.6 Pressure Regulators (Pressure Reducing Valves)

When directed by the LWC Project Manager, the Contractor shall install a pressure regulator (pressure reducing valves).

See Standard Drawings: 3003, 3004, 3401, and 3202 in Appendix of Drawings

10.7 Leak Testing the Service

After the complete service has been installed and before any joints are covered, the corporation stop shall be opened, the entire length of the service filled with water and each joint observed by the Contractor for leaks.

Any leaks so found shall be immediately repaired. After the service has been observed by the Company Inspector to be watertight throughout its length, the meter stop shall be shut off, and the backfilling started.

The corporation barrel set nut may need to be securely tightened to prevent leakage.

The Contractor shall leave the corporation stop fully open and the meter angle stop fully closed upon completion of the testing.

10.8 Relocate Service

Relocating a service is defined to include installing a complete new service to an existing customer, including a new tail pipe, discontinuing the old service at the main (in the event the existing main is to remain active), abandoning the old meter vault, and returning the old meter, cover and cast iron frame to the Louisville Water Company's Allmond Avenue Yard.

Concrete meter vaults and heavy duty frame and covers shall be used in driveways, parking lots, and other areas of vehicular traffic.

Service installation shall be done in accordance with "Small Service Installation (Section 10.3) and Large Service Installation (Section 10.4). Excavation, backfilling, and restoring of surfaces shall be done in accordance with "Service Excavation at Main" (Section 10.12). Abandoning the old meter vaults shall be done in accordance with "Backfill Meter Vault" (Section 10.13).

Contractors shall be responsible to make at least two (2) attempts when connecting the tailpiece to a customer's galvanized service line. The second attempt shall be limited to a maximum of three feet (3') beyond the property line or to any property improvement which would require excessive restoration. If the second attempt is unsuccessful, the Contractor shall immediately contact the Company Inspector, obtain a representative sample of the deteriorated line and provide a temporary service connection to the customer.

See Standard Drawing: 3440 in Appendix of Drawings

10.9 Renew Service

Renewing a service is defined to include installing a new copper service line from the existing main or new main to the meter stop, and a new copper tail pipe from the meter stop to the property line or the joint where the tail pipe connects to the customer service line (whichever is shorter) and shall include, the following: excavation; boring or jacking of copper tubing or pipe; installing corporation stop; tapping saddle or tapping sleeve and gate valve at the main; installing all tubing and/or pipe and all associated fittings; frame and cover; and backfilling and restoring of all surfaces.

Service installation shall be done in accordance with "Small Service Installation" (Section 10.3) and "Large Service Installation" (Section 10.4). The Contractor shall discontinue the old service in accordance with "Discontinue Service" (Section 10.11). All lead service lines shall be renewed in accordance with "Cutting Lead Pipe" (Section 10.16) and "Flushing of Lead Services" (Section 10.17) unless otherwise instructed on the project drawings.

Excavation, backfilling, and restoring of surfaces shall be done in accordance with "Service Excavation at Main" (Section 10.12). The LWC Project Manager has estimated the number of services to be renewed, and these are shown on the project drawings.

Contractors shall be responsible to make at least two (2) attempts when connecting the tailpiece to a customer's galvanized service line. The second attempt shall be limited to a maximum of three feet (3') beyond the property line or to any property improvement which would require excessive restoration. If the second attempt is unsuccessful, the Contractor shall immediately contact the Company Inspector, obtain a representative sample of the deteriorated line and provide a temporary service connection

to the customer.
See Standard Drawing: 3441 in Appendix of Drawings

10.10 Transfer Service

Transferring a service is defined to include installing a length of service line, as require, to reconnect an existing copper service to the existing main or new main, and shall include, the following: excavation; boring or jacking of copper tubing or pipe; installing corporation stop; tapping saddle or tapping sleeve and gate valve at the main; installing all tubing and/or pipe and all associated fittings; and backfilling and restoring of all surfaces.

Service installation shall be done in accordance with "Small Service Installation" (Section 10.3) and "Large Service Installation" (Section 10.4). The Contractor shall discontinue the old service in accordance with "Discontinue Service" (Section 10.11).

When a lead or galvanized tail pipe is encountered, the tail pipe from the meter stop to the property line or joint where the tail pipe connects to the customer service line (whichever is shorter) shall be replaced with a copper service line.

All lead service lines shall be transferred in accordance with "Cutting Lead Pipe" (Section 10.16) and "Flushing of Lead Services" (Section 10.17) unless otherwise instructed on the project drawings.

Excavation, backfilling, and restoring of surfaces shall be done in accordance with "Service Excavation at Main" (Section 10.12). The LWC Project Manager has estimated the number of services to be transferred, and these are shown on the project drawings.

Contractors shall be responsible to make at least two (2) attempts when connecting the tailpiece to a customer's galvanized service line. The second attempt shall be limited to a maximum of three feet (3') beyond the property line or to any property improvement which would require excessive restoration. If the second attempt is unsuccessful, the Contractor shall immediately contact the Company Inspector, obtain a representative sample of the deteriorated line and provide a temporary service connection to the customer.

See Standard Drawing: 3442 in Appendix of Drawings

10.11 Discontinue Service

Discontinuing a service is defined to include excavating a service line at a water main that is to remain active, turning off the corporation stop

(ferrule), disconnecting and plugging the service line, backfill the meter vault, and restoring all surfaces.

Driven ferrules, which are not threaded onto the main, will require water main shutdown, removal, and installation of a wrap-around repair band. Driven ferrules can be expected on most lead services.

Excavating, backfilling, and restoring of surfaces shall be done in accordance with "Service Excavation at Main" (Section 10.12). Abandoning the old meter vaults shall be done in accordance with "Backfill Meter Vault" (Section 10.13). The LWC Project Manager has estimated the number of services to be discontinued, and these are shown on the project drawings.

Service vaults abandoned as a result of abandoning an existing main shall be site-restored by the Contractor as required in "Backfill Meter Vault" (Section 10.13).

See Standard Drawing: 3442 in Appendix of Drawings.

10.12 Service Excavation at Main

The excavation at the water main shall be made in accordance with "Twelve-Inch (12") Cutback Requirement" (Section 5.4.2), and "Trenching" (Section 5.5) as appropriate to the type of surface. Backfilling and restoration shall be in accordance with "BACKFILLING PROCEDURES AND TAMPING" (Section 7) and "RESTORATION" (Section 11) as appropriate to the type of surface.

Contractor shall be responsible for all remedial work due to service excavations as required in the section "WARRANTY" (Section 12).

10.13 Backfill Meter Vault

Meter vaults on all discontinued or relocated services shall be abandoned by removing the old meter, cast iron frame and cover, and any existing curb stop lids, and filling the void to existing grade with backfill and surface material, appropriate to the type surface. Unpaved areas shall be backfilled to grade with topsoil and restored in accordance with "RESTORATION" (Section 11).

Sidewalks shall be backfilled with pit run sand or DGA, and repaved in accordance with "RESTORATION" (Section 11). Parking lots, driveways, and other areas subject to vehicular traffic shall be backfilled using DGA, and restored in accordance with "Twelve-Inch (12") Cutback Requirement" (Section 5.4.2), "BACKFILLING PROCEDURES AND TAMPING" (Section 7), and "RESTORATION" (Section 11) found in

this specification.

All meters and cast iron frames and lids shall be returned to the Allmond Avenue warehouse. Contractor shall be responsible for all remedial work due to discontinuation of meter vaults as required in the section "WARRANTY" (Section 12).

10.14 Potential Shock Hazard

Due to electrical grounding of some electrical services to metal water service lines, the potential for electrically charged water service lines and/or water meters exists.

The Contractor shall check each service for electric potential before working on the service. Any electrically-charged water service shall immediately be brought to the attention of the Company Inspector.

10.15 Cutting Lead Pipe

When the cutting of pipe made of lead is required, the pipe shall be cut with a shear device, such as Reed Ratchet Shears or similar device, as approved by the LWC Project Manager. Sawing of lead pipe shall not be allowed. All lead material shall be removed before it is connected.

10.16 Flushing of Lead Services

Flushing of renewed lead services shall be conducted immediately after the renewed service is reconnected at maximum flow. Flushing shall be continued for a minimum of sixty (60) minutes.

The Contractor shall be responsible for supplying all hoses, fixtures, and couplings needed to perform the lead service flush.

The Contractor shall identify, on a daily basis, those services that will require renewal on the following workday. Residences requiring lead service renewals shall be investigated to determine if an outside spigot is available and functioning properly. The Contractor shall notify the Company Inspector when an outside spigot is not available or not properly functioning in order for the Company Inspector to contact the customer.

Services that cannot be flushed externally by the Contractor or internally by the customer at the time of the renewal, may be renewed, but shall be left in the "off" position immediately after the renewal is completed. The Contractor shall immediately notify the Company Inspector when any service is turned "off" in order for the Company Inspector to notify the Company Radio Room.

10.17 Lead Service Renewal Notification

"Lead Service Renewal" notices shall be supplied by the Company and distributed by the Contractor to all properties in which a lead service was renewed or replaced.

11. RESTORATION

11.1 General

Repaving over the completed trench shall be done by the Contractor, who shall furnish all materials required. Repaving shall match the original paving in type, shall be first class in all respects, and shall comply with specifications covering the type of paving to be restored as issued by the authority over the thoroughfare involved.

The restoration of parking lots and driveways serving commercial and/or public establishments shall comply with the specifications of the respective authority having jurisdiction over the abutting right-of-way.

Except for parking lots, driveways, and sidewalks, each individual pavement restoration shall have a Company-supplied pavement marker installed by the Contractor.

All sawcuts shall be straight and perpendicular to the driveway / roadway. Restoration shall be made with the same type material and finish that is removed. Street restoration shall be as specified in the detail for Backfill and Pavement Restoration in accordance with the Appendix of Drawings, pending the jurisdiction of said street, included in these specifications. Permanent restoration of driveway, sidewalks, and street intersections shall be completed by the Contractor within ten working days after backfilling of trench is complete. If restorations are not completed, the Company may, at its option, have the repairs made by others and deduct those costs from the amount owed to the Contractor.

The Contractor is to take whatever measures are necessary to keep all traveled surfaces free of dirt, mud, or other material during all non-working hours. Unless otherwise approved by the LWC Project Manager, no excavated material shall be placed on the paved surface or any other areas near the trench; the excavated material shall be placed directly from the trench to the haul truck. The Contractor shall provide adequate dust control and follow all governing regulations applicable to the work.

A maximum of 1,500 lineal feet shall be disturbed at one time prior to

final grade. Restoration of the area is required before the Contractor is permitted to proceed.

11.2 Bituminous Paved Surfaces (Asphalt)

All bituminous pavement cuts are to be restored in accordance with the permanent pavement restoration detail as shown in the Appendix of Drawings.

Pavement cuts are to be uniform width and straight sawed edges. An approved joint sealer is to be used to seal all joints between new and existing pavement. In the event asphalt plants have closed for the season, the Contractor shall maintain all pavement cuts with temporary bituminous pavement, until it becomes possible to permanently restore the pavement. Bituminous concrete pavement used for permanent pavement restoration shall have a minimum temperature of 225°F as measured when discharging from the truck.

Particular care is to be taken that existing pavement surfaces within the right-of-way are not scarred or otherwise damaged by equipment. Planking or other protective devices are to be used at all times to prevent damage to paved surfaces from tracked equipment.

In the event the paved surfaces damaged by work on this project, resurfacing is to be required as follows:

- 1) If scarring or other damage is continuous, resurfacing is to be likewise continuous, and is to consist of one and one-half inches (1 ½") Class A bituminous surfaces extending to the edge of damaged lane.

The edge of the damaged pavement shall be edge keyed, with the resurfaced section being flush with the undisturbed adjacent pavement surface, allowing roadway surface drainage not to be obstructed.

- 2) If scarring or other damage is determined to be intermittent, individual or paved patches may be permitted, and are likewise to consist of Class A bituminous surface, extending to the edge of the damaged lane.
- 3) All damage to the edge of pavement shall require the removal of and base repair of a minimum of two feet (2') in addition to the maximum width of the damage. The longitudinal edge is to be a uniform width with straight sawed edges. The lane is then to be milled a minimum of five feet (5') in width with a two inch (2") minimum asphalt overlay.

There will be no skip milling allowed and the minimum length will be determined in the field by the Company Inspector or LWC Project Manager.

All joint sealant material shall be: hot-applied, non-water-based, and produced by a competent and reputable manufacturer. Store-bought items shall not be allowed. Sand shall be placed to prevent tracking.

11.3 Asphalt Materials and Construction Methods

The composition of the bituminous asphalt (bituminous concrete) pavement and method of construction shall be in accordance with the Kentucky Transportation Cabinet Department of Highways (KTCDOH) Standard Specifications for Road and Bridge Construction (latest edition). A copy of these specifications is on file with the Louisville Water Company's Resource Coordinator, Construction Inspection Services, 4801 Allmond Avenue.

11.4 Concrete Paved Surfaces (Portland Cement Concrete)

All concrete used for structural purposes (such as thrusts blocks, road subbase, sidewalks, etc.) shall be produced at a concrete plant, delivered by a ready-mix concrete truck or mobile mixer (metered) concrete truck. Only concrete used for miscellaneous purposes (such as vault floor pad, end plugs for mains to be abandoned-in-place, etc.) is allowed to be that of an on-site bag mix.

All cuts in concrete driveways and sidewalks are to be replaced from construction joint to construction joint, using minimum 3500 psi concrete. When a section of sidewalk at a street intersection is to be replaced in the Louisville / Jefferson County Metro Government jurisdiction a wheel chair ramp is to be installed in accordance with the Appendix of Drawings.

For pipeline installation work, all concrete curbs or curb and gutter which are damaged are to be entirely removed and replaced in kind between existing joints. Stone base material shall be placed and compacted under any disturbed area with the curb replacement with the same type stone base material and compaction as removed. Base material shall extend a minimum of eighteen (18) inches beyond the back of the curb. Install one-half inch (1/2"), pre-molded expansion joint material between new and existing concrete. Concrete shall be a minimum 3500 psi concrete.

For service line installation work, concrete curbs or curb and gutter which

are saw cut (typically four inch (4)" in width) are to be replaced in kind and have additional saw cutbacks one foot (1') to each side of the initial cut (4"cut). If either of the additional one foot (1') saw cutbacks fall within two feet (2') of an existing pavement joint, the entire section shall be removed and replaced to the existing joint. Stone base material shall be placed and compacted under any disturbed area with the curb replacement with the same type stone base material and compaction as removed.

Base material shall extend a minimum of eighteen (18) inches beyond the back of the curb. Install one-half inch (1/2"), pre-molded expansion joint material between new and existing concrete. Concrete shall be a minimum 3500 psi concrete.

Particular care is to be taken that existing pavement surfaces within the right-of-way are not scarred or otherwise damaged by equipment. Planking or other protective devices are to be used at all times to prevent damage to paved surfaces from tracked equipment.

See Standard Drawing: 4410 in Appendix of Drawings

11.5 Concrete Materials and Construction Methods (Portland Cement Concrete)

All concrete used on this project and as shown on the project drawings shall have a 28-day minimum compression strength of 3,500 pounds per square inch (psi). The proportions and construction requirements for the concrete shall be as listed in the Kentucky Transportation Cabinet Department of Highways (KTCDOH) Standard Specifications for Road and Bridge Construction (latest edition).

See Standard Drawings: 4000, 4100 and 4400 in Appendix of Drawings

11.6 Unpaved Surfaces

All drainage structures (such as pipe, head or wing walls, channels, flumes, and culverts), fences, signs, etc., public or private, which are damaged or removed by this Contractor, shall be repaired or replaced in kind to the satisfaction of the owner. All open ditches shall be restored to their present cross sections, depths, and slopes, and dressed and graded to provide permanent adequate drainage to present connecting ditches or culverts equal to the original drainage systems except where specifically indicated on the project drawings.

The Contractor shall replace all surface material including landscaping, shrubbery, fences, or other disturbed surfaces, to a condition at least equal to that before the work began, furnishing all labor and materials.

The grassed area disturbed by the work under this contract, whether by

the Contractor or by any subcontractor, within or adjacent to the right-of-way of any state, county, city or other thoroughfare, public or private (except as required below), now in grass shall be shaped, seeded, and mulched in accordance with KTCDOH Standard Specifications for Road and Bridge Construction (latest edition).

Seed mixture shall be Mixture No. 1 as described in Seed Mixtures for Permanent Seeding. Acceptance of Seeding Section shall be amended to disallow compensations for any corrective seeding required by the LWC Project Manager.

All work fronting residential lots now in grass shall be shaped and seeded in accordance with KTCDOH Standard Specifications for Road and Bridge Construction (latest edition), but shall be amended to include removal of all rock from the sod bed. A minimum of six inches (6") of top soil being free of rock shall be placed prior to final restoration.

Reseeded areas that are located within ditches or on other sloped ground of 2:1 slopes or greater shall be covered with erosion control netting secured with pins or stakes, or prefabricated matting containing mulch, seed and fertilizer. All ditch lines in residential lots shall be covered with erosion control netting secured with pins or stakes, or prefabricated matting containing mulch, seed and fertilizer.

A maximum of 1,500 lineal feet shall be disturbed at one time prior to final grade. Restoration of the area is required before the Contractor is permitted to proceed.

Certain areas as approved by the LWC Project Manager or shown on the project drawings shall be sodded. Unless otherwise approved by the LWC Project Manager, no excavated material shall be placed on any paved roadway surface.

See Standard Drawing: 4300 in Appendix of Drawings.

11.7 Site Clean Up

Surplus pipeline materials, equipment, tools, and temporary structures shall be removed by the Contractor, and all dirt, rubbish and excess earth from excavations shall be hauled and disposed by the Contractor, all in a manner satisfactory to the Company.

The Contractor shall leave the site in presentable shape at least comparable with the condition in which it was before the construction began and in compliance with all restoration provisions of this

specification.

12. **WARRANTY**

The provisions governing work covered by warranty are contained in WARRANTIES, in the TERMS AND CONDITIONS.

13. **ADDITIONAL CONTRACT DEFINITIONS, and ABBREVIATIONS**

13.1 Additional Contract Definitions

Right-of-Way – A general term denoting land, property, or interest therein, usually in a strip, acquired for or devoted to a street, highway, or other public improvement.

Service Line – Any pipe, line, or conduit used or to be used to provide water service from a water main to the property line joint. A water service line shall be owned and maintained by the Company from the tap at the water main to the property line, edge of easement, or property line joint, whichever is closer to the water main.

Non-storm sewers – Sanitary sewer, combined sewer, septic tank, or subsoil treatment system.

Stone Classifications: Equivalencies:

Kentucky # 3 = Indiana # 2

Kentucky # 57 = Indiana # 8

Kentucky # 9 = Indiana # 3/8 pea

Kentucky D.G.A. = Indiana # 73

Structures – Bridges, culverts, catch basins, drop inlets, retaining walls, cribbing, manholes, endwalls, sewers, service pipes, septic tanks, lateral fields, foundation drains, fences, swimming pools, and other features which may be encountered in the work and not classified herein.

Supplemental Project Drawings – Drawings included in the Plans to specify construction details.

Underground Facility – means any item which shall be buried or placed below ground for use in connection with the storage or conveyance of water, sewage, electronic, telephone or telegraph communications, electric

energy, oil, gas or other substances, and shall include pipes. Sewers, conduits, cables, valves, lines, wires, manholes, appurtenances, attachments and those portions of poles and their attachments below ground.

Utility – Pipe lines, conduits, ducts, transmission lines, overhead or underground wires, railroads, storm drains, sanitary sewers, irrigation facilities, street lighting, traffic signals, and fire alarm systems, and appurtenances of public utilities and those of private industry, businesses or individuals solely for their own use or use of their customers which are operated or maintained in, on, under, over or across public right-of-way or public or private easement.

Water Main – Mains of three (3) inch and larger diameter, together with all appurtenances, any necessary valves, fire hydrants, and associated materials receiving potable water and distributing it to individual customers.

13.2 Abbreviations:

ANSI – American National Standards Institute
ASTM – American Society of Testing Materials
AWWA – American Water Works Association
C – Temperature in degree Celsius
CFS – Cubic Feet Per Second
CI – Cast Iron
DEG - ° - Degree
DGA – Dense Graded Aggregate
DI – Ductile Iron
F – Temperature in degree Fahrenheit
FPS – Feet Per Second
FT – ‘ - Feet
HTH – Dry Chlorine (Calcium Hypochlorite)
IN – “ - Inch
KAR – Kentucky Administrative Regulations
KDOW – Kentucky Division of Water
KOSHA – Kentucky Occupational Safety and Health Association
KRS – Kentucky Revised Statutes
KTC – Kentucky Transportation Cabinet
KTCDOH - Kentucky Transportation Cabinet Department of Highways
MJ – Mechanical Joint
MSD – Louisville and Jefferson County Metropolitan Sewer District
MUTCD – Manual on Uniform Traffic Control Devices for Streets and Highways
OSHA – Occupational Safety and Health Administration
PCB – Polychlorinated Biphenyls (toxic chemicals)

PPM – Parts per Million
PSF – Pounds per Square Foot
PSI – Pounds per Square Inch
PVC – Polyvinyl Chloride
USGS – United States Geological Survey
VHS - Video Cassette Format (Vertical Helix Scan)
WQC – Water Quality Certification
% - per cent
@ - at
/ - per
= - equals

13.3 Technical References

Section:

- 1.6.1 Federal Highway Administration, Part VI (6) of the Manual on Uniform Traffic Control Devices (MUTCD).
- 1.6.4 Louisville / Jefferson County Metro Government Ordinance: Title VII (7), Traffic Code: Chapter 72 Parking Regulations.
- 1.6.5 KRS-220, 224 Soil Erosion and Sediment Control
Jefferson County Ordinance, Chapter 159, Erosion Prevention and Sediment Control
- 1.6.6 Kentucky Division of Water- General Water Quality Certification, Permit #12.
- 2.2 KOSHA – 803 KAR 2:300 – 2:320; 803 KAR 2:240 – 2:423
- 3.2.4 Recommended Standards for Water Works (Ten States Standards) 2003 Edition
- 5.3 Blasting Regulations: KRS 351 and KAR 805.
- 6.2.2 PVC Pipe – Design and Installation AWWA Manual No. M-23
- 6.2.3 AWWA Standard Specification C 600 – Installation of Ductile Iron Water Mains and Their Appurtenances.
- 6.4.1 AWWA Standard Specification C 111 – Rubber–Gasket Joints for Ductile Iron Pressure Pipe and Fittings.
AWWA Standard Specification C 900 – Polyvinyl Chloride (PVC) Pressure Pipe, 4”-12” for Water Distribution.
- 6.7.1 AWWA Standard Specification C 105 – Polyethylene Encasement for Ductile-Iron Pipe Systems.
- 7.1. ASTM D-1557 – Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort.
- 7.4 Kentucky Transportation Cabinet – Department of Highways – Standard Specification for Road and Bridge Construction.
- 8.2.2 401 KAR 8:150 –sections 4 (1) and 4 (2) Disinfection and Filtration.
- 8.3 Louisville Water Company Best Management Practice and

Procedures on Chlorinated Water Disposal, December, 2001.

14. TECHNICAL DESIGN AND CONSTRUCTION STANDARDS

1 GENERAL DESIGN REQUIREMENTS

- 1.1 The Utility shall establish and maintain Technical Design and Construction Standards for all water main projects reviewed and constructed under the Agreed Order.
- 1.2 The Utility shall ensure that the plans and specifications for each project meet or exceed all Technical Design and Construction Standards.
- 1.3 The Professional Engineer of Record shall ensure the plans and specifications for each project meet or exceed these Technical Design and Construction Standards.
- 1.4 Hydraulics
 - 1.4.1 The utility shall define existing and potential customer peak demand in the hydraulic analysis.
 - 1.4.2 The hydraulics analysis shall demonstrate the proposed water main projects can be flushed at least two and one half (2.5) feet per second (fps), while keeping system pressure above twenty (20) pounds per square inch (psi) within the pressure zone of the proposed project.
 - 1.4.3 The hydraulic analysis shall demonstrate the proposed water main project maintains thirty (30) psi under peak demand.
 - 1.4.4 The hydraulic analysis shall demonstrate that the proposed water main project does not drop ground level pressure in any part of the pressure zone below twenty (20) psi under all conditions of flow.
 - 1.4.5 Pressure greater than or equal to thirty (30) psi shall be available on the discharge side of all water meters.
- 1.5 Hydrants

- 1.5.1 Fire hydrants shall only be installed on new or existing water mains designed to carry fire flows. The water main supplying the hydrant must have a diameter greater than or equal to six (6) inches and provide sufficient capacity to meet the required fire flow. (LWC Technical Specifications Section 9.1)
- 1.5.2 An auxiliary valve shall be installed in all hydrant supply pipes. (LWC Technical Specifications Section 9.1)
- 1.5.3 Hydrant drains shall not be connected to any sanitary sewer, combined sewer, septic tank or subsoil treatment system (hereinafter “non-storm sewer”) or any storm sewer or storm drain, and shall be located at a distance greater than ten (10) feet from any non-storm sewer. (LWC Technical Specifications Section 9.2)

1.6 Water Main Valves

- 1.6.1 Water mains shall have a sufficient quantity of valves so that customer inconvenience and sanitary hazards will be minimized during repairs.
- 1.6.2 Urban areas as determined by the Utility shall include a valve spacing distance of less than or equal to five hundred feet (500’) for commercial service areas and less than or equal to one thousand feet (1,000’) for residential service areas. Valves should be located at roadway intersections where practical.
- 1.6.3 Rural areas as determined by the Utility shall include a valve spacing distance of less than one (1) mile. Valves should be located at roadway intersections where practical.

1.7 Blow-Off or Flushing Connections

- 1.7.1 For water mains that dead end, a fire hydrant or blow-off shall be required at the end of each six (6) inch or larger diameter water main and a flush hydrant or blow-off

shall be required at the end of each water main that is less than six (6) inches in diameter.

1.7.2 Each blow-off, fire hydrant, or flush hydrant shall be sized so that velocity of greater than or equal to two and one half (2.5) feet per second (fps) can be achieved in the water main served by the blow-off or hydrant during flushing.

1.7.3 Flushing devices, blow-offs, or air relief valve shall not be connected to any non-storm sewer or any storm sewer or storm drain, and shall be located at a distance greater than ten (10) feet from any non-storm sewer. Chambers, pits, or manholes containing valves, blow-offs, meters, or other such appurtenances shall not be directly connected to any non-storm sewer or any storm sewer or storm drain. Such chambers, pits, or manholes shall be drained to absorption pits underground or to the surface of the ground where they are not subject to flooding by surface water. (LWC Technical Specifications Section 8.3.2)

1.8 Air Relief Valves

1.8.1 Air relief valves or hydrants shall be installed at high points in water mains, where air can accumulate. Automatic air relief valves shall not be used in situations where manhole or chamber flooding may occur. (LWC Technical Specifications Section 8.7, 8.7.1 & 8.7.2)

1.8.2 The open end of an air relief pipe from automatic valves shall be extended a distance of greater than or equal to one (1) foot above grade and provided with a screened, downward facing elbow or shall be an equivalent standard as determined by the best professional judgment of the Utility. The pipe from a manually operated valve shall be extended to the top of the pit. (LWC Technical Specifications Section 8.7.1 & 8.7.2)

1.9 Bedding and Backfill

A continuous and uniform bedding shall be provided in the trench for all buried pipe. Backfill material shall be tamped in layers around the pipe and to a sufficient height above the pipe to adequately support and protect the pipe. Stones found in the trench shall be removed for a depth greater than or equal to six (6) inches

below the bottom of the pipe. (LWC Technical Specifications Section 7.1)

1.10 Minimum Depth

All water mains shall be covered to a depth equal to or greater than forty-two (42) inches to prevent freezing. (LWC Technical Specifications Section 7.1)

1.11 Thrust Blocks

All tees, bends, plugs, and hydrants shall be provided with reaction blocking, tie rods, or joints designed to prevent movement. (LWC Technical Specifications Section 6.14 & 9.1)

1.12 Disinfection and Coliform Monitoring

1.12.1 New or relocated water mains shall be thoroughly disinfected in accordance with 401 KAR Chapter 8:150 Section 4 (1) upon completion of construction and before being placed into service. To disinfect the new or relocated water mains, the Utility shall use chlorine or chlorine compounds (disinfectants) in such amounts as to produce an initial disinfectant concentration of at least fifty (50) ppm and a residual disinfection of greater than or equal to twenty-five (25) ppm at the end of twenty-four (24) hours. Follow the water main disinfection with thorough flushing and place the water main into service if, and only if, coliform monitoring applicable to the water main does not show the presence of coliform. If coliform is detected, repeat flushing of the water main and coliform monitoring. If coliform is still detected, repeat disinfection and flushing as if the water main has never been disinfected. Continue the described process until monitoring does not show the presence of coliform. (LWC Technical Specifications Section 8.2.2 & 8.6)

1.12.2 The presence or absence of total coliform monitored by sampling and analysis shall be determined for the new or relocated water main(s) as needed. Take samples at connection points to existing water mains at one (1) mile intervals and at dead ends, without omitting any branch of the new or relocated water main. Sample bottles shall be clearly identified as "special" construction tests. (LWC Technical Specifications Section 8.6)

- 1.12.3 For new construction projects, the distribution system, using the most expedient method, shall maintain coliform test results. (LWC Technical Specifications Section 8.6)
- 1.12.4 Chlorinated water resulting from disinfection of project components shall be disposed in a manner which will not violate 401 KAR 5:031. (LWC Technical Specifications Section 8.4)

1.13 Pressure Testing and Leak Detection

The presence or absence of leaks monitored by physical testing shall be determined in all types of installed pipe as needed. Pressure testing and leakage testing shall be in accordance with the latest edition of AWWA Standard C600. (LWC Technical Specifications Section 8.5)

1.14 Water Main Construction and Material Standards

- 1.14.1 Installation of water mains and appurtenances shall meet or exceed AWWA standards or manufacturer recommendations.
- 1.14.2 Pipes, fittings, valves, fire hydrants, and appurtenances shall meet or exceed the latest standards issued by the AWWA, ASTM, or NSF (if such standards exist). PVC and Polyethylene piping used must be certified to ANSI/NSF Standard 61.

1.15 Sewer Crossings and Separation

- 1.15.1 For the purpose of this standard, “non-storm sewer” is defined as any of the following: sanitary sewer, combined sewer, septic tank, or subsoil treatment system. (LWC Technical Specifications Section 3.1.4)
- 1.15.2 Water mains shall be laid a horizontal distance of greater than or equal to ten (10) feet horizontally from any existing or proposed non-storm sewer. The horizontal distance shall be measured from outside diameter of the water main to outside diameter of the non-storm sewer. (LWC Technical Specifications Section 3.1.4)
- 1.15.3 In cases where the Utility determines it is not practical to maintain a ten (10) foot separation, water mains may be

installed closer to a non-storm sewer provided that a variance is obtained from the Cabinet's Division of Water and maintained with the project records. (LWC Technical Specifications Section 3.1.4)

1.15.4 No deviation from the ten (10) foot separation is allowed if the non-storm sewer is a force main (sewer under pressure). (LWC Technical Specifications Section 3.1.4)

1.15.5 When water mains and non-storm sewers cross:

1.15.5.1 Water mains shall be laid such that there shall be a vertical distance of greater than or equal to eighteen (18) inches between the water main and non-storm sewer. The vertical distance shall be measured from the outside diameter of the water main to the outside diameter of the non-storm sewer line. (LWC Technical Specifications Section 3.1.4)

1.15.5.2 One (1) full length of the water pipe shall be located so that both joints of the water pipe will be as far from the non-storm sewer as practical as determined by the Utility. (LWC Technical Specifications Section 3.1.4)

1.15.5.3 Special structural support for the water and non-storm sewer may be required.
(LWC Technical Specifications Section 3.1.4)

1.15.6 No water pipe shall pass through or come in contact with any part of a non-storm sewer manhole. (LWC Technical Specifications Section 3.1.4)

1.16 Water Mains Near Areas with Organic Contamination

If water mains are installed or replaced in areas of organic contamination or in areas within two hundred (200) feet of underground or petroleum storage tanks, ductile iron or other non-permeable materials shall be used in all portions of the water main installation or replacement. (LWC Technical Specifications Section 5.5.6)

1.17 Asbestos-Cement Pipe (Transite Pipe)

If the existing water main to be tapped is asbestos-cement pipe, then the contractor shall conform to OSHA regulations governing the handling of hazardous waste during the process of tapping the asbestos-cement pipe. Pieces of asbestos-cement pipe resulting from the tap shall be double bagged, placed in a rigid container, and disposed of in an approved landfill. (LWC Technical Specifications Section 6.7)

1.18 Subfluvial Pipe Crossings

1.18.1 For subfluvial pipe crossings, a floodplain construction permit will not be required pursuant to KRS 151.250 if the following requirements of 401 KAR 4:050 Section 2 are met:

1.18.1.1 No material may be placed in the stream or in the flood plain of the stream to form construction pads, coffer dams, access roads, etc. during construction of pipe crossings.

1.18.1.2 Crossing trenches shall be backfilled as closely as possible to the original contour.

1.18.1.3 All excess material resulting from construction displacement in a crossing trench shall be disposed of outside the flood plain.

1.18.1.4 For erodible channels, there shall be at least thirty (30) inches of backfill on top of all pipe or conduit points in the crossing.

1.18.1.5 For nonerodible channels, pipes or conduits in the crossing shall be encased on all sides by at least six (6) inches of concrete with all pipe or conduit points in the crossing at least six (6) inches below the original contour of the channel.
(LWC Technical Specifications Section 1.3.6)

1.18.2 For subfluvial pipe crossings greater than fifteen (15) feet in width:

- 1.18.2.1 The pipe shall be of special construction having flexible, restrained, or welded watertight joints, and
- 1.18.2.2 Valves shall be provided at both ends of water crossings so that the section can be isolated for testing or repair. Valves shall be easily accessible and not be subject to flooding.
- 1.18.2.3 Permanent taps or other provisions to allow insertion of a small meter to determine leakage and obtain water samples shall be made on each side of the valve closest to the supply source.
(LWC Technical Specifications Section 1.3.6)

1.19 Cross Connections

Cross connections shall not be allowed in accordance with 401 KAR 8:020.

401 KAR 8:020 (2) Cross-connections prohibited. All cross-connections shall be prohibited. The use of automatic devices, such as reduced pressure zone back flow preventers and vacuum breakers, may be approved by the cabinet in lieu of proper air gap separation. A combination of air gap separation and automatic devices shall be required if determined by the cabinet to be necessary due to the degree of hazard to public health. Every public water system shall determine if or where cross-connections exist and shall immediately eliminate them.

1.20 Project Approvals, Record Retention and Management requirements and stipulations under this Agreed Order are as follows:

- 1.20.1.1 All water main projects reviewed by the Utility require the preparation of plans and specifications stamped by a licensed Kentucky Professional Engineer (P.E.) who shall be the Engineer of Record for an individual project.
- 1.20.1.2 All water main projects submitted to the Utility for review shall be documented as reviewed

and approved or denied by the Utility's Designated Plans Reviewer for the project.

- 1.20.1.3 All water main projects that the Utility designs internally or has designed by a contractor shall include plans and specifications stamped by a licensed Kentucky Professional Engineer (P.E.) who shall be the Engineer of Record for an individual project, and shall be reviewed and approved or denied by the Utility's Designated Plans Reviewer for the project.
- 1.20.1.4 All revisions to water main project plans previously approved by the Utility under the coverage of this Agreed Order shall be reviewed and approved or denied by the Utility's Designated Plans Reviewer for the project.
- 1.20.1.5 During construction, a set of Utility approved plans and specifications shall be available at the job site at all times. All work shall be performed in accordance with the Utility approved plans and specifications.
- 1.20.1.6 The Utility shall certify the water main projects has been constructed and tested in accordance with the approved plans and specifications. The Utility shall document and maintain a record of the certification of the project consistent with the recordkeeping requirements as stated in the Agreed Order.
- 1.20.1.7 The Utility shall define a project approval period not to exceed twelve (12) months, during which time the project construction shall begin.
- 1.20.1.8 Coverage under this Agreed Order does not relieve the Utility from the responsibility of obtaining any other approvals, permits, licenses required by the Cabinet and other state, federal and local agencies.
- 1.20.1.9 Project files and documentation, including water main project plans, location map, engineering calculations, and hydraulic information demonstrating regulatory compliance shall be

retained for a period of not less than five (5) years from the completion of the project (in-service date).

2 Qualifications For Cabinet's Division of Water Agreed Order Projects

2.1 The Cabinet's Division of Water Agreed Order Projects will be limited to projects that meet the criteria identified in this section. Projects not meeting these qualifications shall be submitted to the Cabinet's Division of Water for review and approval.

2.1.1 The water system shall have a valid Agreed Order.

2.1.2 Projects with an overall length less than ten thousand (10,000) contiguous feet shall qualify. Two (2) or more adjoining projects shall be considered one (1) project for the purposes of this requirement.

2.1.3 Projects consisting of water mains greater than or equal to three (3) inches in diameter or less than or equal to twelve (12) inches in diameter shall qualify. Additionally, circulating two (2) inch water main projects of less than five hundred (500) feet shall qualify if future extension from the line will not occur and if the Utility determines that the two (2) inch line will benefit the overall system hydraulics and / or drinking water quality.

2.1.4 Projects qualifying for review and approval by the Utility may include water main projects with valves and / or hydrants as part of the design. However, projects, including those less than ten thousand (10,000) total linear feet, that include new construction or installation of treatment plants, storage tanks, chemical or pressure booster pumping stations, shall be reviewed by the Cabinet for final determination.

2.1.5 The water demand for the project shall not cause the Utility to exceed eighty-five (85) % of its rated or operational design capacity.

2.1.6 Projects funded in part or in full by the State Revolving Fund (SRF) or Congressional Special Appropriation Grants (SPAP)

shall not qualify for review and approval by the Utility under the terms and conditions of this Agreed Order.

- 2.1.7 Projects under the jurisdiction of any regulating agency or funding agency other than the Kentucky Division of Water (external agencies), which in any way conflict with any regulatory process or funding process of these external agencies, shall not qualify for review and approval by the Utility under the terms and conditions of this Agreed Order.
- 2.1.8 The Utility is not authorized to approve any project that impacts any outstanding state resource water, outstanding national resource water, exceptional water, or cold water aquatic habitat as specified by 401 KAR Chapter 5.
- 2.1.9 Upon completion, projects shall meet all drinking water quality standards as set forth in 401 KAR Chapter 8.
- 2.1.10 The project meets all of the Technical Design and Construction Standards of the Cabinet's Division of Water Agreed Order and does not require any variances or deviations from the Technical Design and Construction Standards of the Cabinet's Division of Water Agreed Order.

APPENDIX OF STANDARD DRAWINGS FOR PIPELINE CONSTRUCTION

Standard
Drawing
Number

Section 1: General Requirements

4501 Creek Crossings With Concrete Cap (Sect. 1.3.5)

Section 3: Site

1000 Typical Utility Location Profiles (Sect.3.1)

3600 Typical Temporary Service From Fire Hydrant (Sect. 3.4.4 & 3.4.4.1)

Section 6: Installation

1500 Steel Casing Pipe and Casing Runners (Sect. 6.3)

1400 Typical Cast-in-Place Thrust Anchors (Sect.6.8 & 6.14)

1200 A-C Methods for Installing and Restoring Polyethylene Wrap (Sect. 6.9)

Section 7: Backfilling Procedures And Tamping

4300 Common Backfill and Lawn Restoration (Sect. 7.1, 7.4, 7.5, 7.6 & 11.6)

Section 8: Placing Water Main In Service

1601 Typical 2" Blow-off and Flushing Connection (Sect. 8.3.2)

1602 Typical 1" Manual Air Valve (For mains up to 20") (Sect. 8.3.2, 8.7 & 8.7.2)

1603 Typical Combined 2" Automatic and Manual Air Valve
(For mains 16" and larger) (Sect. 8.3.2, 8.7 & 8.7.1)

1608 Leak Detection By-Pass Meter for Underwater Crossings (Sect. 1.3.6 & 8.8)

Section 9: Fire Hydrant

2000 Typical Fire Hydrant Installation (Sect. 9)

Section 10: Service Work

3804 Method for Tapping Polyethylene Encased Pipe (Sect. 10.3.1 & 10.3.3)

3002 Typical Copper Service 1" and Smaller (Sect.10.3, 10.3.1, 10.3.2, 10.3.3 & 10.5)

3003 Typical 1" Copper Service With Pressure Reducing Valve (Sect.10.3, 10.3.1, 10.3.2, 10.3.3, 10.5 & 10.6)

3004 Typical 3/4" Copper Service With Pressure Reducing Valve (Sect.10.3, 10.3.1, 10.3.2, 10.3.3, 10.5 & 10.6)

3400 Typical Double 1" Domestic/Irrigation Copper Service (Sect. 10.3, 10.3.1, 10.3.2, & 10.3.3)

3401 Typical Double Domestic/Irrigation 1" Copper Service With Pressure Reducing Valve (Sect. 10.3, 10.3.1, 10.3.2, 10.3.3, 10.5 & 10.6)

3403 Typical 3/4" Irrigation Retro Fit Copper Service (Sect. 10.3, 10.3.1, 10.3.2, 10.3.3, & 10.5)

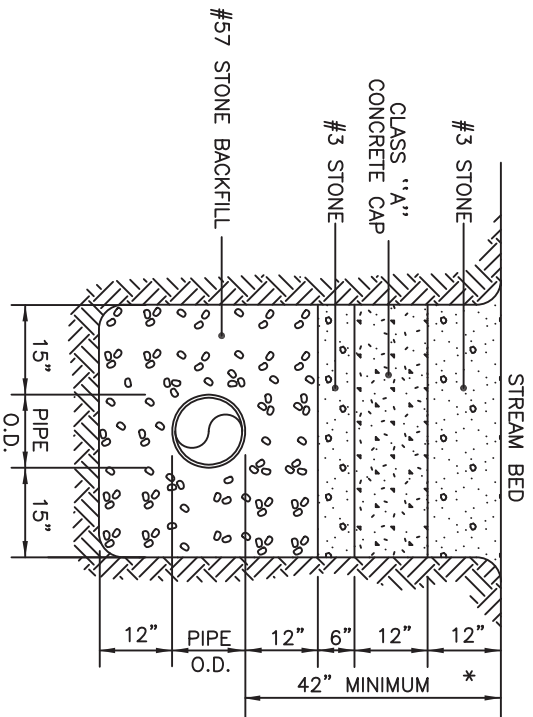
3404 Typical 1" Tandem 2-Way Domestic Copper Service (Sect. 10.3, 10.3.1, 10.3.2, 10.3.3, & 10.5)

3420 Typical 1" 3-Way Domestic Copper Service (Sect. 10.3, 10.3.1, 10.3.2, 10.3.3, & 10.5)

- 3430 Typical 1" 4-Way Domestic Copper Service (Sect. 10.3, 10.3.1, 10.3.2, 10.3.3, & 10.5)
- 3200 Typical 1-1/2" or 2" Copper Service (Sect. 10.3, 10.3.1, 10.3.2, 10.3.3 & 10.5)
- 10.3, 3202 Typical 1-1/2" or 2" Copper Service With Pressure Reducing Valve (Sect. 10.3.1, 10.3.2, 10.3.3, 10.5 & 10.6)
- 3203 Typical Ductile Iron Domestic Service 4" and Larger (Sect. 10.4, 10.4.1, 10.4.2, 10.4.3, & 10.5)
- 10.4.3 3601 Typical Fire Protection Service 4" and Larger (Sect. 10.4, 10.4.1, 10.4.2, & 10.5)
- 3440 Relocate Service (Sect.10.8)
- 3441 Renew Service (Sect. 10.9)
- 3442 Transfer Service (Sect.10.10) and Discontinue Service (Sect.10.11)
- 3805 Service Sleeve Installation Detail (Sect.10)
- Section 11: Restoration**
- 4000 State of Kentucky Backfill and Paving Restoration (Sect. 11)
- 4100 Metro Louisville/Jefferson County Backfill and Paving Restoration (Sect. 11)
- 4400 Sidewalk/Backfill Detail (Sect. 11)
- 4410 Concrete Curb and Gutter Restoration Detail (Sect. 11.4)
- Other:**
- 4600 Typical Master Meter Detail
- 5005 Valve Status Marker

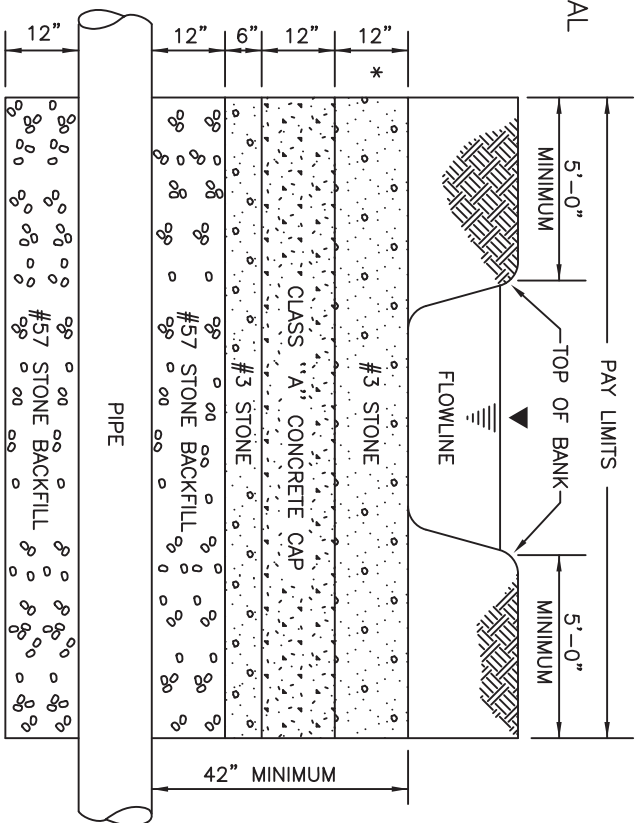
*THE TOP 12" TO BE #3 STONE OR OTHER SELECT MATERIAL APPROVED BY THE KENTUCKY DIVISION OF WATER.

TYPICAL SECTION



STREAM CROSSING CONDITIONS

1. COMPLY WITH SECTION 1.3.5, SOIL EROSION AND SEDIMENT CONTROL.
2. THIS DETAIL APPLIES ONLY TO BLUE-LINE STREAMS, AS SHOWN ON THE PERTINENT USGS QUADRANGLE MAP.
3. MANAGEMENT CONSTRUCTION PRACTICES MUST BE USED AT ALL TIMES DURING CONSTRUCTION. ADEQUATE SILT CONTROL MUST BE PLACED PRIOR TO THE START OF CONSTRUCTION AND MAINTAINED UNTIL VEGETATION IS ESTABLISHED.
4. REVEGETATE ALL DISTURBED GRASSY AREAS ON THE STREAM SLOPES. SOD STAKES MAY BE REQUIRED TO SECURE SOD ON THE STREAM BANKS.
5. MAINTAIN AT LEAST 3.5' OF BACKFILL AT THE STREAM CROSSING FROM THE TOP OF PIPE TO THE ORIGINAL STREAM BED ELEVATION.
6. OBTAIN APPROVAL FROM THE METROPOLITAN SEWER DISTRICT PRIOR TO THE START OF THE STREAM CROSSING WHEN CONSTRUCTION IS UNDER THEIR JURISDICTION.
7. TO BE PAID PER LINEAL FOOT OF CONCRETE CAP.
8. THRUST BLOCKING SHALL BE CONSTRUCTED AT ALL BENDS.

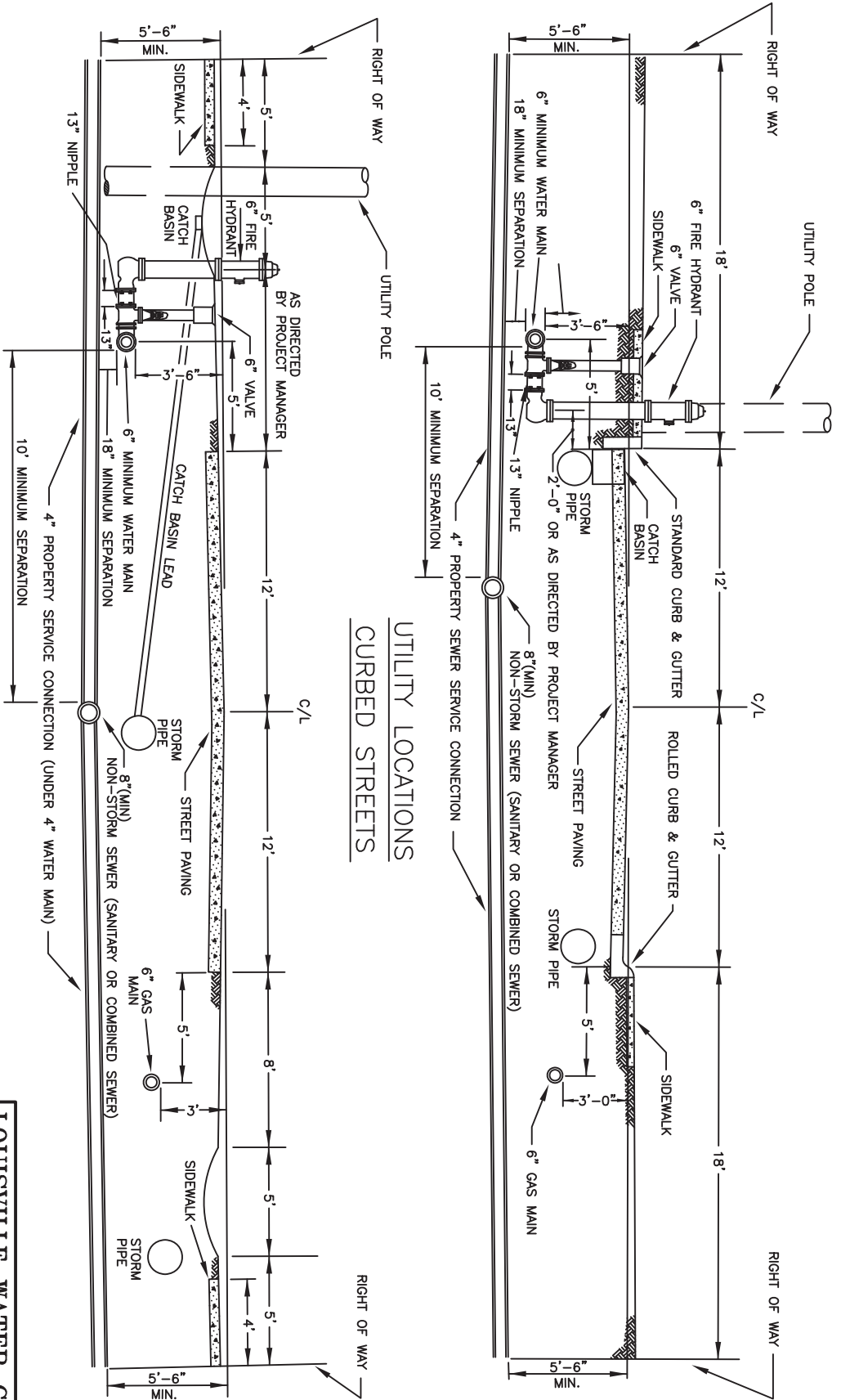


TYPICAL PROFILE

LOUISVILLE WATER COMPANY
 560 S. 3RD STREET - LOUISVILLE, KENTUCKY 40202 - (502) 586-3600
 GREGORY C. HEITZMAN - PRESIDENT
 JAMES H. BRAUNMIEL - VICE PRESIDENT/CHIEF ENGINEER

STANDARD DRAWING
 CREEK CROSSING
 WITH CONCRETE CAP

DATE	MAR. 2008	SCALE	NONE
DRAWING NO.	4501	SHEET	1 OF 1



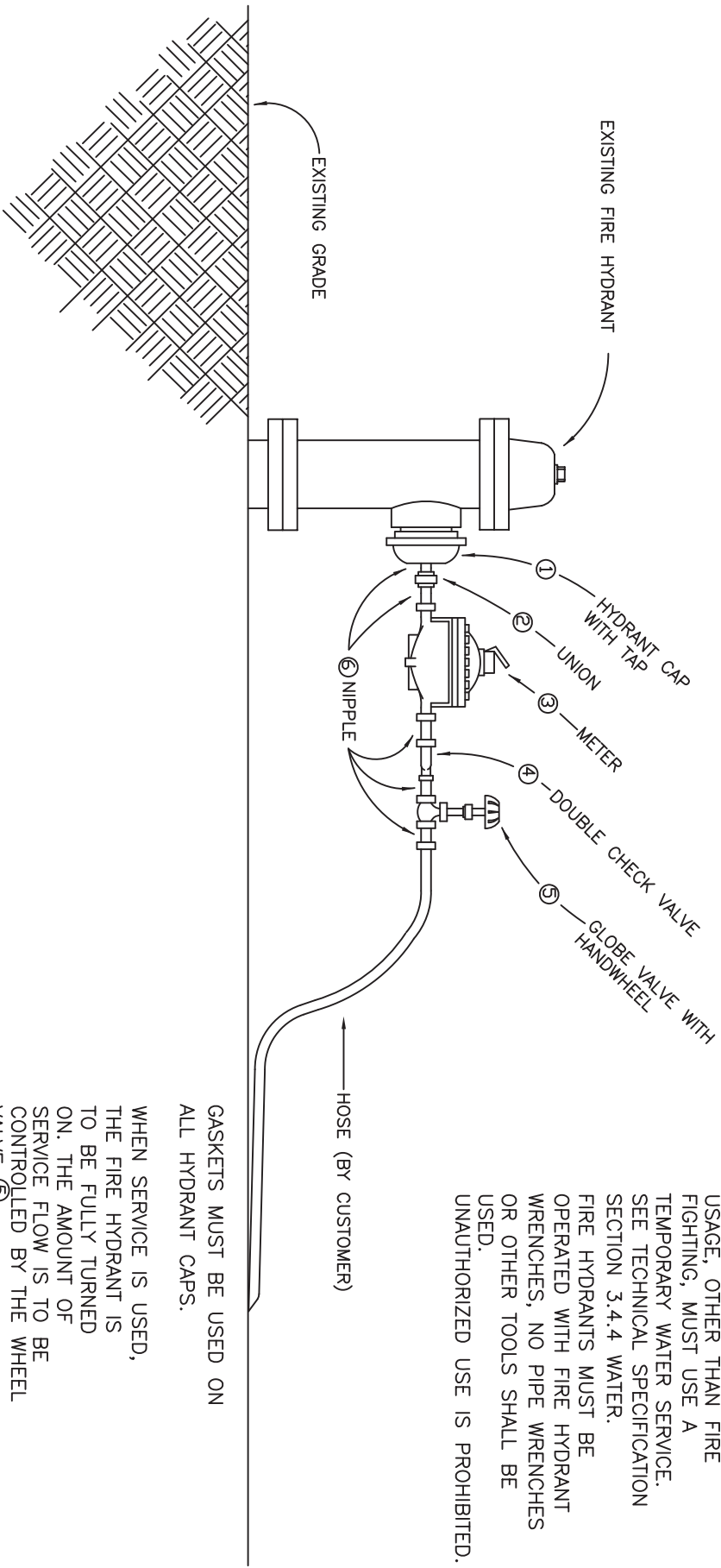
UTILITY LOCATIONS
WITHOUT CURBED STREETS

UTILITY LOCATIONS
CURBED STREETS

STANDARD DRAWING
TYPICAL
UTILITY LOCATION PROFILES

LOUISVILLE WATER COMPANY
550 S. 3RD STREET • LOUISVILLE, KENTUCKY 40202 • (502) 569-3600
GREGORY C. HEITZMAN - PRESIDENT
JAMES H. BRAMMEL - VICE PRESIDENT/CHIEF ENGINEER

DATE	MAR. 2008	SCALE	NONE
DRAWING NO.	1000	SHEET	1 OF 1



NO.	QUANTITY	FITTING	JOINT	SERVICE SIZES	
①	1	Hydrant Cap w/Gasket & Tap	Female Threaded	3/4"	1-1/2"
②	1	Union	Female Threaded	3/4"	1-1/2"
③	1	Meter	Female Threaded Flanged	3/4"	1-1/2"
④	1	Check Valve	Female Threaded	3/4"	1-1/2"
⑤	1	Globe Valve w/Handwheel	Female Threaded	3/4"	1-1/2"
⑥	5	Nipple	Inlet—Male Threaded Outlet—Male Threaded	3/4"	1-1/2"

NOTES :

ALL FIRE HYDRANT USAGE, OTHER THAN FIRE FIGHTING, MUST USE A TEMPORARY WATER SERVICE. SEE TECHNICAL SPECIFICATION SECTION 3.4.4 WATER. FIRE HYDRANTS MUST BE OPERATED WITH FIRE HYDRANT WRENCHES, NO PIPE WRENCHES OR OTHER TOOLS SHALL BE USED.

UNAUTHORIZED USE IS PROHIBITED.

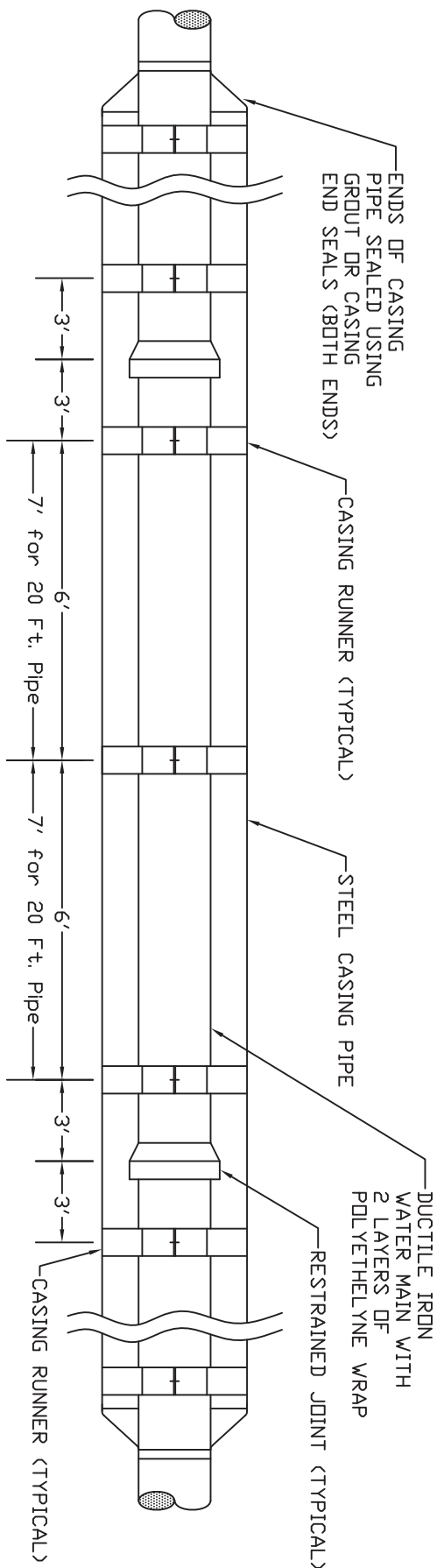
GASKETS MUST BE USED ON ALL HYDRANT CAPS.

WHEN SERVICE IS USED, THE FIRE HYDRANT IS TO BE FULLY TURNED ON. THE AMOUNT OF SERVICE FLOW IS TO BE CONTROLLED BY THE WHEEL VALVE ⑤.

LOUISVILLE WATER COMPANY
 540 S. 3RD STREET · LOUISVILLE, KENTUCKY 40202 · (502) 569-3600
 GREGORY C. HEITZMAN - PRESIDENT
 JAMES H. BRAMMEL - VICE PRESIDENT/CHIEF ENGINEER

STANDARD DRAWING
 TYPICAL TEMPORARY SERVICE
 FROM FIRE HYDRANT
 3/4" OR 1-1/2"

DATE	MAR. 2008	SCALE	NONE
DRAWING NO.	3600	SHEET	1 OF 1



TYPICAL RUNNER SPACING
(PER 18 FT. PIPE LENGTH)

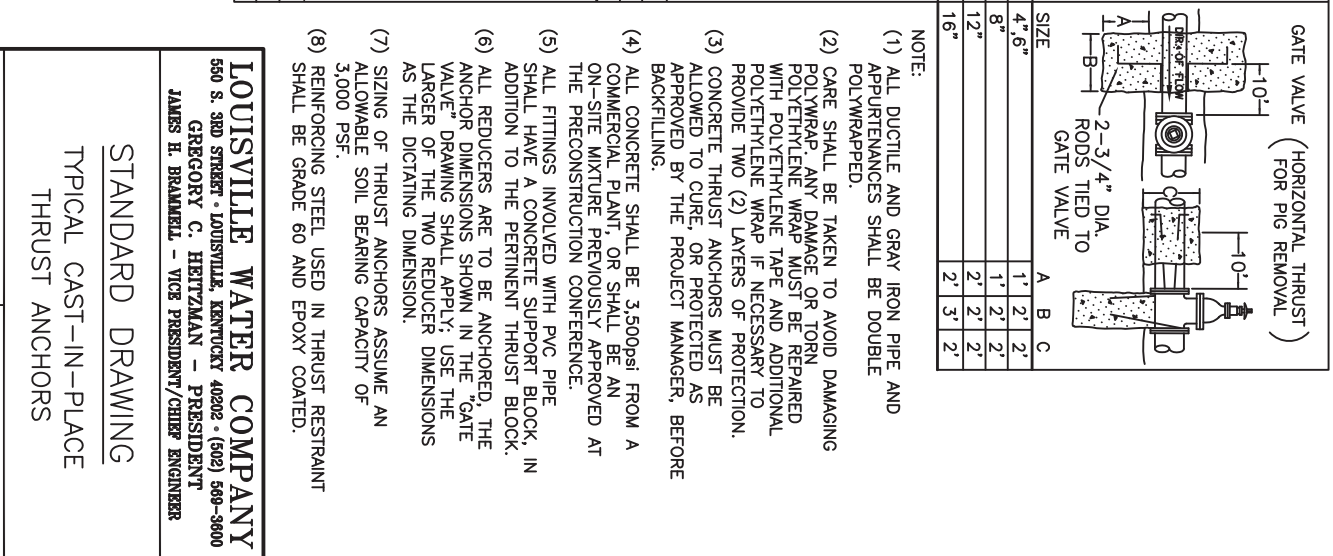
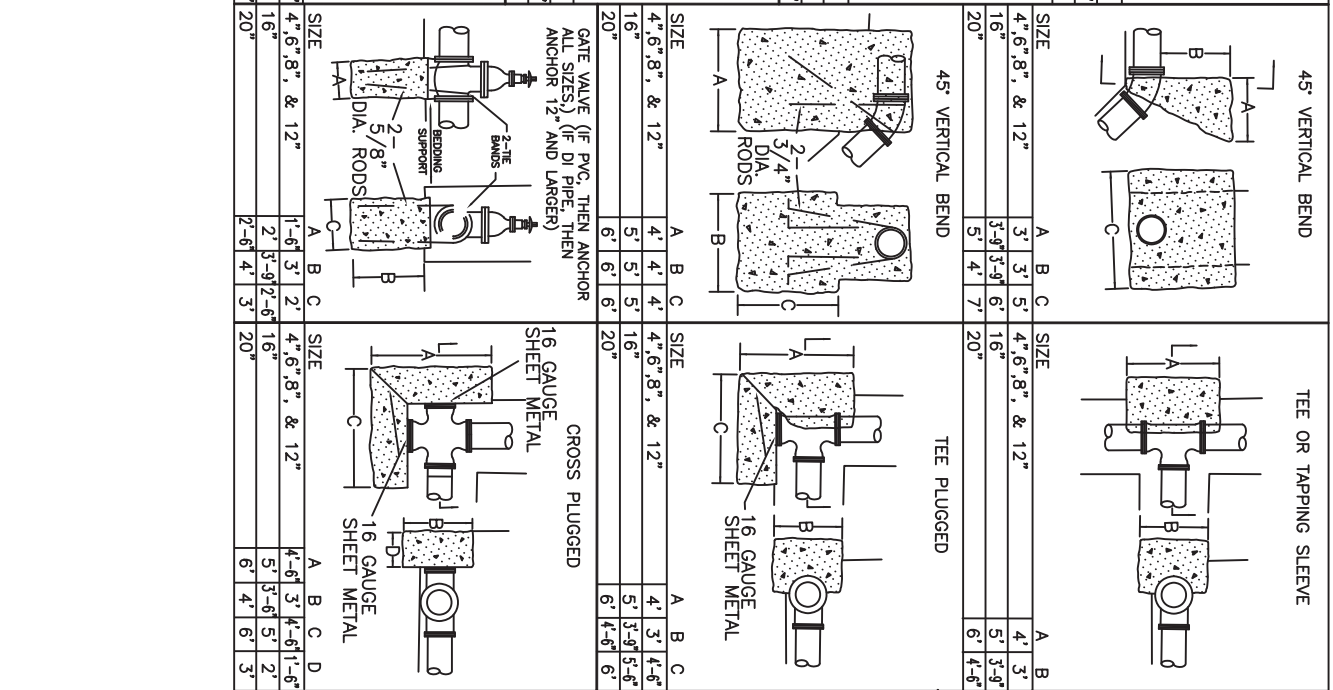
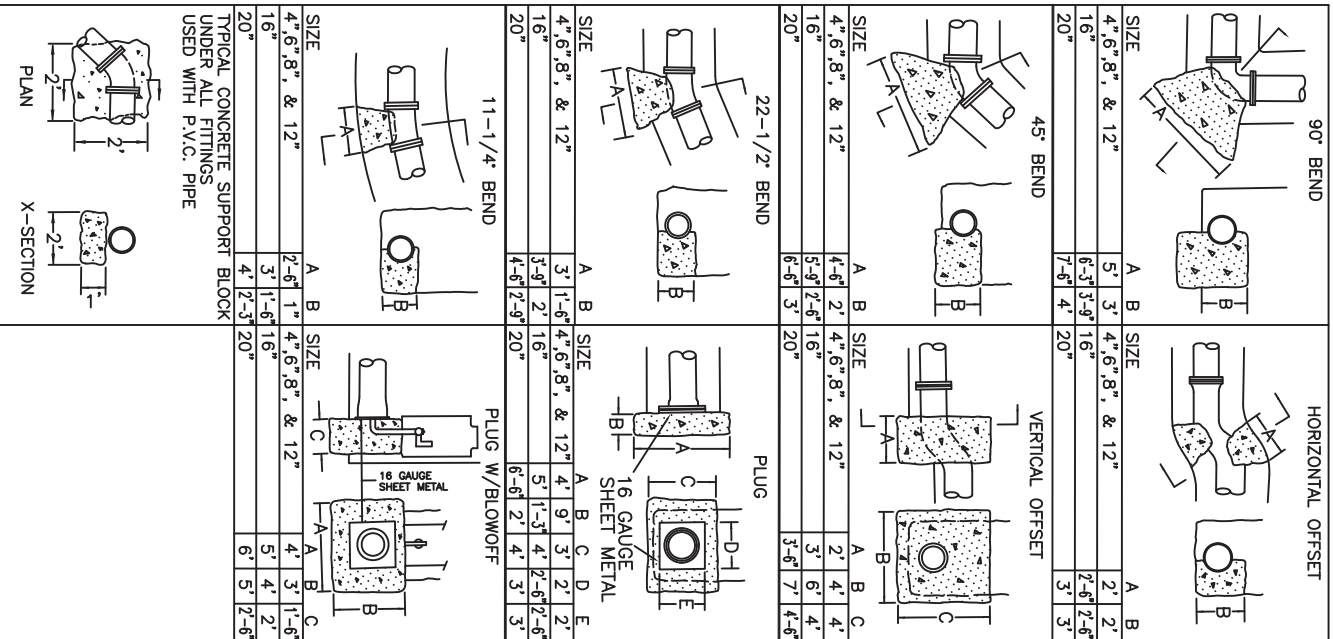
- NOTES:
- 1) STEEL CASING TO EXTEND A MINIMUM OF FIVE (5) FEET BEYOND THE EDGE OF PAVEMENT.
 - 2) THREE (3) CASING RUNNERS PER EACH PIPE LENGTH (MINIMUM), WITH ONE CASING RUNNER WITHIN 3 FT. OF EACH PIPE END.
 - 3) WATER MAIN SHALL HAVE RESTRAINED JOINTS WITHIN CASING PIPE. (SEE SECT. 6.3)

CASING PIPE SIZES		
WATER MAIN PIPE SIZE (INCHES)	CASING PIPE SIZE (INCHES)	CASING THICKNESS (INCHES)
4	12	0.375
6	16	0.375
8	16	0.375
12	20	0.375
16	24	0.375
20	30	0.500

LOUISVILLE WATER COMPANY
 560 S. 3RD STREET - LOUISVILLE, KENTUCKY 40202 - (502) 586-5800
 GREGORY C. HEITZMAN - PRESIDENT
 JAMES H. BRAUNMEL - VICE PRESIDENT/CHIEF ENGINEER

STANDARD DRAWING
 STEEL CASING PIPE
 AND CASING RUNNERS

DATE	MAR. 2008	SCALE	NONE
DRAWING NO.	1500	SHEET	1 OF 1



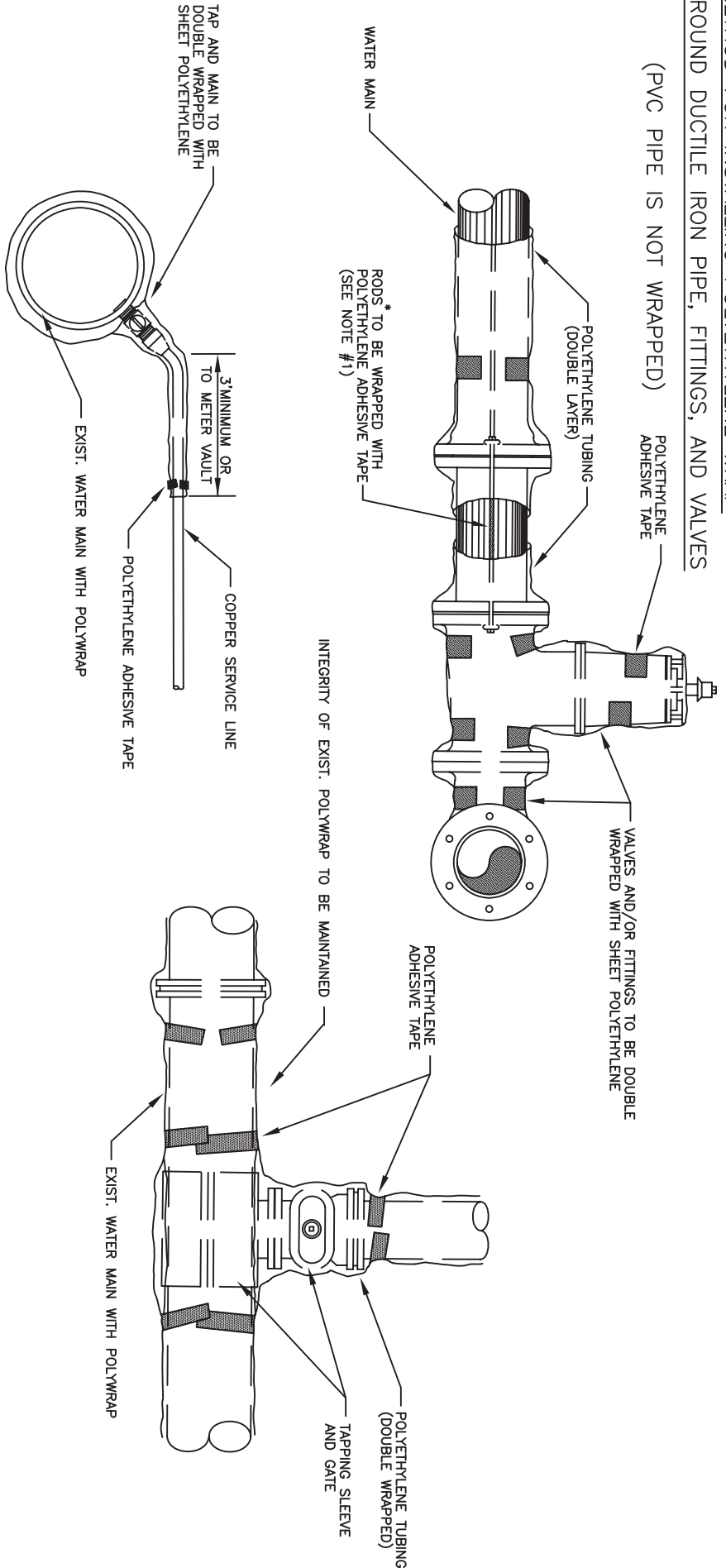
LOUISVILLE WATER COMPANY
550 S. 3RD STREET • LOUISVILLE, KENTUCKY 40202 • (502) 569-5600
GREGORY C. HEITZMAN - PRESIDENT
JAMES H. BRAMMEL - VICE PRESIDENT/CHIEF ENGINEER

STANDARD DRAWING
TYPICAL CAST-IN-PLACE
THRUST ANCHORS

DATE	MAR. 2008	SCALE	NONE
DRAWING NO.	1400	SHEET	1 OF 1

METHOD FOR INSTALLING POLYETHYLENE WRAP
AROUND DUCTILE IRON PIPE, FITTINGS, AND VALVES

(PVC PIPE IS NOT WRAPPED)



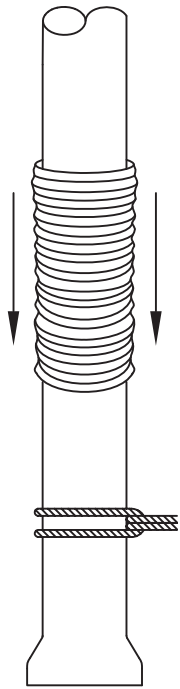
METHOD FOR RESTORING
POLYETHYLENE WRAP
WHEN TAPPING WATER MAINS

- NOTES:
- 1) *RODS USED FOR THRUST RESTRAINT ARE TO BE USED ONLY AS TEMPORARY THRUST RESTRAINT. THRUST ANCHORS MUST BE POURED FOR ALL FITTINGS AS DETAILED IN THE STANDARD SPECIFICATIONS. MECHANICAL RESTRAINT MAY BE USED IN PLACE OF RODS AT THE DISCRETION OF THE PROJECT MANAGER.
 - 2) ANY DAMAGE OR TORN POLYETHYLENE WRAP MUST BE REPAIRED WITH POLYETHYLENE ADHESIVE TAPE AND ADDITIONAL POLYETHYLENE WRAP IF NECESSARY TO PROVIDE TWO (2) LAYERS OF PROTECTION.
 - 3) PIPE SHALL NOT BE WRAPPED FOR MORE THAN FIVE (5) DAYS IN ADVANCE OF PLACEMENT INTO THE TRENCH.
 - 4) ALL DUCTILE IRON TEES, VALVES AND FITTINGS ON PVC PIPE SHALL BE DOUBLE WRAPPED WITH POLYETHYLENE AND ENDS FASTENED SECURELY ON PVC PIPE.

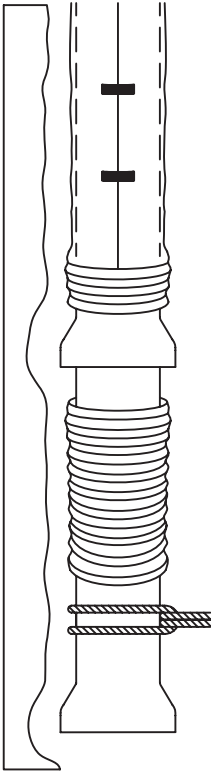
LOUISVILLE WATER COMPANY
560 S. 3RD STREET • LOUISVILLE, KENTUCKY 40202 • (502) 566-3600
GREGORY C. HEITZMAN - PRESIDENT
JAMES H. BRAMMILL - VICE PRESIDENT/CHIEF ENGINEER

STANDARD DRAWING
METHODS FOR
INSTALLING AND RESTORING
POLYETHYLENE WRAP

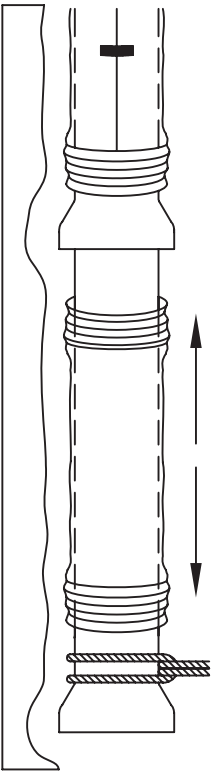
DATE	MAR. 2008	SCALE	NONE
DRAWING NO.	1200-A	SHEET	1 OF 3



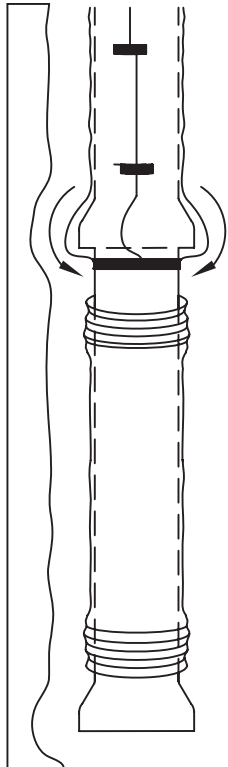
STEP 1.
CUT A SECTION OF POLYETHYLENE TUBE APPROXIMATELY TWO FEET LONGER THAN THE PIPE SECTION. REMOVE ALL LUMPS OF CLAY, MUD, CINDERS, OR OTHER MATERIAL THAT MIGHT HAVE ACCUMULATED ON THE PIPE SURFACE DURING STORAGE. SLIP THE POLYETHYLENE TUBE AROUND THE PIPE, STARTING AT THE SPIGOT END. BUNCH THE TUBE ACCORDIAN-FASHION ON THE END OF THE PIPE. PULL BACK THE OVERHANGING END OF THE TUBE UNTIL IT CLEARS THE PIPE END.



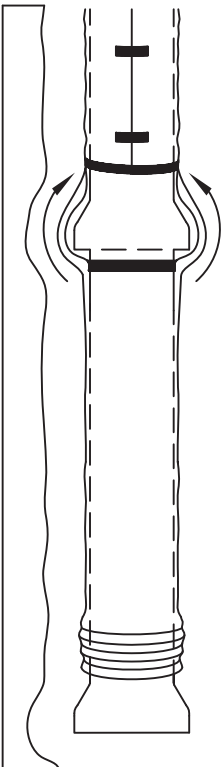
STEP 2.
DIG A SHALLOW BELL HOLE IN THE TRENCH BOTTOM AT THE JOINT LOCATION TO FACILITATE INSTALLATION OF THE POLYETHYLENE TUBE. LOWER THE PIPE INTO THE TRENCH AND MAKE UP THE PIPE JOINT WITH THE PRECEDING SECTION OF PIPE.



STEP 3.
MOVE THE CABLE TO THE BELL END OF THE PIPE AND LIFT THE PIPE SLIGHTLY TO PROVIDE ENOUGH CLEARANCE TO EASILY SLIDE THE TUBE. SPREAD THE TUBE OVER THE ENTIRE BARREL OF THE PIPE. NOTE: MAKE SURE THAT NO DIRT OR THE BEDDING MATERIAL BECOMES TRAPPED BETWEEN THE WRAP AND THE PIPE.



STEP 4.
MAKE THE OVERLAP OF THE POLYETHYLENE TUBE BY PULLING BACK THE BUNCHED POLYETHYLENE FROM THE PRECEDING LENGTH OF PIPE AND SECURING IT IN PLACE. NOTE: THE POLYETHYLENE MAY BE SECURED IN PLACE BY USING TAPE, STRING, OR ANY OTHER MATERIAL CAPABLE OF HOLDING THE POLYETHYLENE ENCASUREMENT SNUGLY AGAINST THE PIPE.



STEP 5.
OVERLAP THE SECURED TUBE END WITH THE TUBE END OF THE NEW PIPE SECTION. SECURE THE NEW TUBE END IN PLACE.

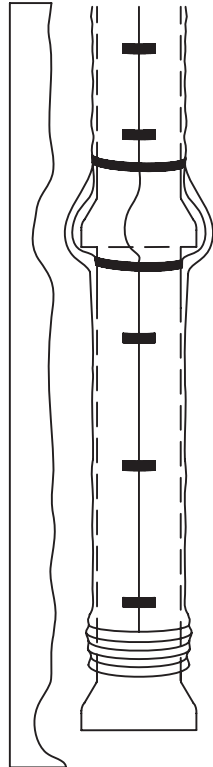


STEP 6.
TAKE UP THE SLACK IN THE TUBE ALONG THE BARREL OF THE PIPE TO MAKE A SNUG, BUT NOT TIGHT, FIT. FOLD EXCESS POLYETHYLENE BACK OVER THE TOP OF THE PIPE.

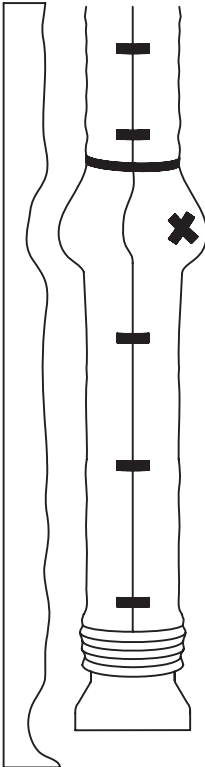
LOUISVILLE WATER COMPANY
550 S. 3RD STREET - LOUISVILLE, KENTUCKY 40202 • (502) 586-5600
GREGORY C. HEITZMAN - PRESIDENT
JAMES H. BRAUNMEL - VICE PRESIDENT/CHIEF ENGINEER

STANDARD DRAWING
METHODS FOR
INSTALLING AND RESTORING
POLYETHYLENE WRAP

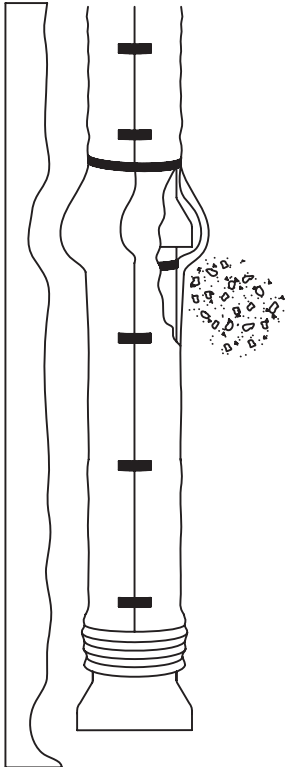
DATE	MAR. 2008	SCALE	NONE
DRAWING NO.	1200-B	SHEET	2 OF 3



STEP 7.
SECURE THE FOLD AT SEVERAL LOCATIONS ALONG THE PIPE BARREL (APPROXIMATELY EVERY THREE FEET).



STEP 8.
REPAIR ALL SMALL RIPS, TEARS, OR OTHER TUBE DAMAGE WITH ADHESIVE TAPE. IF THE POLYETHYLENE IS BADLY DAMAGED, REPAIR THE DAMAGED AREA WITH A SHEET OF POLYETHYLENE AND SEAL THE EDGES OF THE REPAIR WITH ADHESIVE TAPE.



STEP 9.
CAREFULLY BACKFILL THE PIPE ACCORDING TO THE AWWA C600 STANDARD FOR BACKFILL PROCEDURE. TO PREVENT DAMAGE DURING BACKFILLING, ALLOW ADEQUATE SLACK IN THE TUBE AT THE JOINT. BACKFILL SHOULD BE FREE OF CINDERS, ROCKS, BOULDERS, NAILS, STICKS, OR OTHER MATERIALS THAT MIGHT DAMAGE THE POLYETHYLENE. AVOID DAMAGING THE POLYETHYLENE WHEN USING TAMPING DEVICES.

TABLE FOR MINIMUM FLATTENED
POLYETHYLENE TUBE WIDTHS

NOMINAL PIPE SIZE (INCHES)	RECOMMENDED POLYETHYLENE FLAT TUBE WIDTH (INCHES)
4	24
6	24
8	24
12	30
16	36
20	48

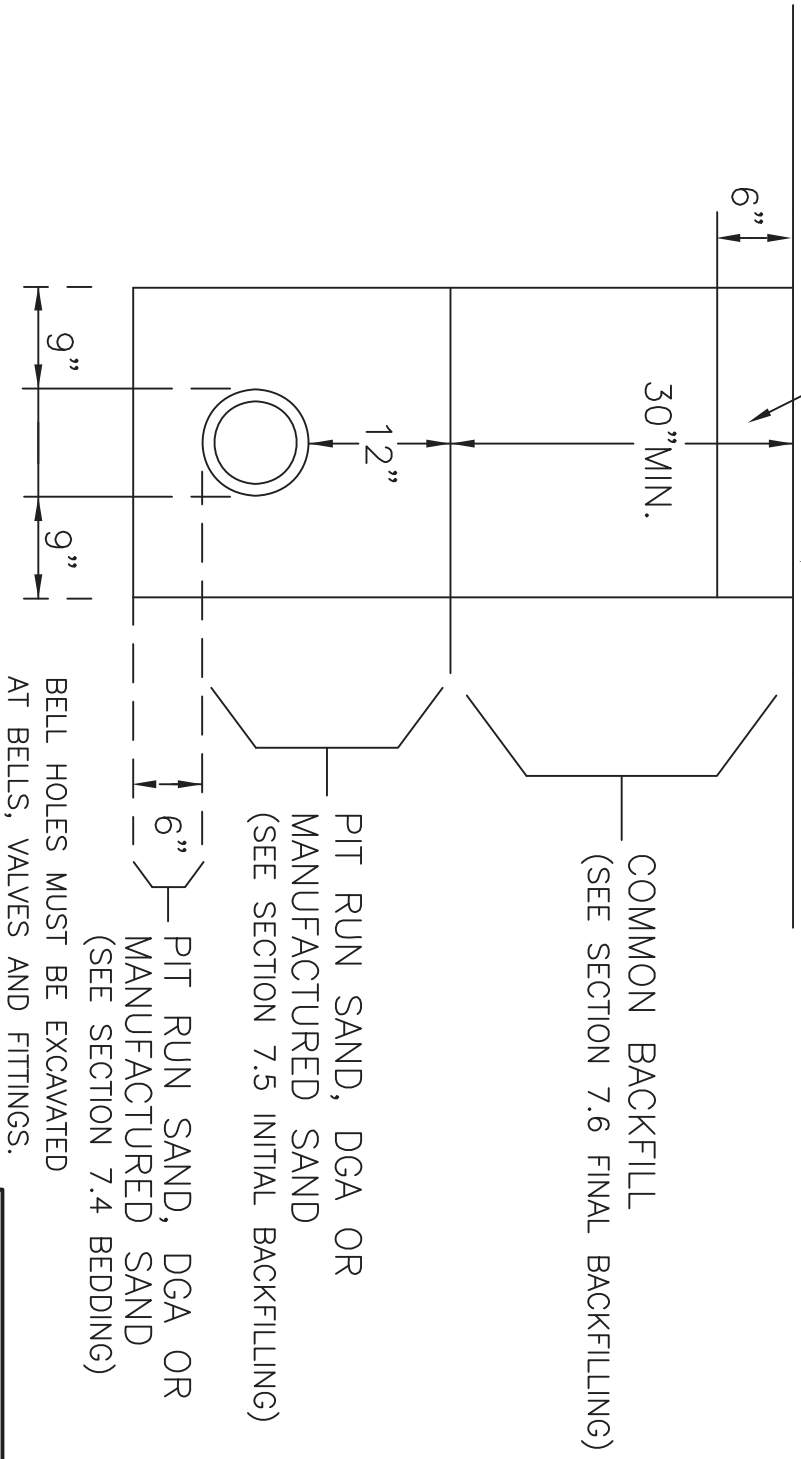
LOUISVILLE WATER COMPANY
 550 S. 3RD STREET • LOUISVILLE, KENTUCKY 40202 • (502) 589-3600
 GREGORY C. HEITZMAN - PRESIDENT
 JAMES H. BRAUNEL - VICE PRESIDENT/CHIEF ENGINEER

STANDARD DRAWING
 METHODS FOR
 INSTALLING AND RESTORING
 POLYETHYLENE WRAP

DATE	MAR. 2008	SCALE	NONE
DRAWING NO.	1200-C	SHEET	3 of 3

NO ROCK IN
TOP 6 " LAYER OF SOIL

FINAL GRADE
(SEE SECTION 11.6 UNPAVED SURFACES)



COMMON BACKFILL
(SEE SECTION 7.6 FINAL BACKFILLING)

PIT RUN SAND, DGA OR
MANUFACTURED SAND
(SEE SECTION 7.5 INITIAL BACKFILLING)

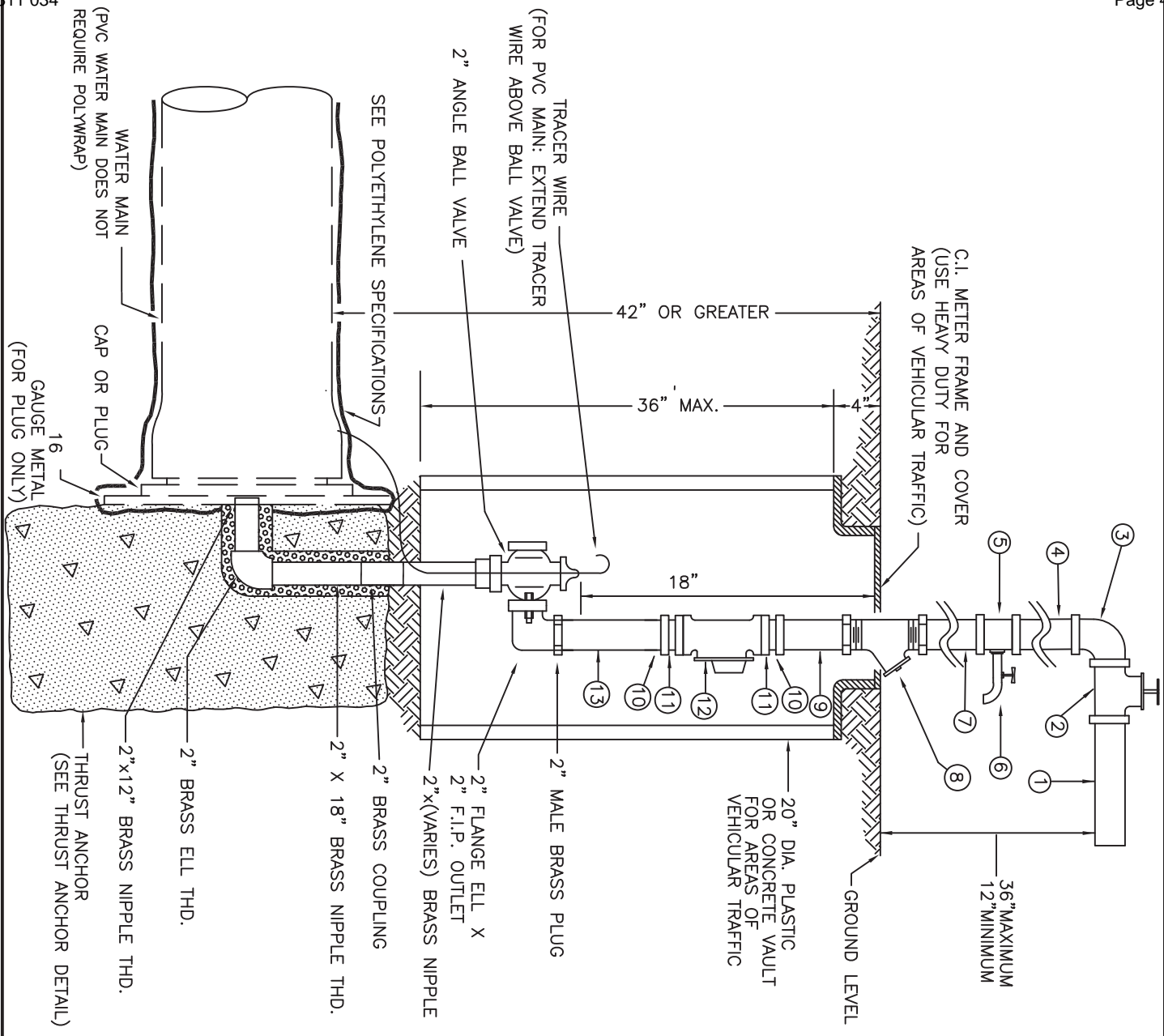
PIT RUN SAND, DGA OR
MANUFACTURED SAND
(SEE SECTION 7.4 BEDDING)

BELL HOLES MUST BE EXCAVATED
AT BELLS, VALVES AND FITTINGS.

LOUISVILLE WATER COMPANY
560 S. 3RD STREET - LOUISVILLE, KENTUCKY 40202 - (502) 586-3600
GREGORY C. HEITZMAN - PRESIDENT
JAMES H. BRAUNMIEL - VICE PRESIDENT/CHIEF ENGINEER

STANDARD DRAWING
COMMON BACKFILL AND
LAWN RESTORATION

DATE	SCALE	SHEET	OP
MAR. 2008	NONE	1	1
DRAWING NO.	4300		



TEMPORARY FLUSHING ASSEMBLY
 FURNISHED BY LWC METER SHOP.

- 1 2"x6" BRASS NIPPLE THD*
- 2 2" GATE VALVE*
- 3 2" 90° ELL BRASS THD*
- 4 2"x6" BRASS NIPPLE THD*
- 5 2"x1" TEE WITH 1"x3/4" BUSHING*
- 6 3/4" BRASS SPIGOT WITH 1/2" OUTLET*
- 7 2"x12" BRASS NIPPLE THD*
- 8 2" DUAL CHECK VALVE*
- 9 2"x3" BRASS NIPPLE THD*
- 10 2"x1-1/2" BRASS REDUCER*
- 11 1-1/2" MIP X FLG*
- 12 1-1/2" TURBINE METER*
- 13 2"x6" BRASS NIPPLE THD*

NOTE: DO NOT CONNECT PRESSURE TEST EQUIPMENT TO TEMPORARY FLUSHING ASSEMBLY!

NOTE:
 1-1/2" TURBINE METER AND 2" DUAL CHECK VALVE ARE TO BE INSTALLED AFTER PIGGING OPERATIONS. A 2" HOSE IS TO BE USED DURING ALL FLUSHING OPERATIONS.

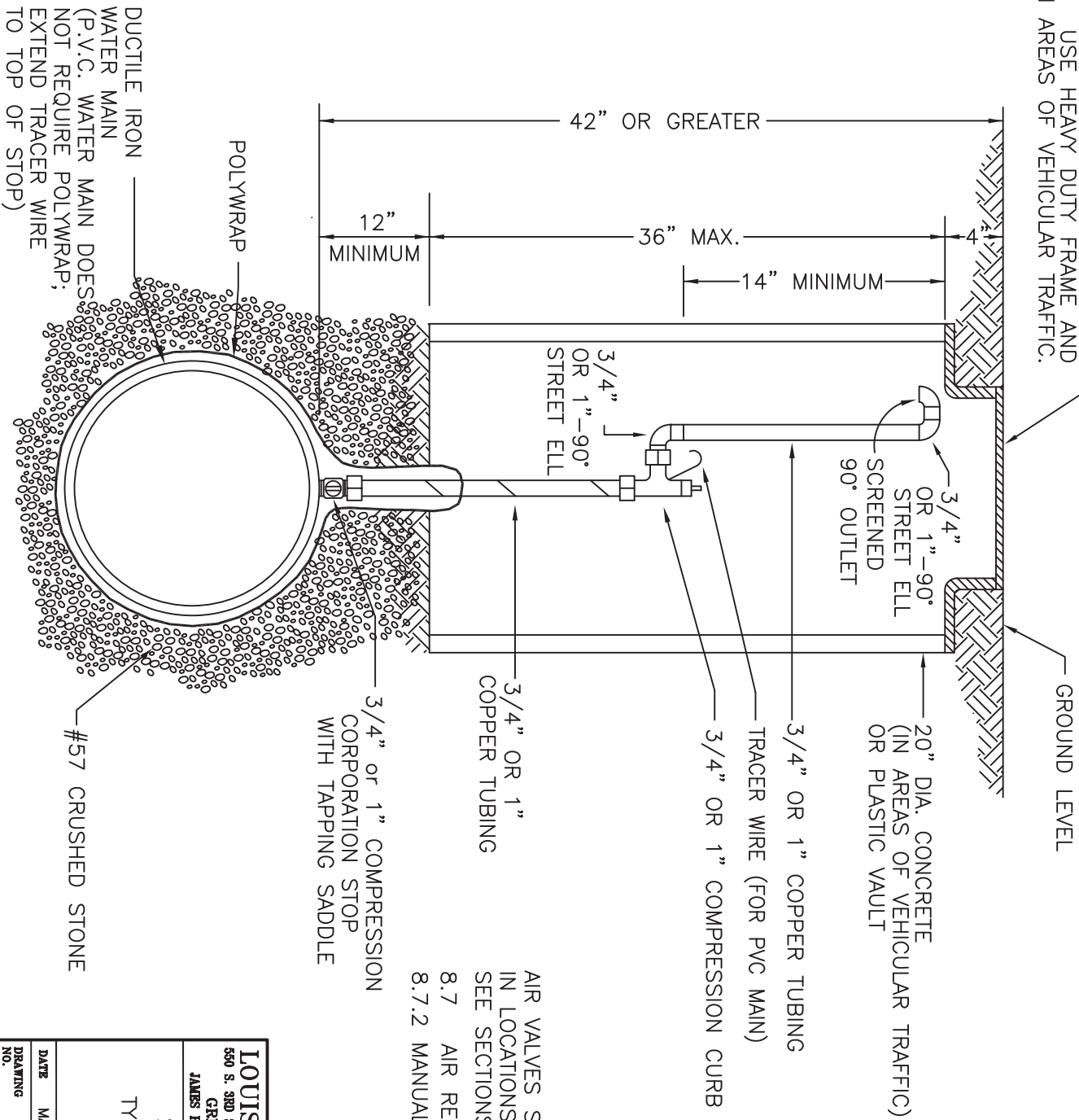
NOTE:
 8" AND LARGER WATER MAINS MAY REQUIRE LARGER THAN A 2" FLUSHING OUTLET TO MEET THE KDW 2.5 F.P.S. FLUSHING REGULATION.

LOUISVILLE WATER COMPANY
 550 S. 3RD STREET • LOUISVILLE, KENTUCKY 40202 • (502) 569-3600
 GREGORY C. HEITZMAN - PRESIDENT
 JAMES H. BRAHMBEL - VICE PRESIDENT/CHIEF ENGINEER

STANDARD DRAWING
 TYPICAL 2" BLOW-OFF AND FLUSHING CONNECTION

DATE	MAR. 2008	SCALE	NONE
DRAWING NO.	1601	SHEET	1 OF 1

C.I. METER FRAME AND COVER,
USE HEAVY DUTY FRAME AND
COVER IN AREAS OF VEHICULAR TRAFFIC.

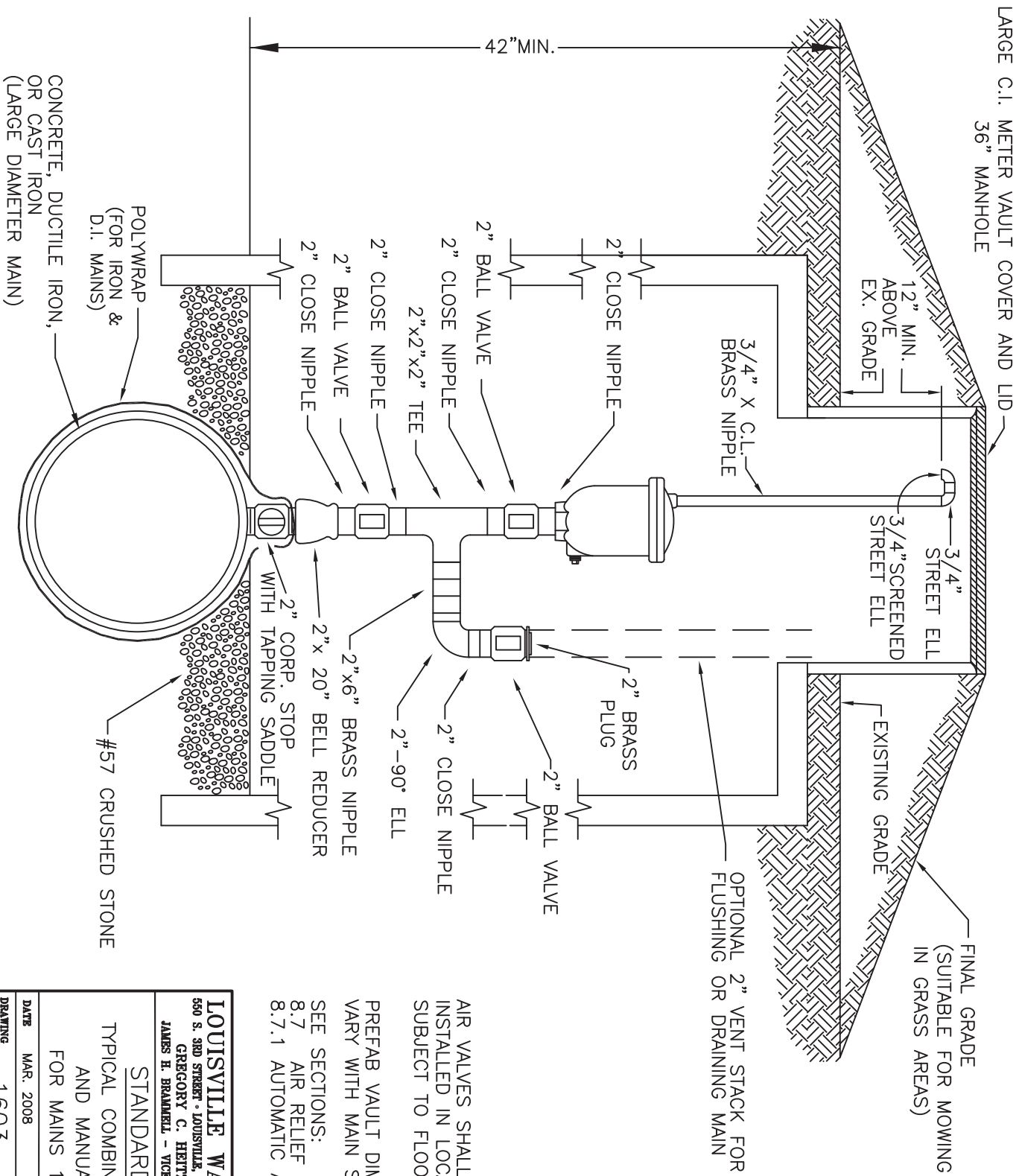


AIR VALVES SHALL NOT BE INSTALLED
IN LOCATIONS SUBJECT TO FLOODING.
SEE SECTIONS:
8.7 AIR RELIEF VALVES
8.7.2 MANUAL AIR RELIEF VALVES

LOUISVILLE WATER COMPANY
550 S. 3RD STREET - LOUISVILLE, KENTUCKY 40202 - (502) 586-3600
GREGORY C. HEITZMAN - PRESIDENT
JAMES H. BRAUNWEL - VICE PRESIDENT/CHIEF ENGINEER

STANDARD DRAWING
TYPICAL 3/4" OR 1" MANUAL
AIR VALVE
(FOR MAINS UP TO 20")

DATE	MAR. 2008	SCALE	NONE
DRAWING NO.	1602	SHEET	1 OF 1



AIR VALVES SHALL NOT BE INSTALLED IN LOCATIONS SUBJECT TO FLOODING.

PREFAB VAULT DIMENSIONS VARY WITH MAIN SIZE

SEE SECTIONS:
8.7 AIR RELIEF VALVES
8.7.1 AUTOMATIC AIR RELIEF VALVES

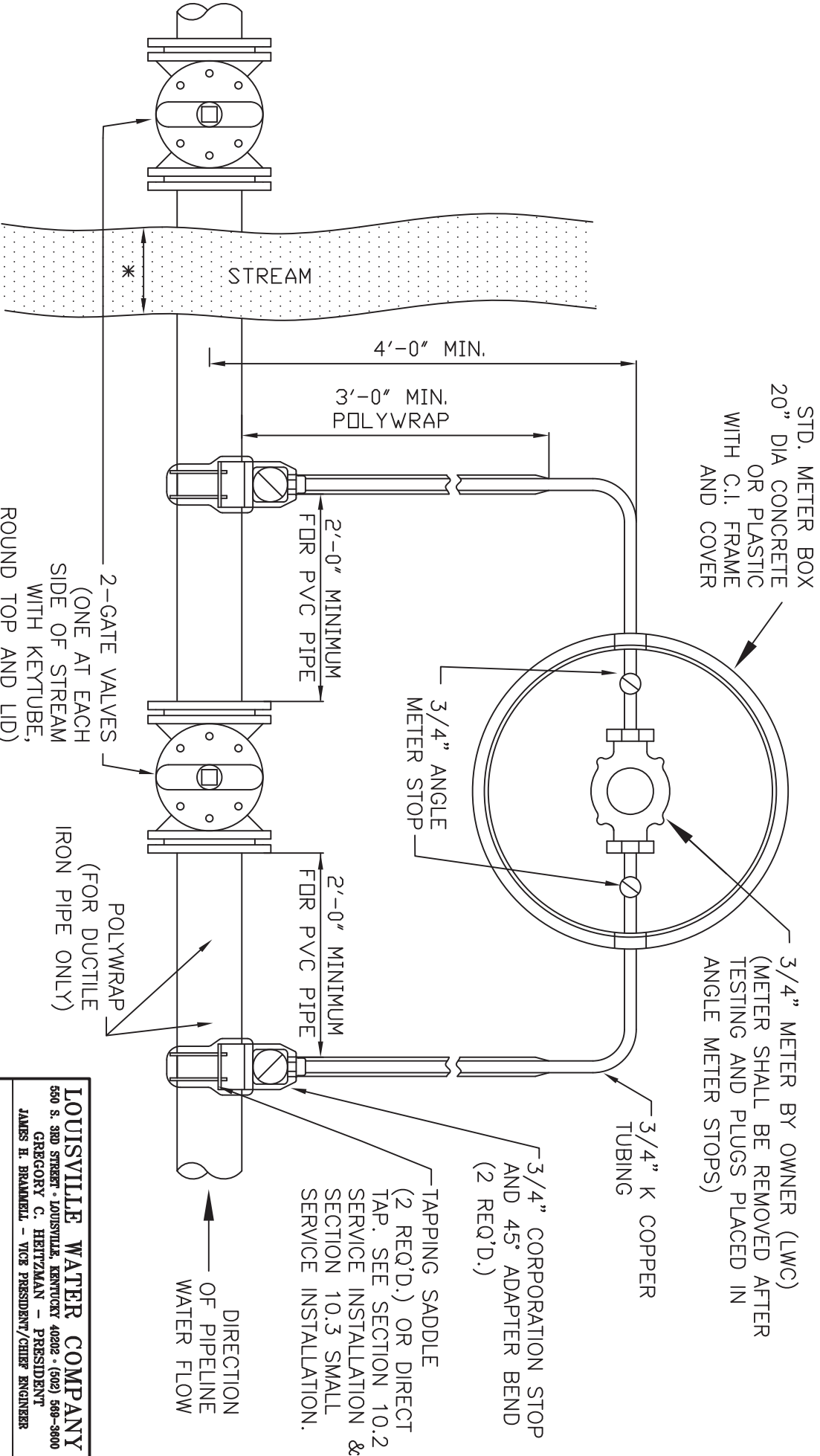
LOUISVILLE WATER COMPANY
550 S. 3RD STREET • LOUISVILLE, KENTUCKY 40202 • (502) 566-3600
GREGORY C. HEITZMAN - PRESIDENT
JAMES H. BRANNELL - VICE PRESIDENT/CHIEF ENGINEER

STANDARD DRAWING

TYPICAL COMBINED 2" AUTOMATIC AND MANUAL AIR VALVE FOR MAINS 16" AND LARGER

DATE	MAR. 2008	SCALE	NONE
DRAWING NO.	1603	SHEET	1 OF 1

* LEAK DETECTION BY-PASS METER IS REQUIRED IF UNDERWATER CROSSING IS GREATER THAN 15 FT. SEE SECTION 8.8.



LEAK DETECTION BY-PASS METER
FOR UNDERWATER CROSSINGS

LOUISVILLE WATER COMPANY
560 S. 3RD STREET - LOUISVILLE, KENTUCKY 40202 - (502) 566-3600
GREGORY C. HEITZMAN - PRESIDENT
JAMES H. BRAUNMILL - VICE PRESIDENT/CHIEF ENGINEER

STANDARD DRAWING
LEAK DETECTION
BY-PASS METER

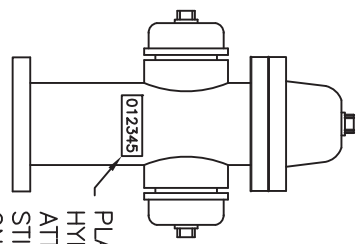
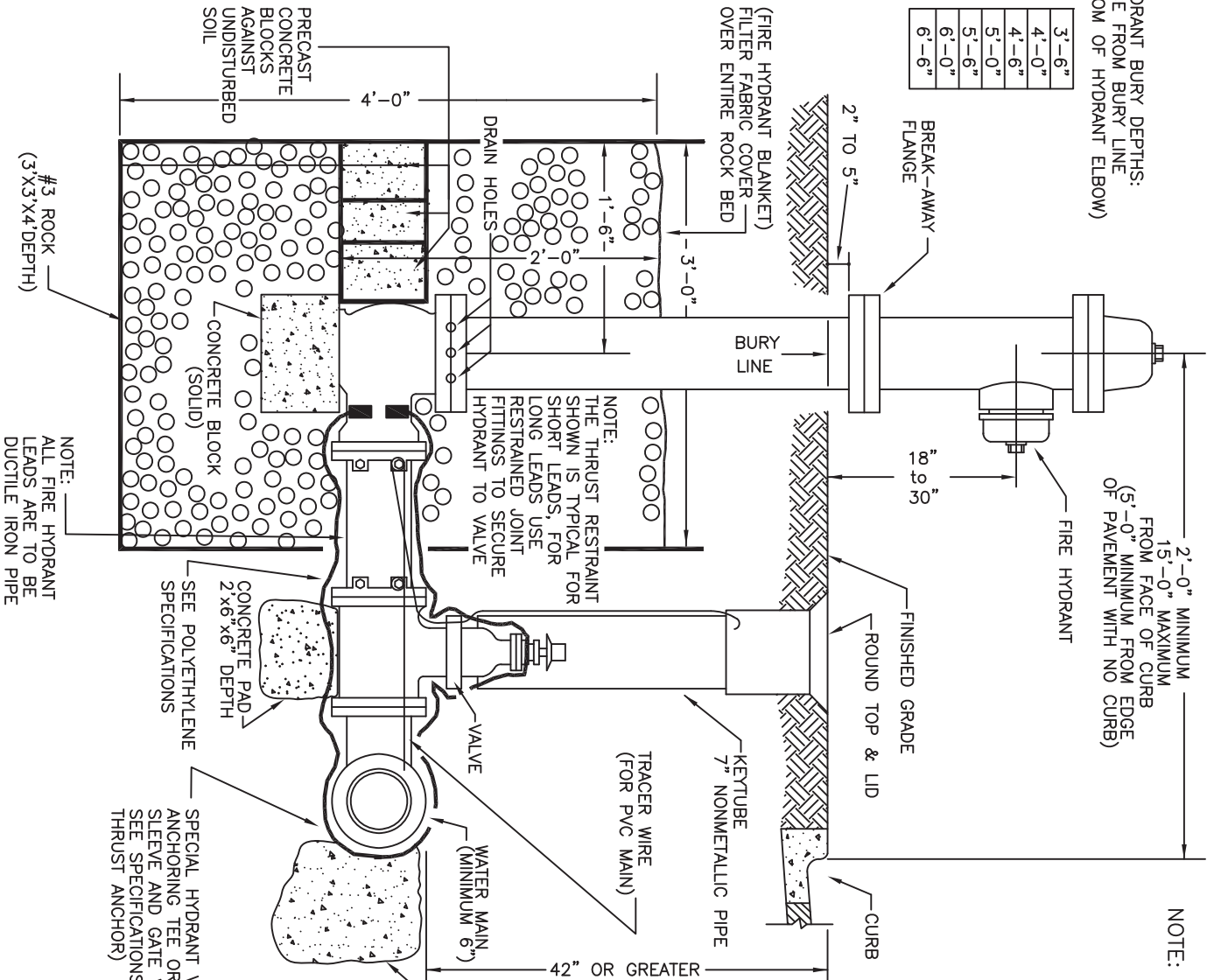
DATE	MAR. 2008	SCALE	NONE
DRAWING NO.	1608	SHEET	1 of 1

FIRE HYDRANT BURY DEPTHS:
(DISTANCE FROM BURY LINE
TO BOTTOM OF HYDRANT ELBOW)

3'-6"
4'-0"
4'-6"
5'-0"
5'-6"
6'-0"
6'-6"

2'-0" MINIMUM
15'-0" MAXIMUM
FROM FACE OF CURB
(5'-0" MINIMUM FROM EDGE
OF PAVEMENT WITH NO CURB)

NOTE: LWC SUPPLIES HYDRANTS
OF VARIOUS BURY DEPTHS.
EXTENSION KITS ARE PROHIBITED
FOR NEW INSTALLATIONS. SEE SECTION 9.
WHEN TURNING FIRE HYDRANT OFF,
ALLOW TIME FOR FIRE HYDRANT TO
DRAIN BEFORE REPLACING NOZZLE CAPS.

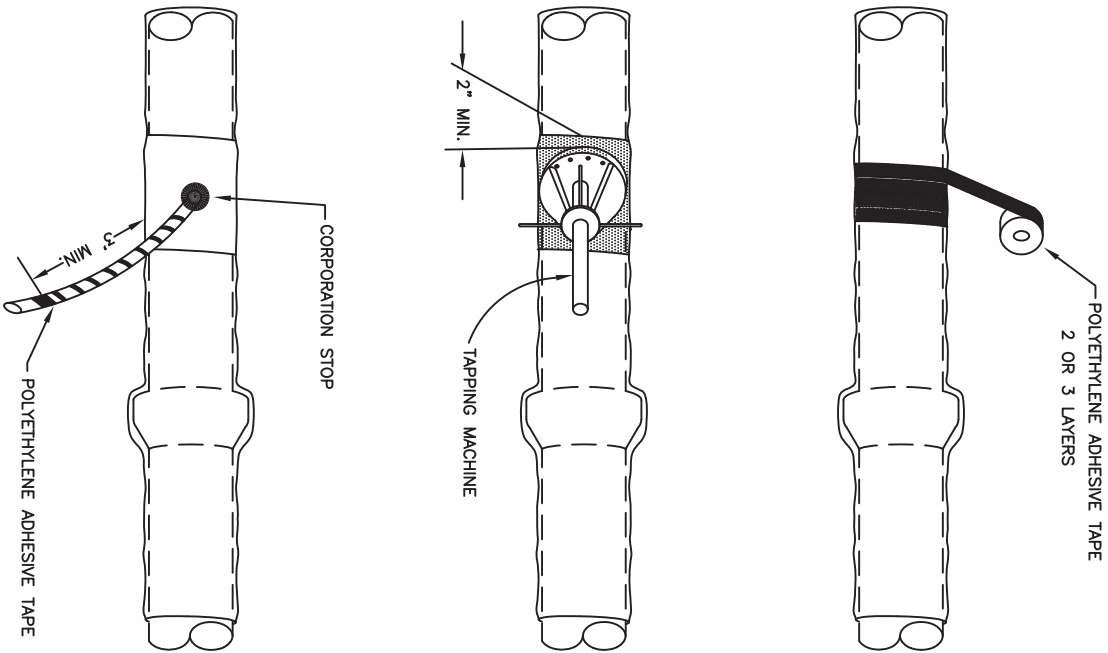


PLACE FIRE
HYDRANT
ATTACHMENT
STICKER
ON SMOOTH
SURFACE,
CENTERED
BETWEEN
NOZZLES ON
BARREL.

LOUISVILLE WATER COMPANY
560 S. 3RD STREET • LOUISVILLE, KENTUCKY 40202 • (502) 566-3600
GREGORY C. HEITZMAN - PRESIDENT
JAMES H. BRAUNHILL - VICE PRESIDENT/CHIEF ENGINEER

STANDARD DRAWING
TYPICAL
FIRE HYDRANT INSTALLATION

DATE	MAR. 2008	SCALE	NONE
DRAWING NO.	2000	SHEET	1 OF 1

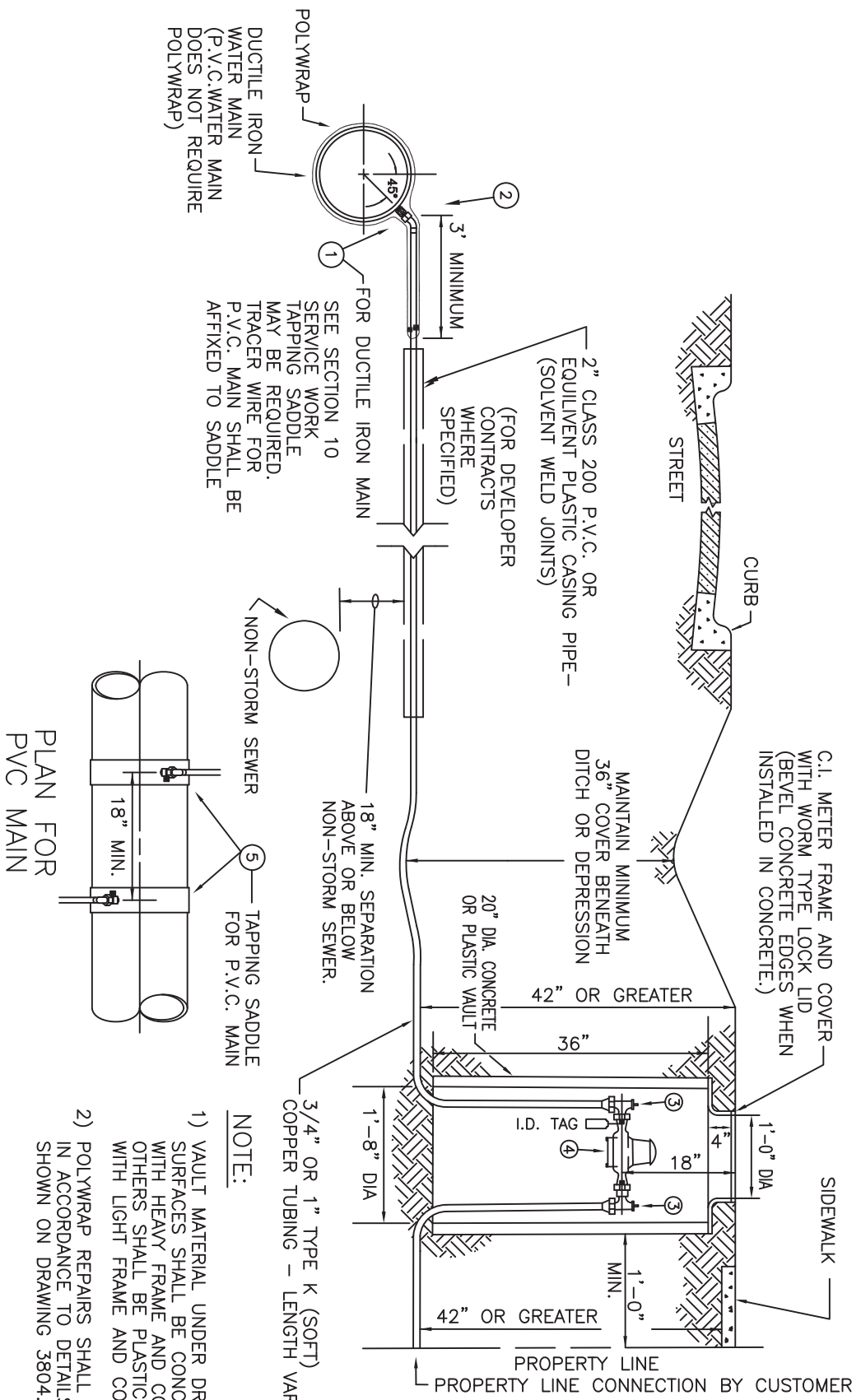


- OPENINGS FOR BRANCHES, SERVICE TAPS, BLOW OFFS, AIR VALVES, AND SIMILAR APPURTENANCES SHALL BE MADE BY :
- 1.) WRAPPING 2 OR 3 LAYERS OF POLYETHYLENE ADHESIVE TAPE COMPLETELY AROUND THE PIPE TO COVER THE AREA WHERE THE TAPPING MACHINE AND CHAIN WILL BE MOUNTED, EXTENDING A MINIMUM OF 2" BEYOND THE MOUNTING SURFACE.
 - 2.) MOUNT THE TAPPING MACHINE ON THE PIPE AREA COVERED BY THE TAPE. MAKE THE TAP AND INSTALL THE CORPORATION STOP DIRECTLY THROUGH THE TAPE AND POLYETHYLENE.
 - 3.) INSPECT THE ENTIRE CIRCUMFERENTIAL AREA FOR DAMAGE AND MAKE ANY NECESSARY REPAIRS WITH TAPE.
 - 4.) ON HOUSE SERVICES, TO MINIMIZE THE POSSIBILITY OF DISSIMILAR METAL CORROSION AT SERVICE CONNECTIONS, WRAP THE CORPORATION STOP AND A MINIMUM CLEAR DISTANCE OF THREE (3) FEET OF THE COPPER SERVICE WITH POLYETHYLENE ADHESIVE TAPE.
 - 5.) SEE SECTION 10.3.1 & 10.3.3

LOUISVILLE WATER COMPANY
550 S. 3RD STREET • LOUISVILLE, KENTUCKY 40202 • (502) 569-3600
GREGORY C. HEITZMAN - PRESIDENT
JAMES H. BRAMMEL - VICE PRESIDENT/CHIEF ENGINEER

STANDARD DRAWING
METHOD FOR
TAPPING POLYETHYLENE
ENCASED PIPE

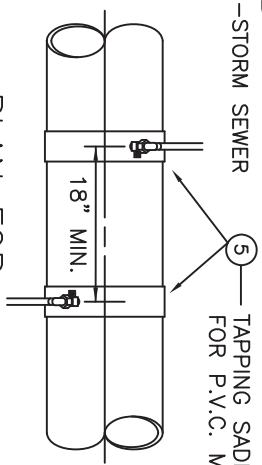
DATE	MAR. 2008	SCALE	NONE
DRAWING NO.	3804	SHEET	1 OF 1



DUCTILE IRON WATER MAIN (P.V.C. WATER MAIN DOES NOT REQUIRE POLYWRAP)

SEE SECTION 10 SERVICE WORK TAPPING SADDLE MAY BE REQUIRED. TRACER WIRE FOR P.V.C. MAIN SHALL BE AFFIXED TO SADDLE

PLAN FOR PVC MAIN



NOTE:
1) VAULT MATERIAL UNDER DRIVING SURFACES SHALL BE CONCRETE WITH HEAVY FRAME AND COVER, OTHERS SHALL BE PLASTIC WITH LIGHT FRAME AND COVER.
2) POLYWRAP REPAIRS SHALL BE MADE IN ACCORDANCE TO DETAILS AS SHOWN ON DRAWING 3804.

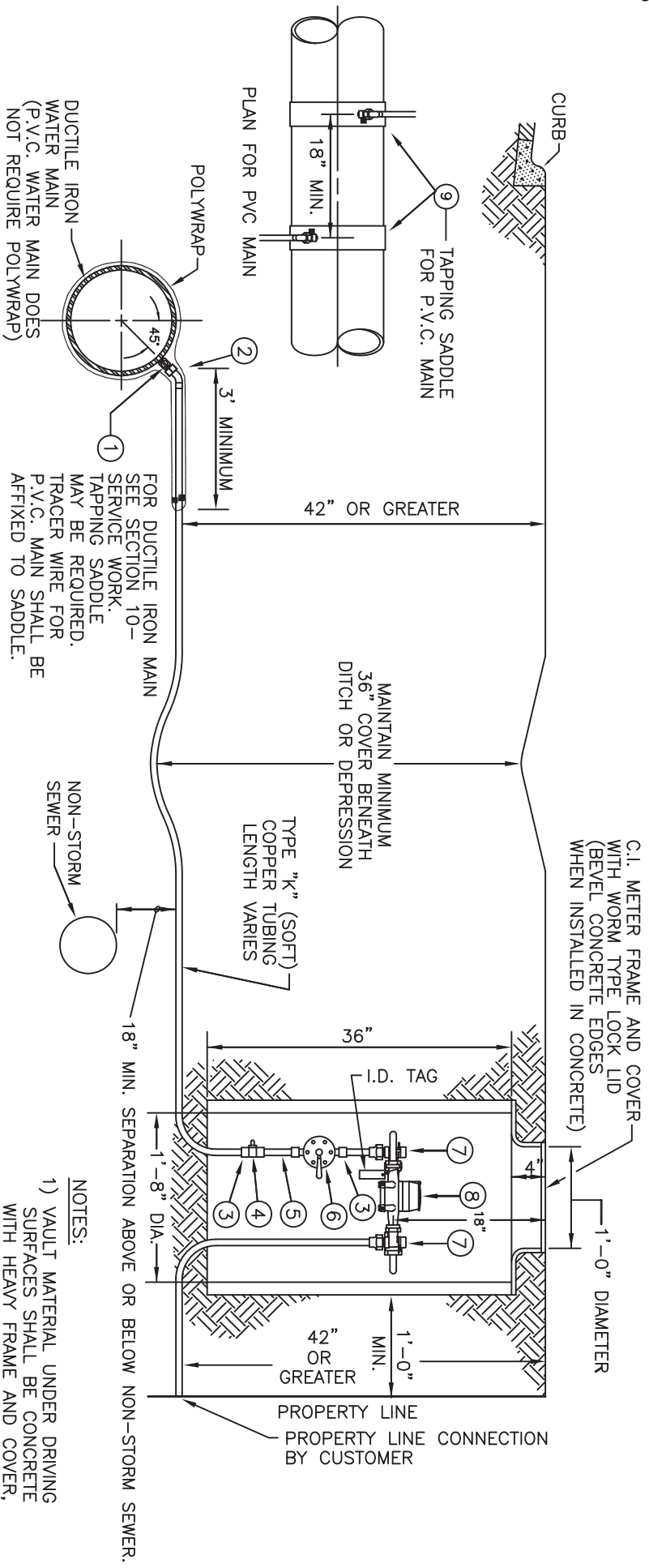
TYPICAL COPPER SERVICE 1" AND SMALLER

NO.	QTY	FITTING	JOINT	SERVICE SIZES
①	1	Corporation Stop	Inlet-Male Thread (Tapered) Outlet-Male Thread	3/4" 1"
②	1	Adapter Bend (45° OR 90°)	Inlet-Female Thread Outlet-Female Thread	3/4" 1"
③	2	Angle Meter Stop	Female Compression Male Thread	3/4" 1"
④	1	Meter	Male Thread	3/4" 1"

LOUISVILLE WATER COMPANY
560 S. 3RD STREET - LOUISVILLE, KENTUCKY 40202 • (502) 589-3600
GREGORY C. HERTZMAN - PRESIDENT
JAMES H. BRAMMEL - VICE PRESIDENT/CHIEF ENGINEER

STANDARD DRAWING
TYPICAL COPPER
SERVICE 1" AND
SMALLER

DATE	MAR. 2008	SCALE	NONE
DRAWING NO.	3002	SHEET	1 OF 1



DUCTILE IRON WATER MAIN (P.V.C. WATER MAIN DOES NOT REQUIRE POLYWRAP)

FOR DUCTILE IRON MAIN SEE SECTION 10 - SERVICE WORK. TAPPING SADDLE MAY BE REQUIRED. TRACER WIRE FOR P.V.C. MAIN SHALL BE AFFIXED TO SADDLE.

TYPICAL 1" COPPER SERVICE WITH PRESSURE REDUCING VALVE

- NOTES:
- 1) VAULT MATERIAL UNDER DRIVING SURFACES SHALL BE CONCRETE WITH HEAVY FRAME AND COVER, OTHERS SHALL BE PLASTIC WITH LIGHT FRAME AND COVER.
 - 2) POLYWRAP REPAIRS SHALL BE MADE IN ACCORDANCE TO DETAILS AS SHOWN ON DRAWING 3804.

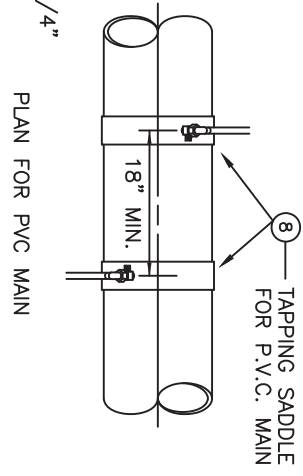
NO.	QTY	FITTING	JOINT	SIZE
1	1	Corporation Stop	Inlet-Male Thread (Tapered) Outlet-Male Thread	1"
2	1	Adapter Bend (45° OR 90°)	Inlet-Female Thread Outlet-Female Compression	1"
3	2	Adapter	Female Compression Male Thread	1"
4	1	Ball Valve w/ Handle	Female Thread	1"
5	1	Brass Nipple	Male Thread	1"
6	1	Pressure Reducing Valve	Female Thread	1"
7	2	Angle Meter Stop	Female Compression Female Thread	1"
8	1	Meter	Meter Thread	1"

LOUISVILLE WATER COMPANY
 550 S. 3RD STREET - LOUISVILLE, KENTUCKY 40202 • (502) 569-5600
 GREGORY C. HEITZMAN - PRESIDENT
 JAMES H. BRAMMEL - VICE PRESIDENT/CHIEF ENGINEER

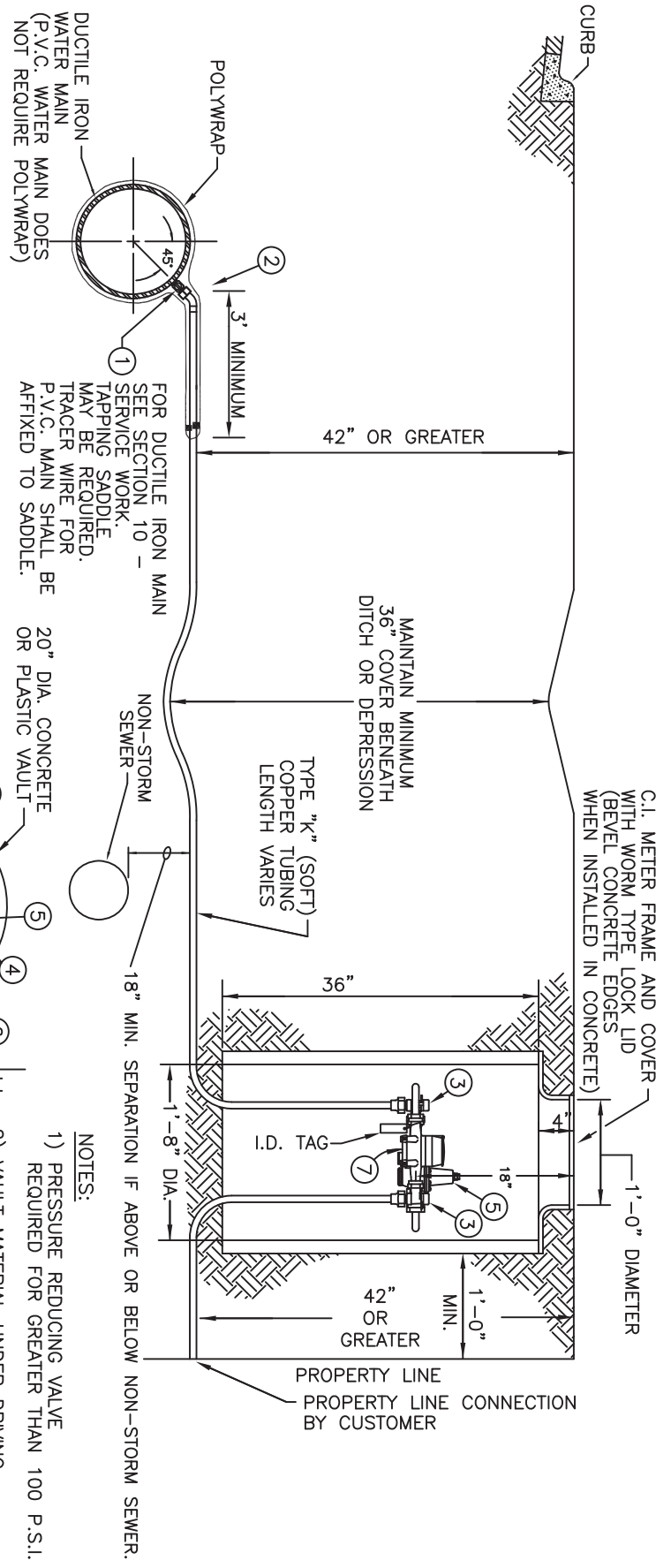
STANDARD DRAWING
 TYPICAL 1" COPPER SERVICE
 WITH PRESSURE REDUCING VALVE

DATE	MAR. 2008	SCALE	NONE
DRAWING NO.	3003	SHEET	1 OF 1

NO.	QTY	FITTING	JOINT	SIZE
①	1	Corporation Stop	Inlet-Male Thread (Tapered) Outlet-Male Thread	3/4"
②	1	Adapter Bend (45° OR 90°)	Inlet-Female Thread Outlet-Female Compression	3/4"
③	2	Angle Meter Stop	Female Compression Female Thread	3/4"
④	2	Adapter For Pressure Regulator	Male Thread	3/4"
⑤	1	Pressure Regulator	Female Thread	3/4"
⑥	1	S-Tube	Female Thread	3/4"
⑦	1	Meter	Male Thread	5/8" x 3/4" (or 3/4")



PLAN FOR PVC MAIN



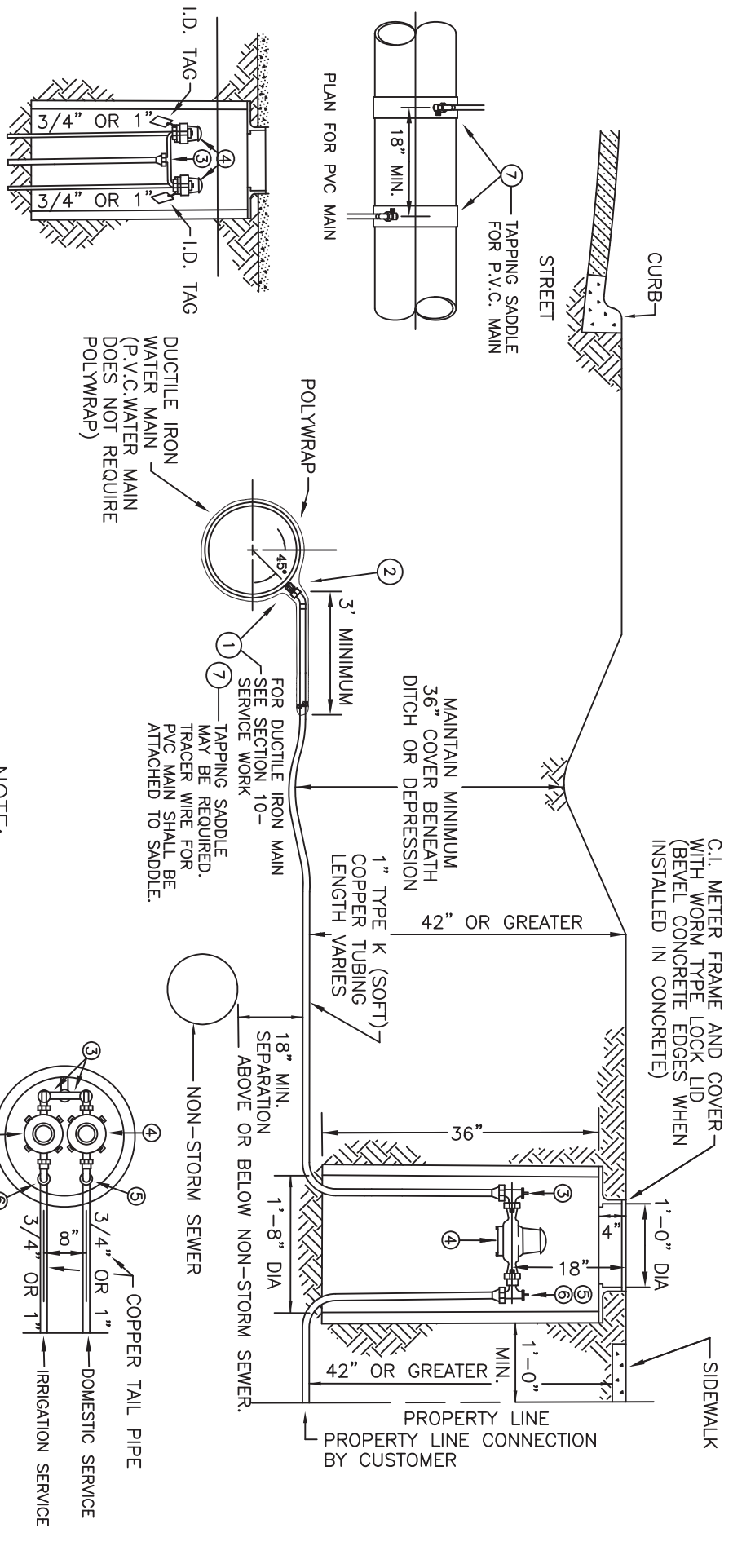
- NOTES:**
- 1) PRESSURE REDUCING VALVE REQUIRED FOR GREATER THAN 100 P.S.I.
 - 2) VAULT MATERIAL UNDER DRIVING SURFACES SHALL BE CONCRETE. WITH HEAVY FRAME AND COVER, OTHERS SHALL BE PLASTIC WITH LIGHT FRAME AND COVER.
 - 3) POLYWRAP REPAIRS SHALL BE MADE IN ACCORDANCE TO DETAILS AS SHOWN ON DRAWING 3804.

STANDARD DRAWING

TYPICAL 3/4" COPPER SERVICE WITH PRESSURE REDUCING VALVE

LOUISVILLE WATER COMPANY
560 S. 3RD STREET • LOUISVILLE, KENTUCKY 40202 • (502) 569-3600
GREGORY C. HEITZMAN - PRESIDENT
JAMES H. BRAMMEL - VICE PRESIDENT/CHIEF ENGINEER

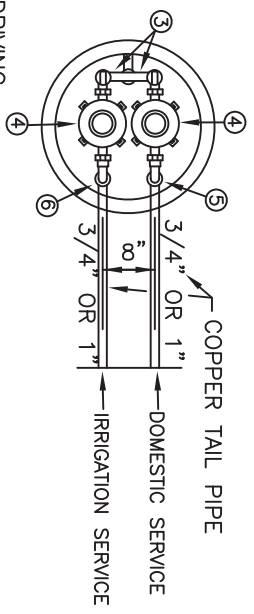
DATE	MAR. 2008	SCALE	NONE
DRAWING NO.	3004	SHEET	1 OF 1



NO.	QTY	FITTING	JOINT	SIZE
①	1	Corporation Stop	Inlet-Male Thread (Tapered) Outlet-Male Thread	1" 1"
②	1	Adapter Bend (45° OR 90°)	Inlet-Female Thread Outlet-Female Compression	1" 1"
③	1	Branch Piece, with Angle Meter Stops	Inlet-Female Compression Outlet-Female Compression	1" 3/4"
④	2	Meter	Male Thread	3/4"
⑤	1	Angle Meter Stop	Female Thread	3/4"
⑥	1	Angle Check Valve (Irrigation Service Only)	Female Thread Female Compression	3/4" 3/4" or 1"

NOTE:

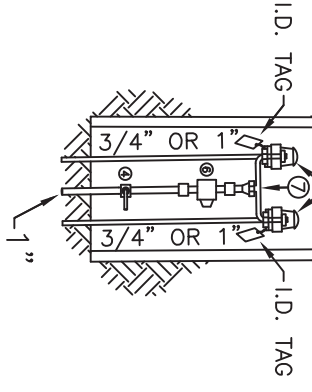
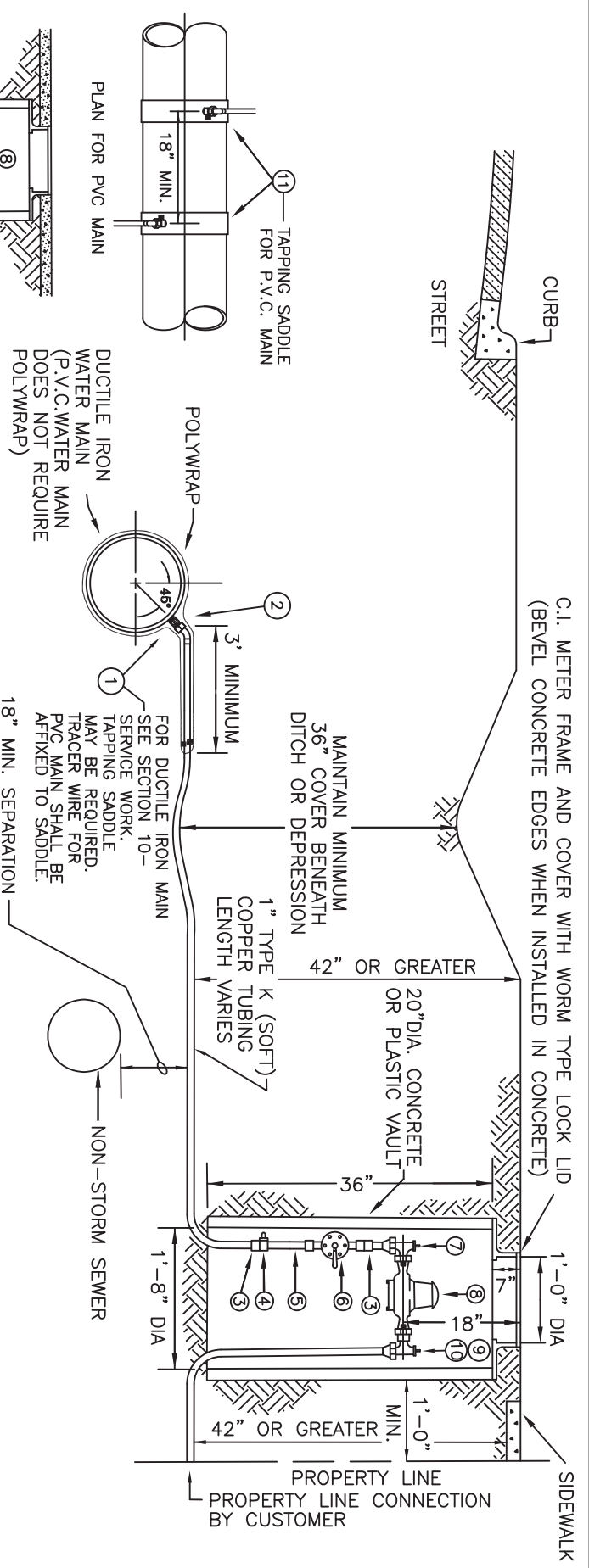
- 1) VAULT MATERIAL UNDER DRIVING SURFACES SHALL BE CONCRETE WITH HEAVY FRAME AND COVER, OTHERS SHALL BE PLASTIC WITH LIGHT FRAME AND COVER.
- 2) POLYWRAP REPAIRS SHALL BE MADE IN ACCORDANCE TO DETAILS AS SHOWN ON DRAWING 3804.



LOUISVILLE WATER COMPANY
 550 S. 3RD STREET - LOUISVILLE, KENTUCKY 40202 • (502) 569-5600
 GREGORY C. HEITZMAN - PRESIDENT
 JAMES H. BRAMMEL - VICE PRESIDENT/CHIEF ENGINEER

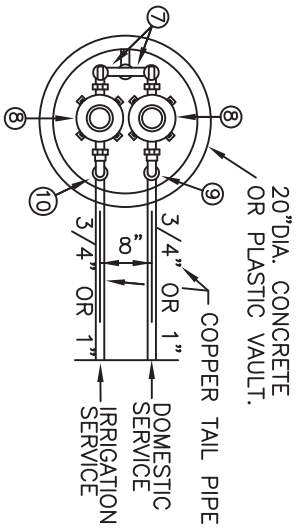
STANDARD DRAWING
 TYPICAL DOUBLE 1" DOMESTIC/IRRIGATION COPPER SERVICE

DATE	MAR. 2008	SCALE	NONE
DRAWING NO.	3400	SHEET	1 OF 1



TYPICAL DOUBLE DOMESTIC/IRRIGATION 1" COPPER SERVICE WITH PRESSURE REDUCING VALVE

NO.	QTY	FITTING	JOINT	SIZE
①	1	Corporation Stop	Inlet-Male Thread (Tapered) Outlet-Male Thread	1" 1"
②	1	Adapter Bend (45° OR 90°)	Inlet-Female Thread Outlet-Female Compression	1" 1"
③	2	Adapter	Female Compression Male Thread	1" 1"
④	1	Ball Valve w/ Handle	Female Thread	1"
⑤	1	Brass Nipple	Male Thread	1"
⑥	1	Pressure Reducing Valve	Female Thread	1"
⑦	1	Brand Piece with 2 Angle Meter Stop	Inlet-Female Compression Outlet-Female Thread	1" 1"
⑧	2	Meter	Male Thread	3/4"
⑨	1	Angle Meter Stop	Female Thread	3/4"
⑩	1	Angle Check Valve (Irrigation Service Only)	Female Thread Female Compression	3/4" or 1" 3/4" or 1"



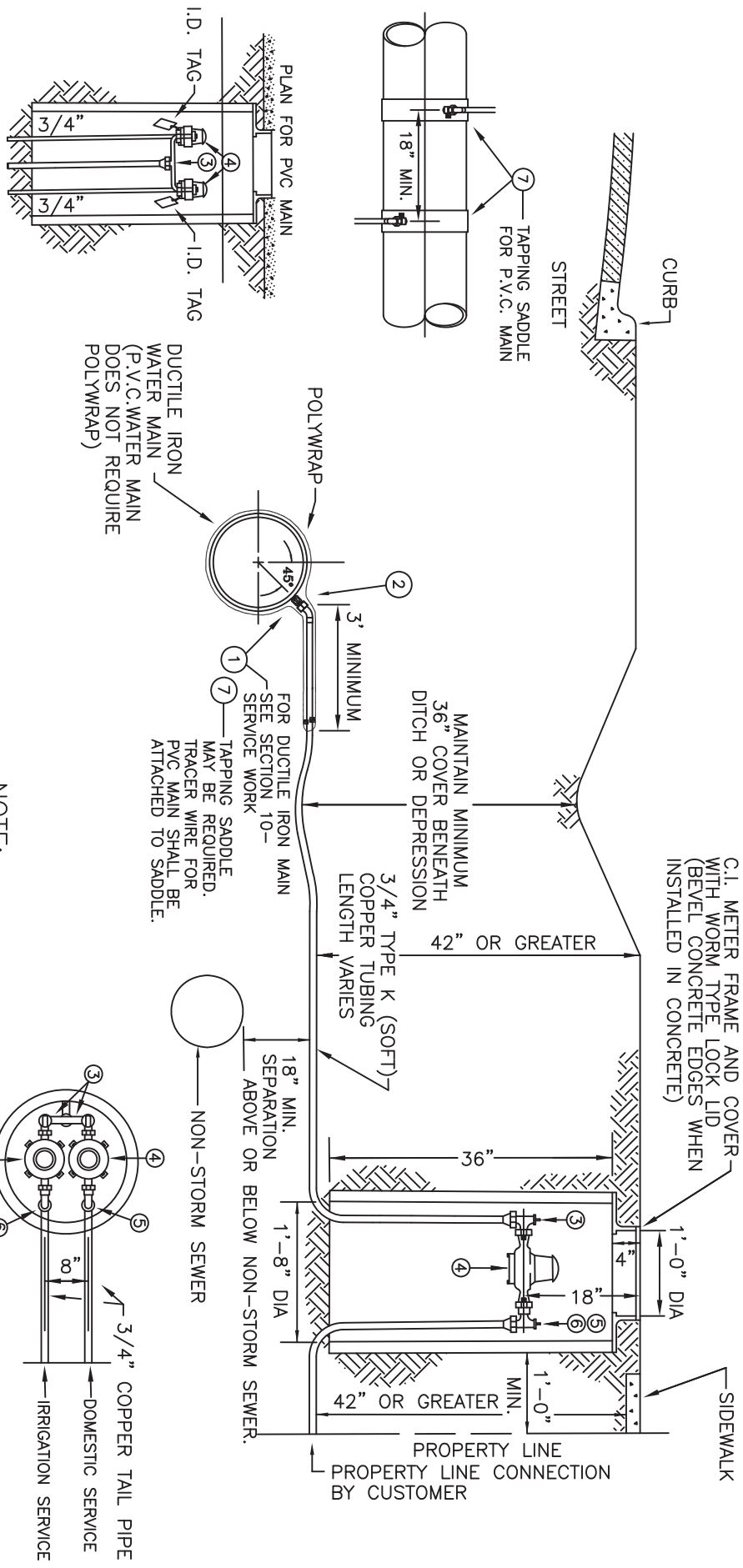
NOTE:

- 1) VAULT MATERIAL UNDER DRIVING SURFACES SHALL BE CONCRETE WITH HEAVY FRAME AND COVER, OTHERS SHALL BE PLASTIC WITH LIGHT FRAME AND COVER.
- 2) POLYWRAP REPAIRS SHALL BE MADE IN ACCORDANCE TO DETAILS AS SHOWN ON DRAWING 3804.

LOUISVILLE WATER COMPANY
560 S. 3RD STREET • LOUISVILLE, KENTUCKY 40202 • (502) 569-3600
GREGORY C. HEITZMAN - PRESIDENT
JAMES H. BRAMMILL - VICE PRESIDENT/CHIEF ENGINEER

STANDARD DRAWING
TYPICAL DOUBLE 1" DOMESTIC/IRRIGATION COPPER SERVICE WITH PRESSURE REDUCING VALVE

DATE	MAR. 2008	SCALE	NONE
DRAWING NO.	3401	SHEET	1 OF 1



NOTE:

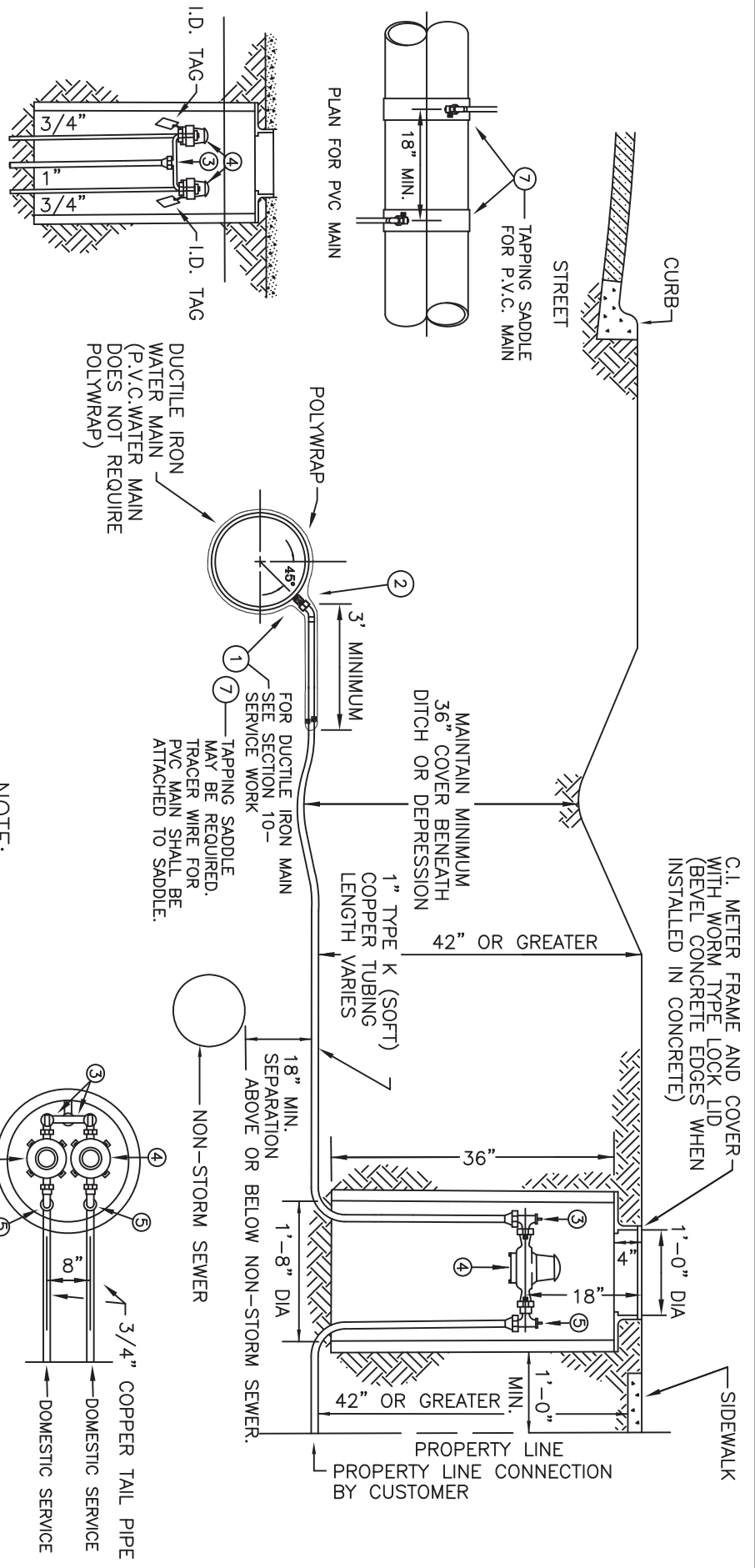
- 1) VAULT MATERIAL UNDER DRIVING SURFACES SHALL BE CONCRETE WITH HEAVY FRAME AND COVER, OTHERS SHALL BE PLASTIC WITH LIGHT FRAME AND COVER.
- 2) POLYWRAP REPAIRS SHALL BE MADE IN ACCORDANCE TO DETAILS AS SHOWN ON DRAWING 3804.

NO.	QTY	FITTING	JOINT	SIZE
①	1	Corporation Stop	Inlet-Male Thread (Tapered) Outlet-Male Thread	3/4" 3/4"
②	1	Adapter Bend (45° OR 90°)	Inlet-Female Thread Outlet-Female Compression	3/4" 3/4"
③	1	Branch Piece, with 2 Angle Meter Stops	Inlet-Female Compression 3/4" x 3/4" Outlet-Female Compression 3/4"	3/4" 3/4"
④	2	Meter	Male Thread	3/4"
⑤	1	Angle Meter Stop	Female Thread Female Compression	3/4" 3/4"
⑥	1	Angle Check Valve (Irrigation Service Only)	Female Thread Female Compression	3/4" 3/4"

LOUISVILLE WATER COMPANY
 550 S. 3RD STREET · LOUISVILLE, KENTUCKY 40202 · (502) 569-9600
 GREGORY C. HEITZMAN - PRESIDENT
 JAMES H. BRAMMEL - VICE PRESIDENT/CHIEF ENGINEER

STANDARD DRAWING
 TYPICAL 3/4" IRRIGATION
 RETRO FIT
 COPPER SERVICE

DATE	MAR. 2008	SCALE	NONE
DRAWING NO.	3403	SHEET	1 OF 1

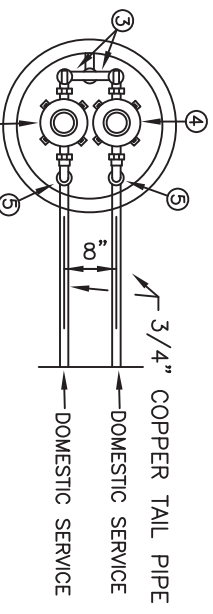


TYPICAL DOUBLE DOMESTIC/IRRIGATION 1" COPPER SERVICE

NO.	QTY	FITTING	JOINT	SIZE
①	1	Corporation Stop	Inlet-Male Thread (Tapered) Outlet-Male Thread	1" 1"
②	1	Adapter Bend (45° OR 90°)	Inlet-Female Thread Outlet-Female Compression	1" 1"
③	1	Branch Piece, with 2 Angle Meter Stops	Inlet-Female Compression Outlet-Female Compression	1" x 3/4" 3/4"
④	2	Meter	Male Thread	3/4"
⑤	2	Angle Meter Stop	Female Thread Female Compression	3/4" 3/4"

NOTE:

- 1) VAULT MATERIAL UNDER DRIVING SURFACES SHALL BE CONCRETE WITH HEAVY FRAME AND COVER, OTHERS SHALL BE PLASTIC WITH LIGHT FRAME AND COVER.
- 2) POLYWRAP REPAIRS SHALL BE MADE IN ACCORDANCE TO DETAILS AS SHOWN ON DRAWING 3804.



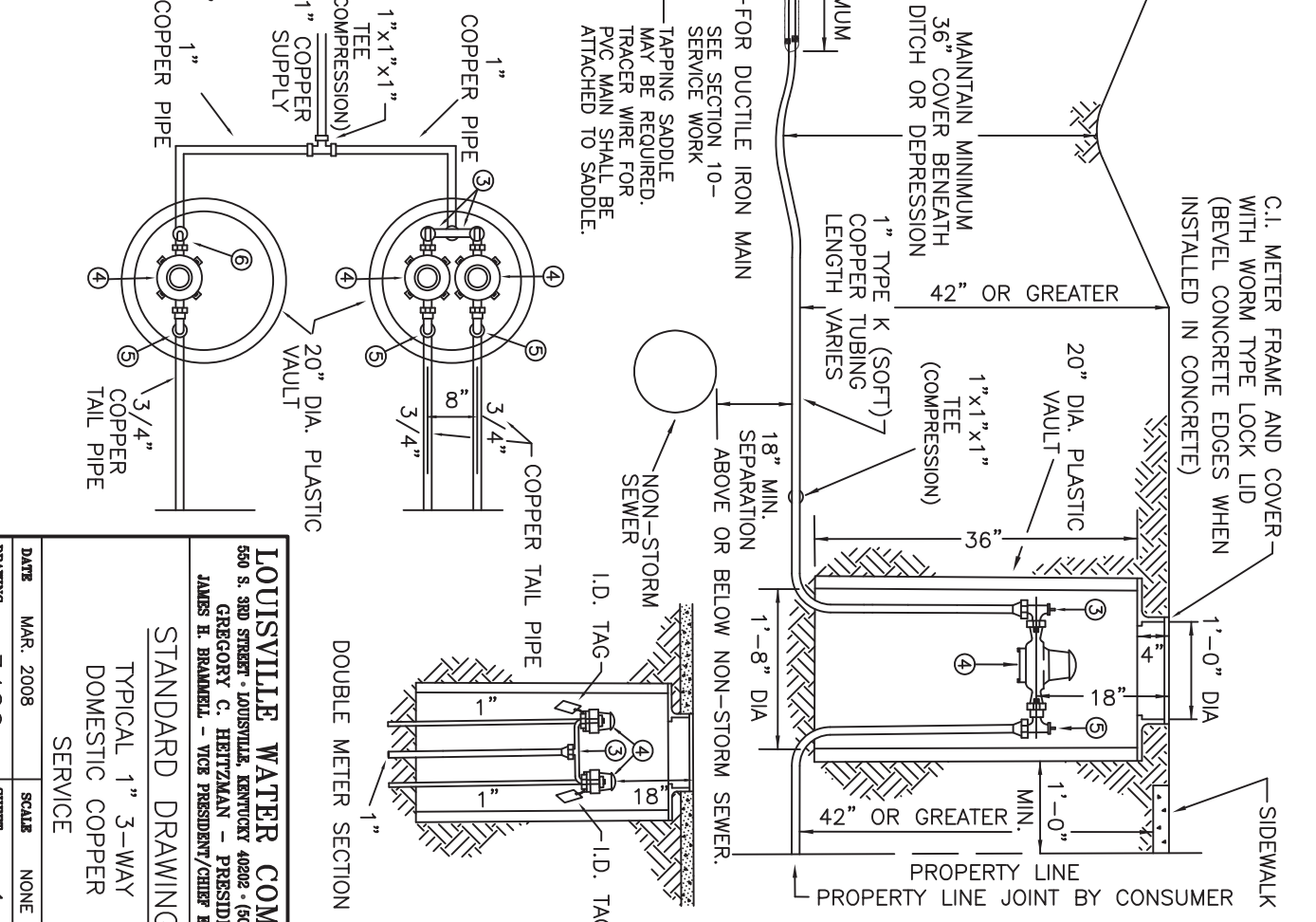
LOUISVILLE WATER COMPANY
 550 S. 3RD STREET - LOUISVILLE, KENTUCKY 40202 - (502) 566-3600
 GREGORY C. HEITZMAN - PRESIDENT
 JAMES H. BRAUNERL - VICE PRESIDENT/CHIEF ENGINEER

STANDARD DRAWING
 TYPICAL 1" TANDEM
 2-WAY DOMESTIC
 COPPER SERVICE

DATE	MAR. 2008	SCALE	NONE
DRAWING NO.	3404	SHEET	1 OF 1

NO.	QTY	FITTING	COPPER SERVICE	JOINT	SIZE
①	1	Corporation Stop	Inlet-Male Thread (Tapered) Outlet-Male Thread		1" (Compression) 1" COPPER SUPPLY
②	1	Adapter Bend (45° OR 90°)	Inlet-Female Thread Outlet-Female Compression		1" 1" 1"
③	1	Branch Piece, with 2 Angle Meter Stops	Inlet-Female Compression Outlet-Female Compression		1" x 3/4" 3/4" 3/4"
④	3	Meter	Male Thread		3/4"
⑤	3	Angle Meter Stop	Female Thread Female Compression		3/4" 3/4"
⑥	1	Angle Meter Stop	Female Thread Female Compression		3/4" 1"

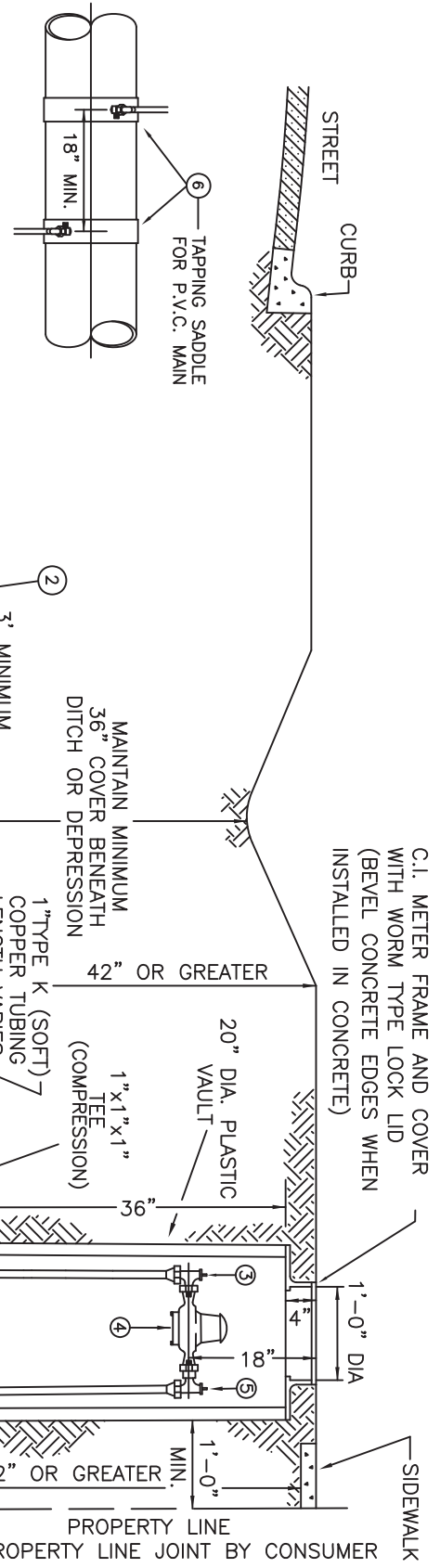
NOTE:
1) VAULT MATERIAL UNDER DRIVING SURFACES SHALL BE CONCRETE. WITH HEAVY FRAME AND COVER, OTHERS SHALL BE PLASTIC WITH LIGHT FRAME AND COVER.
2) POLYWRAP REPAIRS SHALL BE MADE IN ACCORDANCE TO DETAILS AS SHOWN ON DRAWING 3804.



LOUISVILLE WATER COMPANY
560 S. 3RD STREET - LOUISVILLE, KENTUCKY 40202 - (502) 586-5800
GREGORY C. HEITZMAN - PRESIDENT
JAMES H. BRAUNMIEL - VICE PRESIDENT/CHIEF ENGINEER

STANDARD DRAWING
TYPICAL 1" 3-WAY
DOMESTIC COPPER
SERVICE

DATE	MAR. 2008	SCALE	NONE
DRAWING NO.	3420	SHEET	1 OF 1

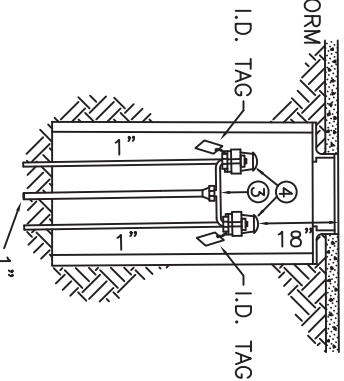


PLAN FOR PVC MAIN

NOTE:
1) VAULT MATERIAL UNDER DRIVING SURFACES SHALL BE CONCRETE. WITH HEAVY FRAME AND COVER, OTHERS SHALL BE PLASTIC WITH LIGHT FRAME AND COVER.
2) POLYWRAP REPAIRS SHALL BE MADE IN ACCORDANCE TO DETAILS AS SHOWN ON DRAWING 3804.

DUCTILE IRON WATER MAIN (P.V.C. WATER MAIN DOES NOT REQUIRE POLYWRAP)

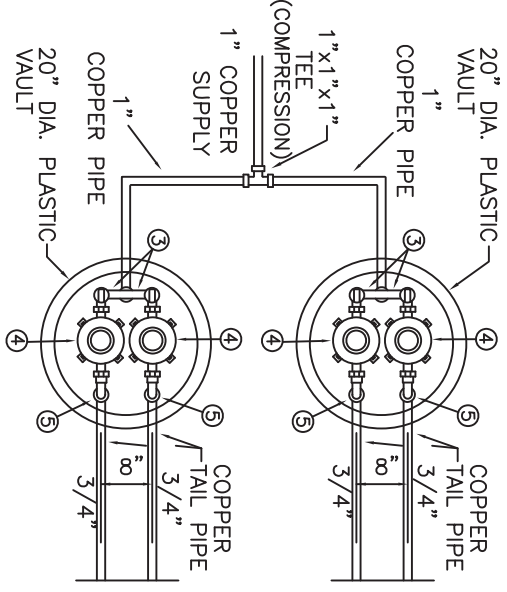
FOR DUCTILE IRON MAIN SEE SECTION 10- SERVICE WORK
TAPPING SADDLE MAY BE REQUIRED. TRACER WIRE FOR PVC MAIN SHALL BE ATTACHED TO SADDLE.



DOUBLE METER SECTION

NO.	QTY	FITTING	JOINT	SIZE
①	1	Corporation Stop	Inlet-Male Thread (Tapered) Outlet-Male Thread	1" 1"
②	1	Adapter Bend (45° OR 90°)	Inlet-Female Thread Outlet-Female Compression	1" 1"
③	2	Branch Piece, with Angle Meter Stops	Inlet-Female Compression Outlet-Female Compression	1" x 3/4" 3/4"
④	4	Angle Meter Stop	Male Thread	3/4"
⑤	4	Angle Meter Stop	Female Thread Female Compression	3/4" 3/4"

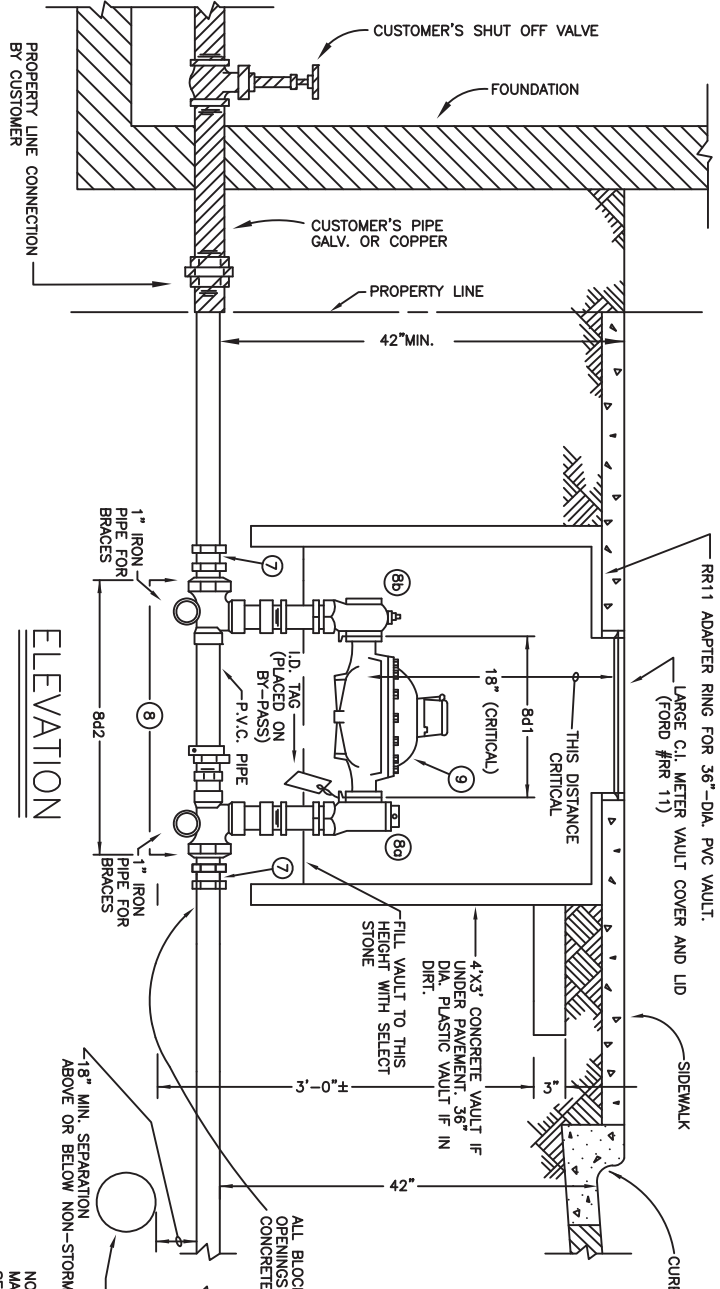
TYPICAL 1" 4-WAY DOMESTIC COPPER SERVICE



LOUISVILLE WATER COMPANY
560 S. 3RD STREET - LOUISVILLE, KENTUCKY 40202 • (502) 569-3600
GREGORY C. HEITZMAN - PRESIDENT
JAMES H. BRAMMEL - VICE PRESIDENT/CHIEF ENGINEER

STANDARD DRAWING
TYPICAL 1" 4-WAY
DOMESTIC COPPER
SERVICE

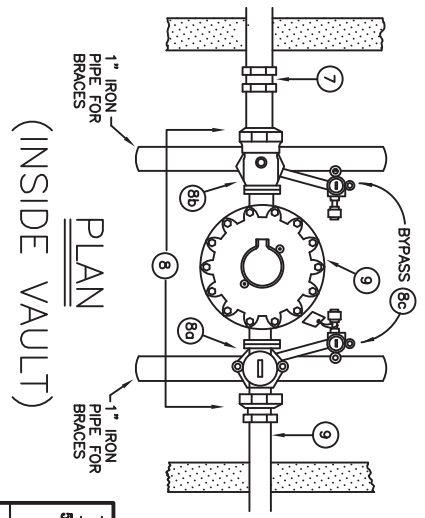
DATE	SCALE
MAR. 2008	NONE
DRAWING NO.	SHEET
3430	1 OF 1



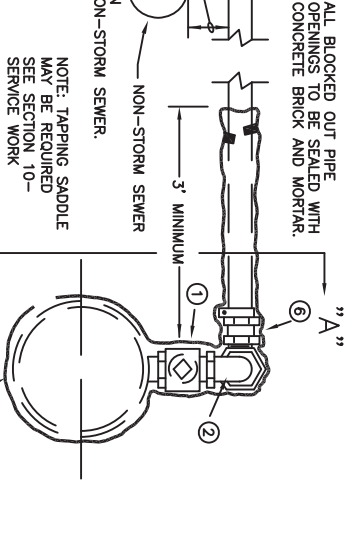
TYPICAL 1-1/2" OR 2" COPPER SERVICE

ELEVATION

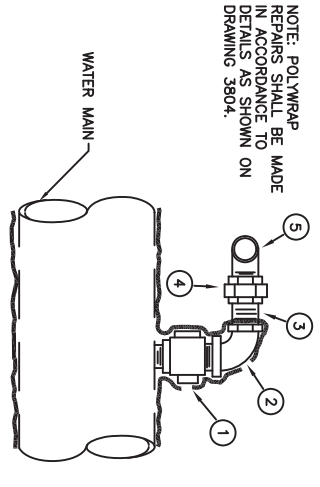
NO.	QTY	FITTING	JOINT	SERVICE SIZES
1	1	Corporation Stop	Inlet-Male Thread (Tapered) Outlet-Male Thread	1-1/2" 2" 1-1/2" 2-1/2"
2	1	Brass Reducing Ell	Inlet-Female Thread Outlet-Female Thread	1-1/2" 2" 2-1/2" 2"
3	1	Brass Nipple (close)	Male Thread	1-1/2" 2"
4	1	Brass Union	Female Thread	1-1/2" 2"
5	1	Brass Street Ell	Male Thread	1-1/2" 2"
6	1	Compression Coupling	Female Thread Female Compression	1-1/2" 2" 1-1/2" 2"
7	2	Adapter	Female Compression Male Thread	1-1/2" 2" 1-1/2" 2"
8	1	Meter Setter	Male Thread	1-1/2"
8a	1	Angle Meter Stop		
8b	1	Angle Check Valve		
8c	1	By-Pass 1"		
8d1	1	Meter	Male Thread	13-3/8" 17-3/8" 22" 27-1/8"
8d2	1	Meter	Male Thread	1-1/2" 2"



PLAN
(INSIDE VAULT)



SECTION "A-A"



NOTE: POLYWRAP REPAIRS SHALL BE MADE IN ACCORDANCE TO DETAILS AS SHOWN ON DRAWING 3804.

NOTE: TAPPING SADDLE MAY BE REQUIRED SEE SECTION 10-SERVICE WORK

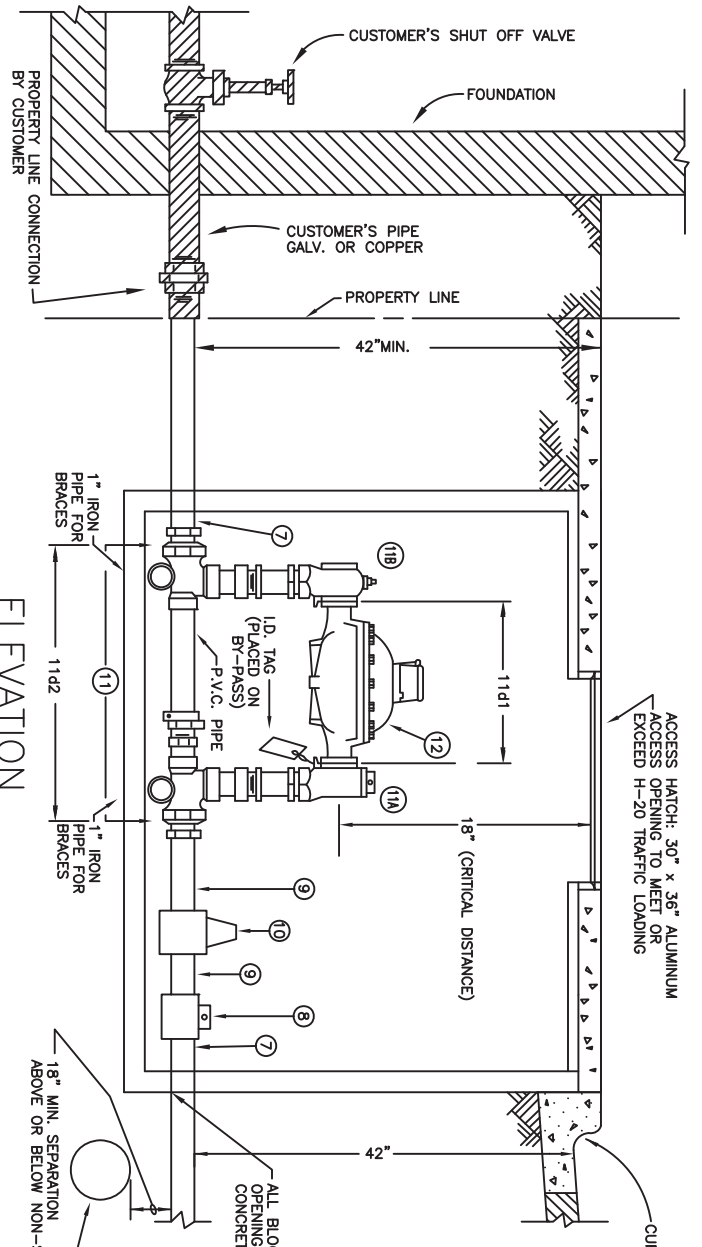
1/8" MIN. SEPARATION ABOVE OR BELOW NON-STORM SEWER.

ALL BLOCKED OUT PIPE OPENINGS TO BE SEALED WITH CONCRETE BRICK AND MORTAR.

LOUISVILLE WATER COMPANY
550 S. 3RD STREET • LOUISVILLE, KENTUCKY 40202 • (502) 569-3600
GREGORY C. HEITZMAN - PRESIDENT
JAMES H. BRAMMEL - VICE PRESIDENT/CHIEF ENGINEER

STANDARD DRAWING
TYPICAL 1-1/2" OR 2"
COPPER SERVICE

DATE	MAR. 2008	SCALE	NONE
DRAWING NO.	3200	SHEET	1 OF 1



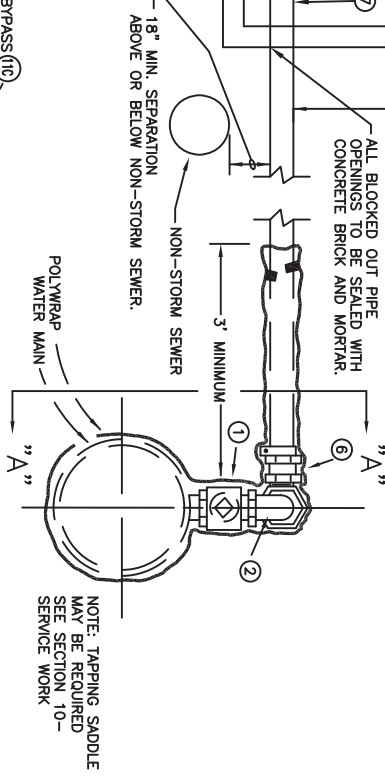
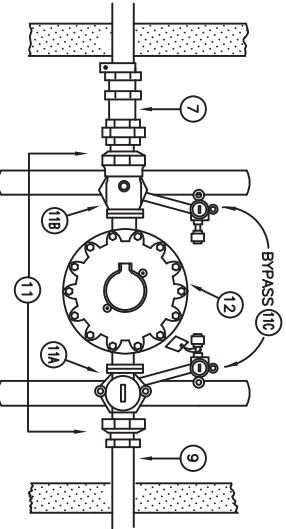
TYPICAL 1-1/2" OR 2" COPPER SERVICE WITH PRESSURE REDUCING VALVE

ELEVATION

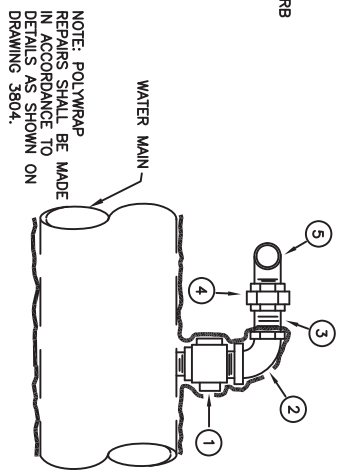
SERVICE SIZES

NO.	QTY	FITTING	JOINT	SERVICE SIZES
1	1	Corporation Stop	Inlet-Male Thread (Tapered)	1-1/2" 2"
2	1	Brass Reducing Ell	Outlet-Male Thread	2" 2-1/2"
3	1	Brass Nipple (close)	Inlet-Female Thread	1-1/2" 2-1/2"
4	1	Brass Union	Outlet-Female Compression	1-1/2" 2"
5	1	Brass Street Ell	Male Thread	1-1/2" 2"
6	1	Compression Coupling	Female Thread	1-1/2" 2"
7	2	Adapter	Female Compression	1-1/2" 2"
8	1	Curb Stop	Male Thread	1-1/2" 2"
9	2	Brass Nipple (x6)	Female Compression	1-1/2" 2"
10	1	Pressure Reducing Valve	Male Thread	1-1/2" 2"
11	1	Water Meter	Female Thread	1-1/2" 2"
11a	1	Angle Meter Stop	Female Thread	1-1/2" 2"
11b	1	Angle Check Valve	Female Thread	1-1/2" 2"
11c	1	By-Pass	Female Thread	1-1/2" 2"
11d1	1			13-3/8" 17-3/8"
11d2	1			22" 27-1/8"
12	1	Meter	Male Thread	1-1/2" 2"

PLAN (INSIDE VAULT)



SECTION "A-A"



NOTE: POLYWRAP REPAIRS SHALL BE MADE IN ACCORDANCE TO DETAILS AS SHOWN ON DRAWING 3504.

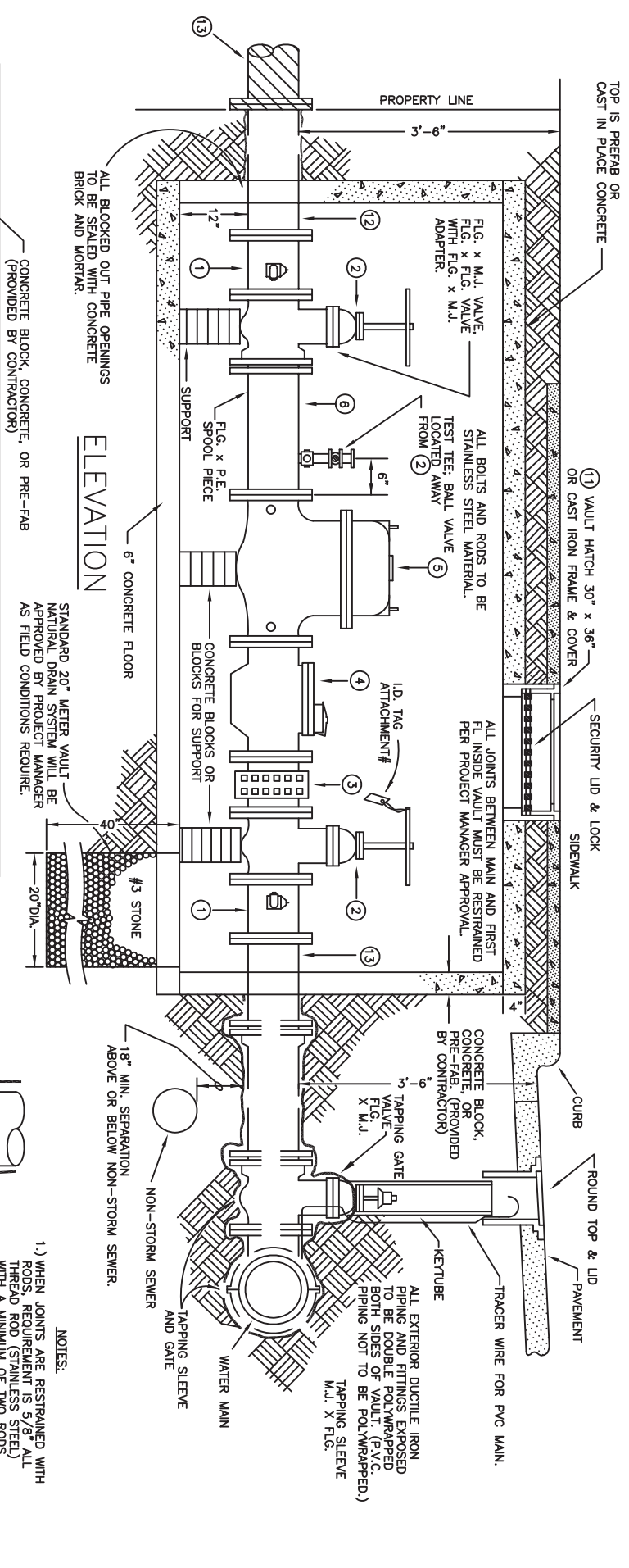
INTERIOR VAULT DIMENSIONS (MINIMUM)
LENGTH = 76"
WIDTH = 36"
HEIGHT = 48"

ACCESS HATCH AND VAULT MUST MEET OR EXCEED H-20 TRAFFIC LOADING DESIGN CRITERIA.

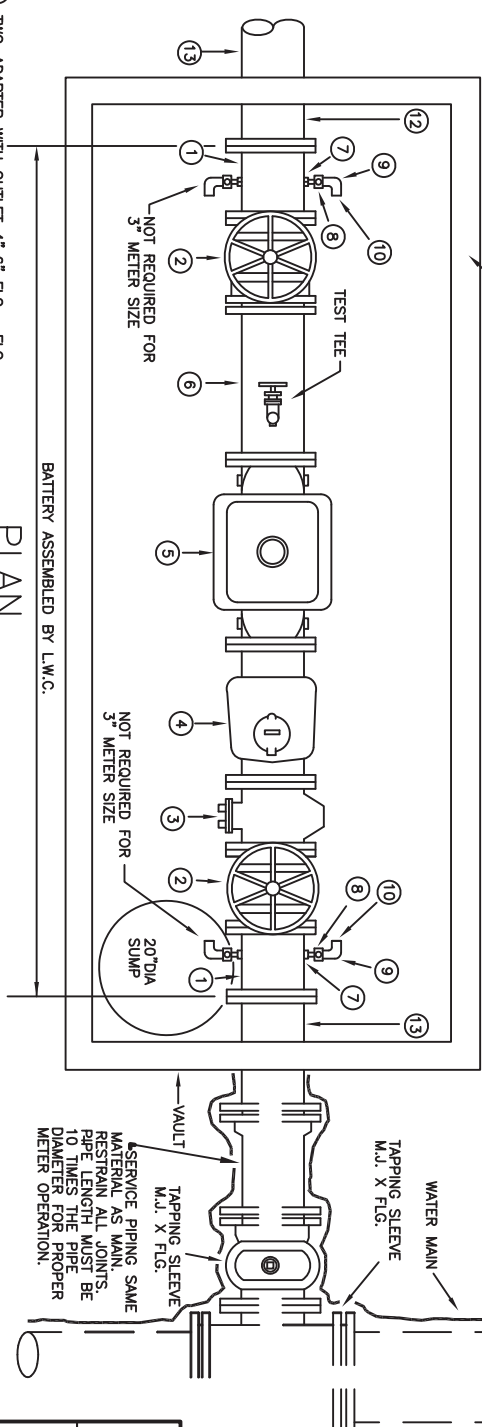
LOUISVILLE WATER COMPANY
550 S. 3RD STREET • LOUISVILLE, KENTUCKY 40202 • (502) 566-3600
GREGORY C. HEITZMAN - PRESIDENT
JAMES H. BRANNEN - VICE PRESIDENT/CHIEF ENGINEER

STANDARD DRAWING
TYPICAL 1-1/2" OR 2"
COPPER SERVICE
WITH PRESSURE REDUCING VALVE

DATE	MAR. 2008	SCALE	NONE
DRAWING NO.	3202	SHEET	1 OF 1



ELEVATION



PLAN

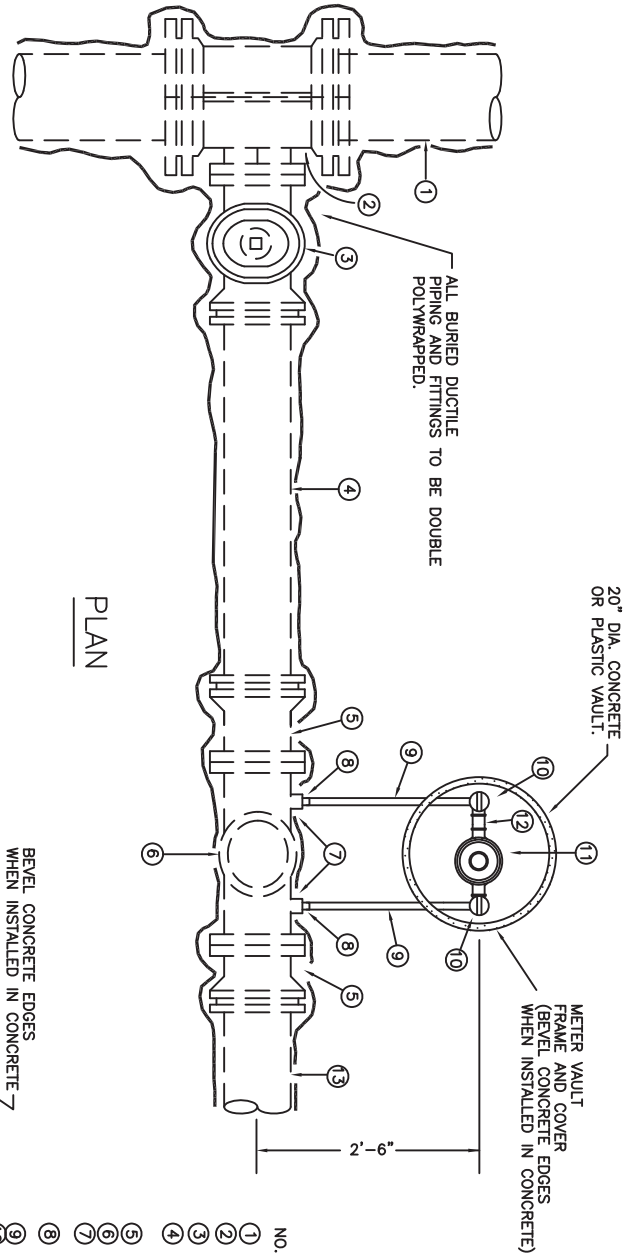
- 1) TWO-ADAPTER WITH OUTLET 4"x6" FLG x FLG
- 2) TWO-ADAPTER, REDUCING W/OUTLET 4"x3" FLG x FLG
- 3) TWO-GATE VALVE, WHEEL FLG x FLG
- 4) ONE-STRAINER, FLG x FLG
- 5) ONE-CHECK VALVE, FLG x FLG
- 6) ONE-SPOOL PIECE WITH 2" BALL VALVE ASSEMBLY (MALE THREAD)
- 7) TWO OR FOUR-NIPPLE, MALE THREAD
- 8) TWO OR FOUR-STOP OR VALVE, MALE THREAD
- 9) TWO OR FOUR-STREET ELL, MALE THREAD
- 10) TWO OR FOUR-PLUG, MALE THREAD
- 11) ONE-VAULT HATCH-30" x 36"
- 12) TWO-ADAPTER-FLG. x M.J. OR FLG. x P.E.
- 13) CUSTOMER PIPING

- NOTES:
- 1.) WHEN JOINTS ARE RESTRAINED WITH RODS, REQUIREMENT IS 3/8" ALL THREAD ROD (STAINLESS STEEL) WITH A MINIMUM OF TWO RODS PER JOINT.
 - 2.) RESTRAIN ALL JOINTS BETWEEN THE MAIN AND THE ADAPTER FLANGE JOINT THAT'S INSIDE THE VAULT.
 - 3.) IF ANY PORTION OF THE SERVICE PIPING IS ENCASED THEN THE ENTIRE LENGTH OF SERVICE PIPING SHALL BE DUCTILE IRON WITH RESTRAINED JOINTS.
 - 4.) ACCESS HATCH AND VAULT MUST MEET OR EXCEED H-20 TRAFFIC LOADING DESIGN CRITERIA. CAST IRON FRAME & COVER REQUIRED IN AREAS OF VEHICULAR TRAFFIC.
 - 5.) COMPOUND METER INSTALLATIONS SAME AS TURBINE METERS.

LOUISVILLE WATER COMPANY
 560 S. 3RD STREET - LOUISVILLE, KENTUCKY 40202 - (502) 586-5600
 GREGORY C. HEITZMAN - PRESIDENT
 JAMES H. BRAUNWEL - VICE PRESIDENT/CHIEF ENGINEER

STANDARD DRAWING
 TYPICAL DUCTILE IRON
 DOMESTIC SERVICE
 4" AND LARGER

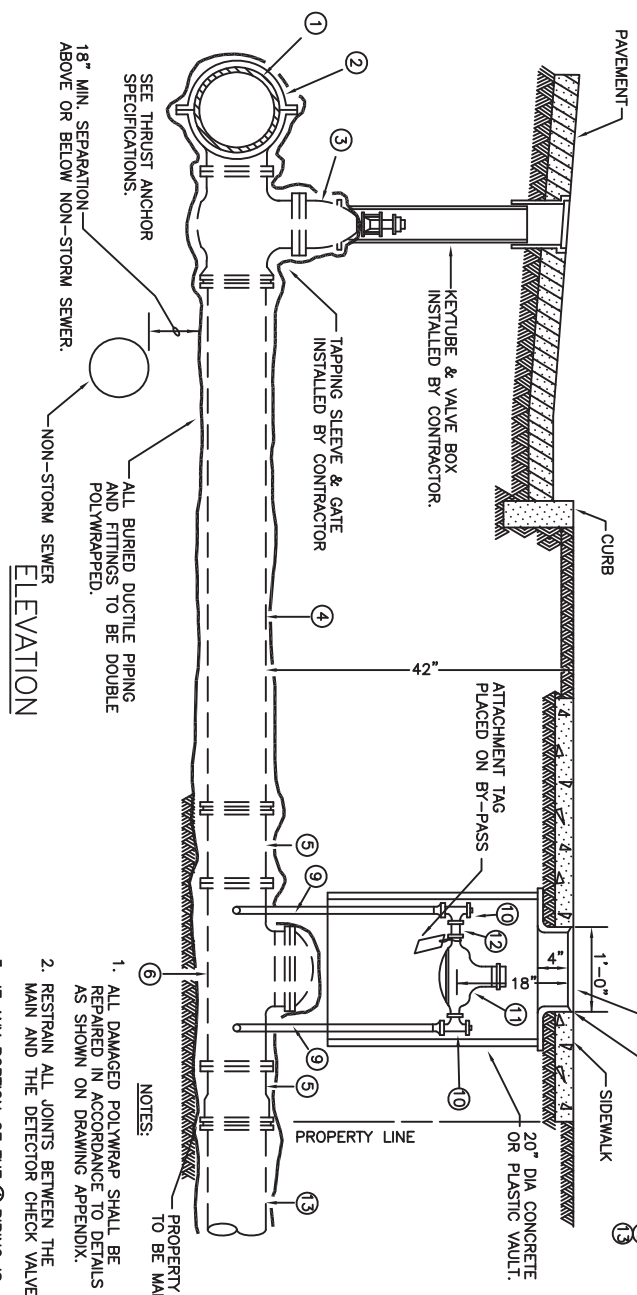
DATE	MAR. 2008	SCALE	NONE
DRAWING NO.	3203	SHEET	1 OF 1



PLAN

NO.	QTY	FITTING	JOINT	FIRE SERVICE SIZES
1	1	Main in Street	Varies	4" - 6"
2	1	Tapping Sleeve	Flange	4" - 6"
3	1	Tapping Gate Valve	Flange x MJ (restrained)	4" - 6"
4	varies	D.I. Service Piping	MJ / B & S (restrain all joints up to check valve)	4" - 6"
5	2	Adapter	Flange X MJ or PE	4" - 6"
6	1	Detector Check Valve	Flange	4" - 6"
7	2	Bushing	Male Thread	1" - 1 1/2"
8	2	Adapter	Female Thread	3/4"
9	varies	Copper Tubing	Female Compression	3/4"
10	2	Angle Meter Stop	Female Compression	3/4"
11	1	Meter	Female Thread	3/4"
12	1	Swing Check Valve	Male Thread	3/4"
13	1	Customer Piping	Female Thread	3/4"

TYPICAL FIRE PROTECTION SERVICE 4" OR LARGER



ELEVATION

- NOTES:
1. ALL DAMAGED POLYWRAP SHALL BE REPAIRED IN ACCORDANCE TO DETAILS AS SHOWN ON DRAWING APPENDIX.
 2. RESTRAIN ALL JOINTS BETWEEN THE MAIN AND THE DETECTOR CHECK VALVE.
 3. IF ANY PORTION OF THE ④ PIPING IS ENCASED, THEN THE ENTIRE LENGTH OF ④ PIPING SHALL BE DUCTILE IRON.

SEE THRUST ANCHOR SPECIFICATIONS.
18" MIN. SEPARATION ABOVE OR BELOW NON-STORM SEWER.
NON-STORM SEWER
ALL BURIED DUCTILE PIPING AND FITTINGS TO BE DOUBLE POLYWRAPPED.

KEYTUBE & VALVE BOX INSTALLED BY CONTRACTOR.

TAPPING SLEEVE & GATE INSTALLED BY CONTRACTOR.

ATTACHMENT TAG PLACED ON BY-PASS OR 20" DIA CONCRETE OR PLASTIC VAULT.

BEVEL CONCRETE EDGES WHEN INSTALLED IN CONCRETE AND COVER.

PROPERTY JOINT TIE-IN TO BE MADE BY OTHERS.

PROPERTY LINE

PAVEMENT

CURB

SIDEWALK

1'-0"

42"

LOUISVILLE WATER COMPANY
550 S. 3RD STREET • LOUISVILLE, KENTUCKY 40202 • (502) 569-3600
GREGORY C. HEITZMAN - PRESIDENT
JAMES H. BRAMMEL - VICE PRESIDENT/CHIEF ENGINEER

STANDARD DRAWING
TYPICAL
FIRE PROTECTION SERVICE
4" AND LARGER

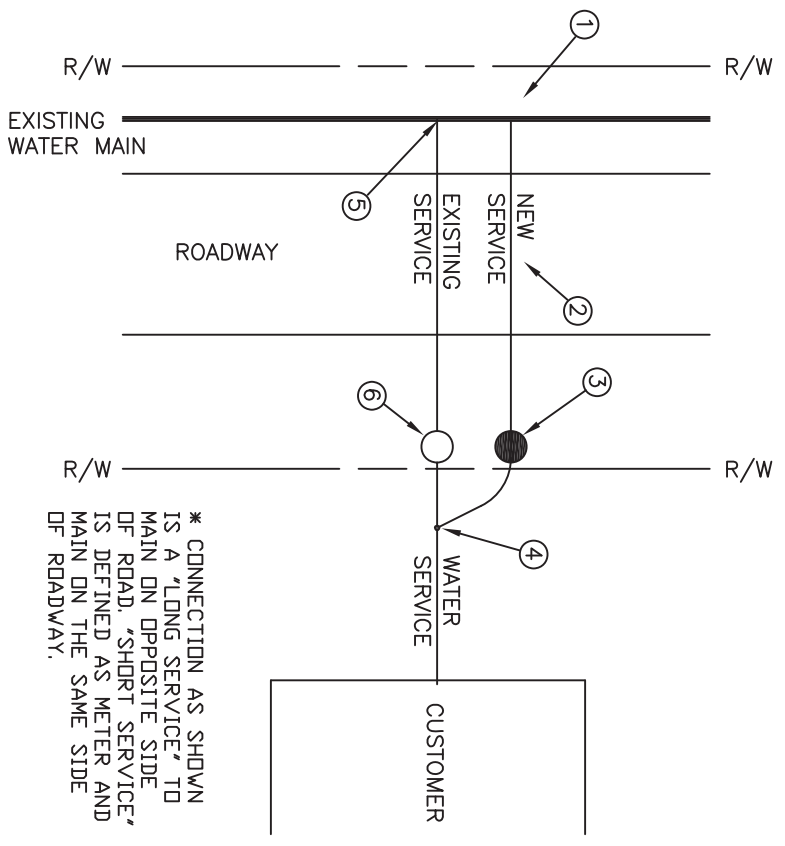
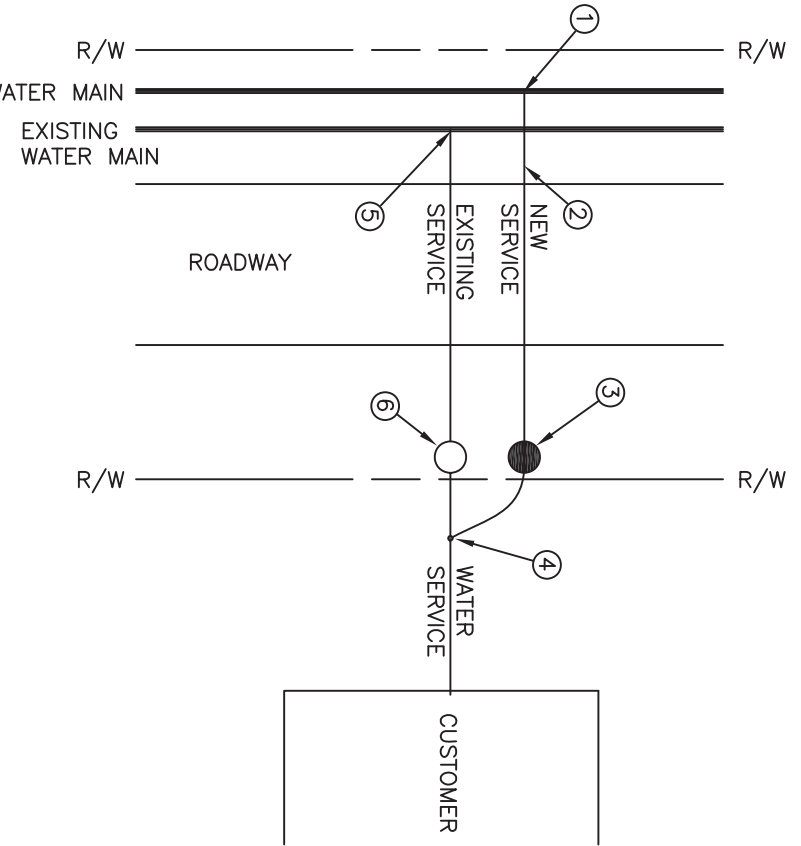
DATE	MAR. 2008	SCALE	NONE
DRAWING NO.	3601	SHEET	1 OF 1

- NOTES:**
- ① INSTALL CORPORATION STOP ON NEW MAIN.
 - ② INSTALL NEW SERVICE LINE.
 - ③ INSTALL METER, VAULT, FRAME AND LID.
 - ④ CONCRETE METER VAULTS WITH HEAVY FRAME AND COVER SHALL BE INSTALLED IN AREAS OF VEHICULAR TRAFFIC.
 - ⑤ INSTALL TAIL PIECE AND TIE-IN TO CUSTOMER SERVICE LINE.

- ⑥ DISCONTINUE OLD SERVICE AT EXISTING WATER MAIN. DRIVEN FERRULES MUST BE REMOVED AND REPAIR BAND INSTALLED AT TAP IF MAIN WILL REMAIN ACTIVE. (SEE SECT. 10.111)
- ⑦ ABANDON OLD METER VAULT, RETURN METER AND CAST IRON FRAME & COVER TO ALLMOND AVENUE, BACKFILL METER VAULT (SEE SECT.10.13)

RELOCATE SERVICE (SECT. 10.8)
WITH CONNECTION TO NEW WATER MAIN *

RELOCATE SERVICE (SECT. 10.8)
WITH CONNECTION TO EXISTING WATER MAIN *



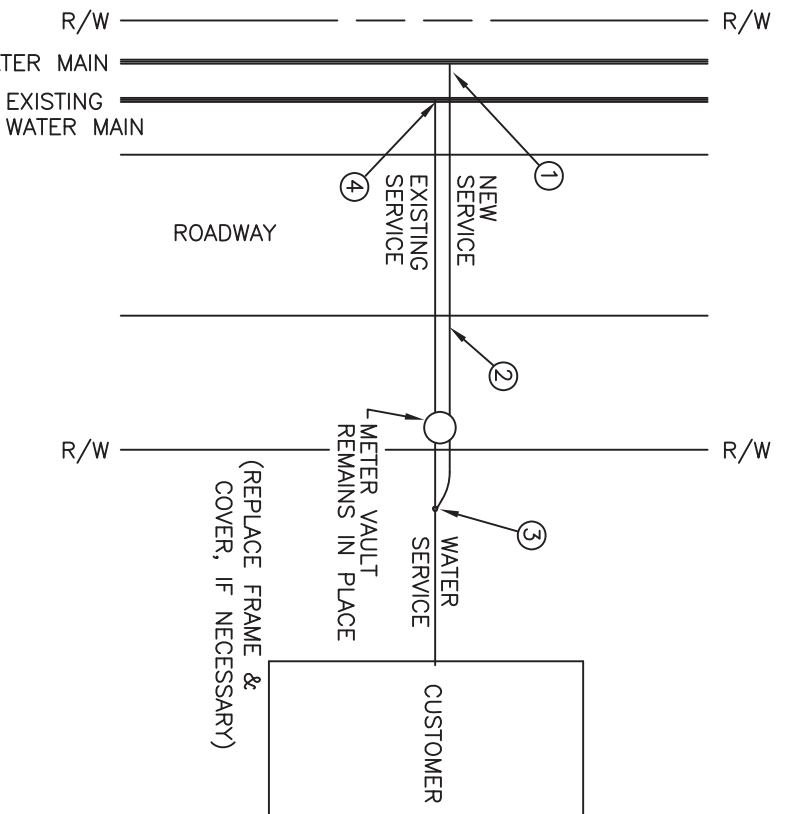
* CONNECTION AS SHOWN IS A 'LONG SERVICE' TO MAIN ON OPPOSITE SIDE OF ROAD. 'SHORT SERVICE' IS DEFINED AS METER AND MAIN ON THE SAME SIDE OF ROADWAY.

LEGEND
○ = EXISTING METER VAULT
● = NEW METER VAULT

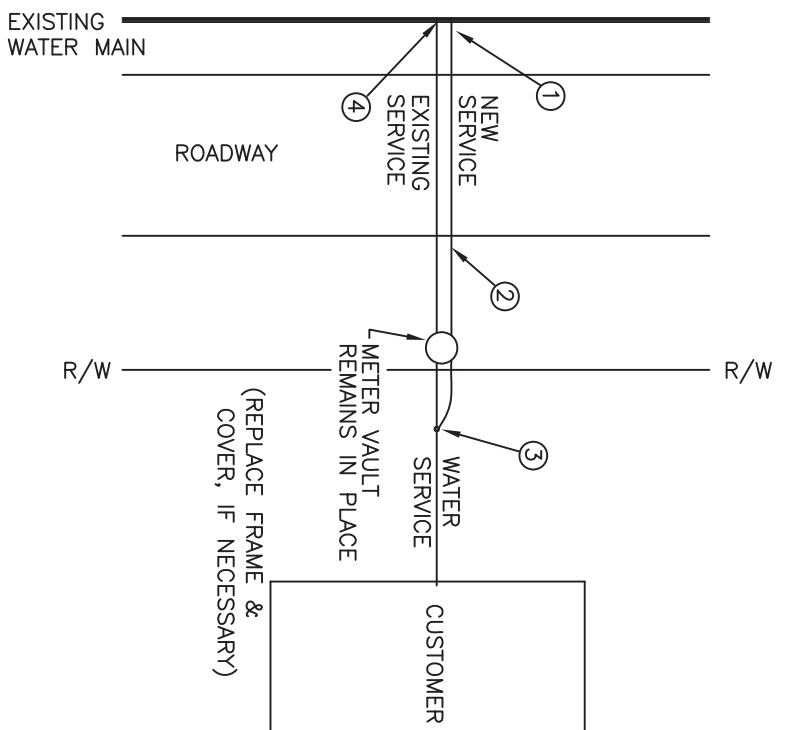
LOUISVILLE WATER COMPANY
550 S. 3RD STREET - LOUISVILLE, KENTUCKY 40202 - (502) 586-5800
GREGORY C. HEITZMAN - PRESIDENT
JAMES H. BRAUNWEL - VICE PRESIDENT/CHIEF ENGINEER

STANDARD DRAWING
RELOCATE SERVICE (SECT. 10.8)

DATE	MAR. 2008	SCALE	NONE
DRAWING NO.	3440	SHEET	1 of 1



RENEW SERVICE (SECT. 10.9)
WITH CONNECTION TO NEW WATER MAIN *



RENEW SERVICE (SECT. 10.9)
WITH CONNECTION TO EXISTING WATER MAIN *

* CONNECTIONS AS SHOWN ARE A 'LONG SERVICE' TO MAIN ON OPPOSITE SIDE OF ROAD. 'SHORT SERVICE' IS DEFINED AS METER AND MAIN ON THE SAME SIDE OF ROADWAY.

LEGEND
○ = EXISTING METER VAULT

NOTES:

- ① INSTALL CORPORATION STOP ON MAIN.
- ② INSTALL NEW SERVICE LINE TO EXISTING METER STOP.
- ③ INSTALL TAIL PIECE AND TIE-IN TO CUSTOMER SERVICE LINE.

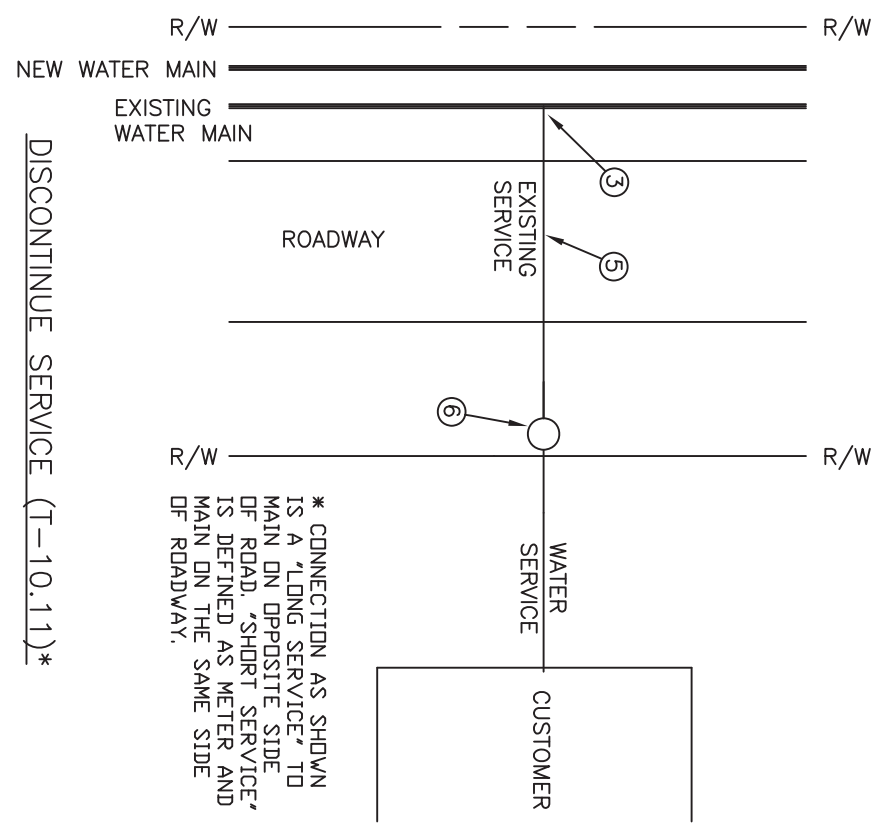
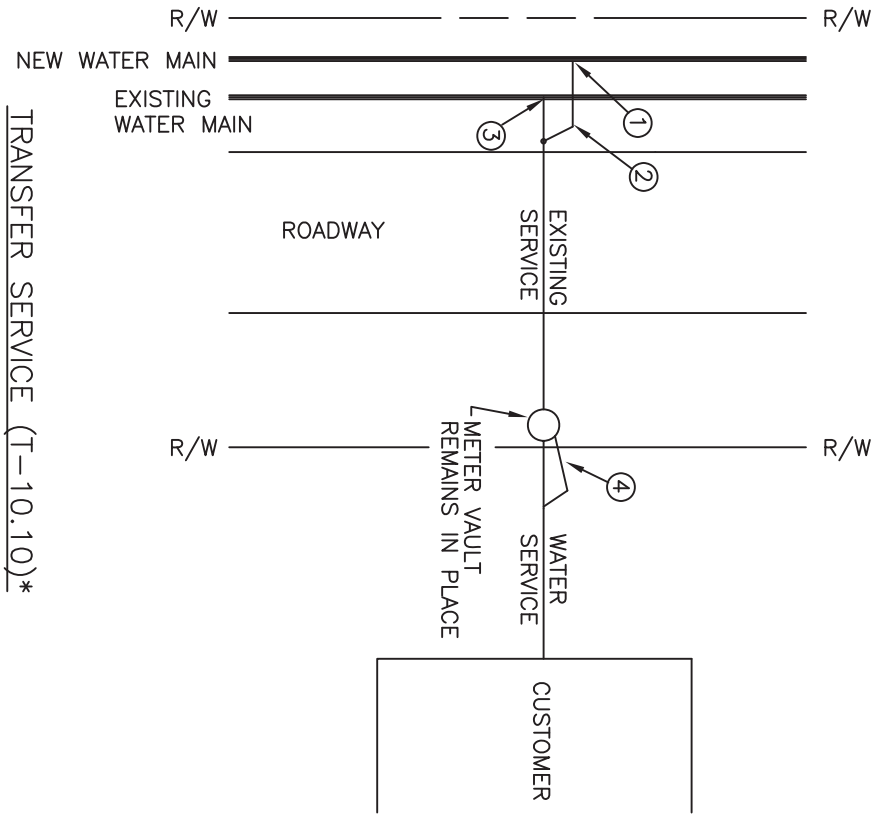
- ④ DISCONTINUE OLD SERVICE AT EXISTING WATER MAIN. DRIVEN FERRULES MUST BE REMOVED AND REPAIR BAND INSTALLED AT TAP IF MAIN WILL REMAIN ACTIVE.

RENEW SERVICE (SECT. 10.9)

STANDARD DRAWING

LOUISVILLE WATER COMPANY
560 S. 3RD STREET • LOUISVILLE, KENTUCKY 40202 • (502) 569-3800
GREGORY C. HEITZMAN - PRESIDENT
JAMES H. BRAMMEL - VICE PRESIDENT/CHIEF ENGINEER

DATE	MAR. 2008	SCALE	NONE
DRAWING NO.	3441	SHEET	1 of 1



* CONNECTION AS SHOWN IS A 'LONG SERVICE' TO MAIN ON OPPOSITE SIDE OF ROAD. 'SHORT SERVICE' IS DEFINED AS METER AND MAIN ON THE SAME SIDE OF ROADWAY.

LEGEND
○ = EXISTING METER VAULT
● = NEW METER VAULT

TRANSFER SERVICE (T-10.10)*

DISCONTINUE SERVICE (T-10.11)*

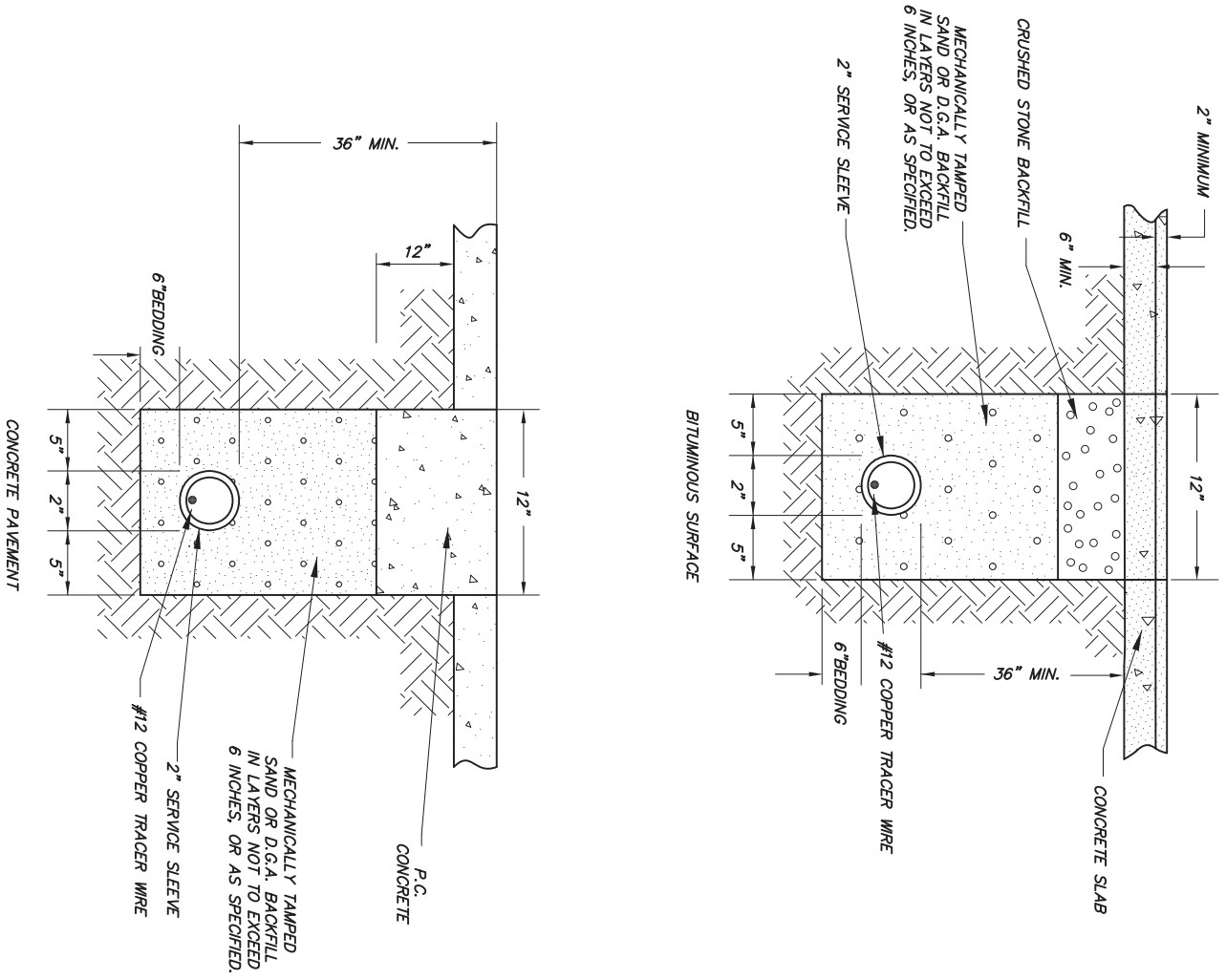
- NOTES:
- ① INSTALL CORPORATION STOP ON NEW MAIN.
 - ② INSTALL NEW SERVICE LINE FROM NEW MAIN AND TIE-IN TO EXISTING SERVICE LINE. (AS REQUIRED)
 - ③ DISCONTINUE OLD SERVICE AT EXISTING WATER MAIN. DRIVEN FERRULES MUST BE REMOVED AND REPAIR BAND INSTALLED AT TAP IF MAIN WILL REMAIN ACTIVE.

- ④ REPLACE TAIL PIECE WHEN EXISTING SERVICE LINE IS LEAD.
- ⑤ DISCONNECT & PLUG SERVICE LINE.
- ⑥ ABANDON OLD METER VAULT, RETURN METER AND CAST IRON FRAME & COVER TO ALLMOND AVENUE, BACKFILL METER VAULT (SEE SECT. 10.13)

LOUISVILLE WATER COMPANY
560 S. 3RD STREET - LOUISVILLE, KENTUCKY 40202 - (502) 586-5800
GREGORY C. HEITZMAN - PRESIDENT
JAMES H. BRAUNDEL - VICE PRESIDENT/CHIEF ENGINEER

STANDARD DRAWING
TRANSFER SERVICE (SECT. 10.10)
DISCONTINUE SERVICE (SECT. 10.11)

DATE	SCALE
MAR. 2008	NONE
DRAWING NO.	SHEET
3442	1 of 1



SERVICE SLEEVE INSTALLATIONS

IN ORDER TO AVOID CURB AND PAVEMENT CUTS DURING SERVICE INSTALLATIONS, THE FOLLOWING PROCEDURES HAVE BEEN ESTABLISHED FOR NEW DEVELOPMENT PROJECTS:

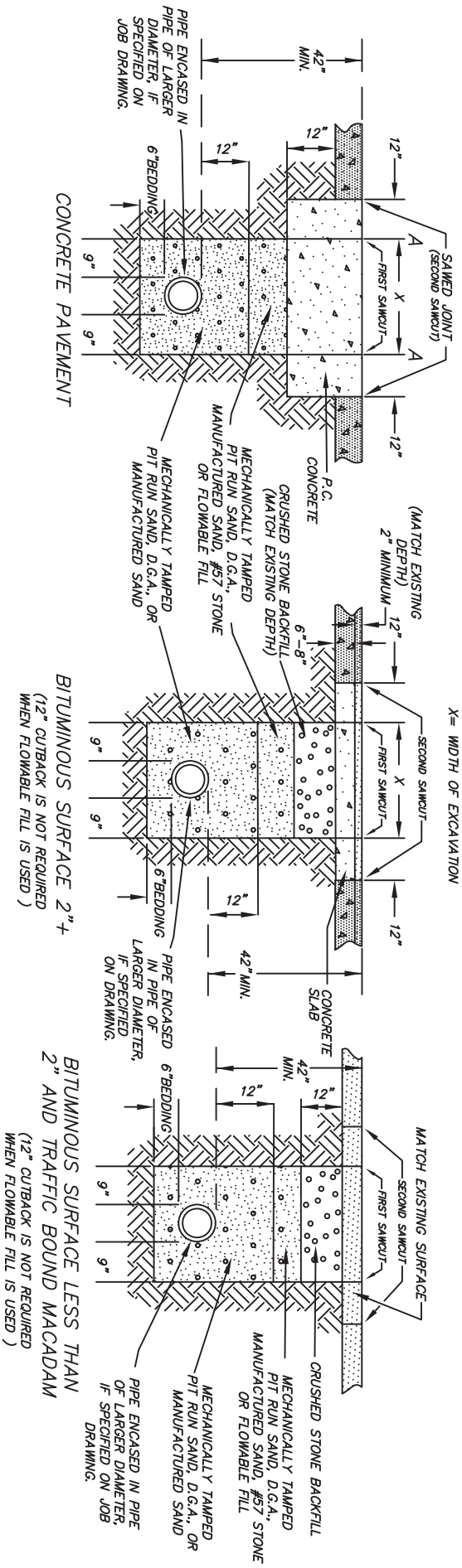
- SERVICE SLEEVES ARE TO BE INSTALLED BY THE DEVELOPER'S WATER MAIN INSTALLATION CONTRACTOR AS SHOWN ON THE PLANS. LOCATIONS SHOWN ON THE PLANS ARE APPROXIMATE; THE CONTRACTOR SHALL COORDINATE EXACT SERVICE SLEEVE LOCATIONS WITH THE DEVELOPER OR THEIR REPRESENTATIVE.
 - WHEN THE SERVICE SLEEVES ARE SUPPLIED BY THE DEVELOPER, L.W.C. WILL ADJUST THE DEVELOPER'S PROJECT MATERIAL COSTS TO REFLECT DEVELOPER-DOCUMENTED SLEEVE MATERIAL COST.
 - SLEEVES MUST BE INSTALLED AT 36" COVER, AND ALIGNED SO THAT FUTURE INSTALLATION OF SERVICE PIPING CAN BE ACCOMPLISHED WITHOUT PAVEMENT, OR CURB CUTS. SLEEVES MUST BE INSTALLED IN A STRAIGHT LINE WITHOUT ANY BENDS OR OBSTRUCTIONS.
 - ALL SERVICE SLEEVES MUST EXTEND AT LEAST 2 FEET BEYOND THE BACK OF CURBS, WITH SEALED ENDS MARKED BY ABOVE-GRADE P.V.C. PIPE, TRACER WIRE OR OTHER MARKER ACCEPTABLE TO L.W.C.
 - ALL SLEEVES MUST HAVE #12 COPPER TRACER WIRE INSTALLED THROUGH EACH SLEEVE AND THE TRACER WIRE MUST BE CONNECTED TO THE WATER MAIN. (FOR P.V.C. PIPE, THE TRACER WIRE IN THE SLEEVE MUST BE CONNECTED TO THE WIRE ON THE P.V.C. PIPE AND FOR DUCTILE IRON PIPE, THE TRACER WIRE MUST BE CONNECTED TO THE D.I. PIPE).
- EXPEDITED SERVICE INSTALLATION REQUESTS**
- FOR LOTS WHERE THE DEVELOPER PREFERS TO REQUEST EXPEDITED SERVICE INSTALLATIONS PRIOR TO FINAL PAVING, THE CONTRACTOR SHALL NOTIFY THE DEVELOPER WHEN THE WATER LINES HAVE PASSED PRESSURE AND L.W.C. LAB TESTING AND ADVISE THEM TO MAKE APPLICATION TO L.W.C. FOR THOSE SERVICES.
 - AFTER APPLICATIONS HAVE BEEN MADE AND AT LEAST TWO WEEKS PRIOR TO PAVING, THE CONTRACTOR SHALL NOTIFY L.W.C. INSPECTOR WHEN THEY PLAN TO PAVE AND REQUEST EXPEDITED SERVICE INSTALLATION FOR THOSE SERVICES.
 - L.W.C. INSPECTOR WILL NOTIFY L.W.C. SERVICE INSTALLATION SUPERVISOR THAT EXPEDITED INSTALLATION HAS BEEN REQUESTED, AND PROVIDE DATE THE CONTRACTOR HAS ADVISED PAVING IS PLANNED.

LOUISVILLE WATER COMPANY
 550 S. 3RD STREET • LOUISVILLE, KENTUCKY 40202 • (502) 566-3600
 GREGORY C. HEITZMAN - PRESIDENT
 JAMES H. BRAMMEL - VICE PRESIDENT/CHIEF ENGINEER

STANDARD DRAWING
 SERVICE SLEEVE
 INSTALLATION DETAIL

DATE	MAR. 2008	SCALE	NONE
DRAWING NO.	3805	SHEET	1 OF 1

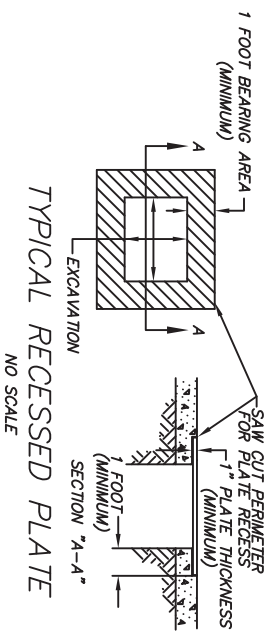
NOTE: FROM POINTS "A-A" (CONCRETE PAVEMENT) TO NEAREST JOINT OR BREAK IN PAVEMENT MUST BE SIX(6) FEET OR MORE. IF LESS THAN 6, REMOVE PAVEMENT TO JOINT OR BREAK AND REPLACE ENTIRE SLAB. CONCRETE SLAB UNDER BITUMINOUS SURFACE TO EXTEND 12 INCHES ON EACH SIDE OF TRENCH.



NOTE: REPLACE CONCRETE PAVEMENT WITH NEW PAVEMENT SAME THICKNESS OF EXISTING PAVEMENT + 12".
 REPLACE BITUMINOUS PAVEMENT WITH SAME TYPE AND DEPTH AS EXISTING PAVEMENT.

STATE OF KENTUCKY SPECIFICATIONS

1. INITIAL BACKFILL SHALL BE PIT RUN SAND, DENSE-GRADED AGGREGATE, OR MANUFACTURED SAND MECHANICALLY COMPACTED PER SECTION 7. BACKFILLING PROCEDURES AND TAMPING.
2. CONTRACTOR WILL BE HELD RESPONSIBLE DURING THE ENSUING 5 YEARS FOR PROPER BACKFILLING AND REPLACEMENT OF SURFACE DURING THE 5 YEAR PERIOD AFTER THE DATE OF THE FINAL CONTRACT PAYMENT. ANY PAVEMENT SETTLEMENT SHALL BE IMMEDIATELY REPAIRED IN AN APPROVED MANNER AT THE EXPENSE OF THE CONTRACTOR.
3. BACKFILLING UP TO BOTTOM OF SUBBASE ELEVATION SHALL BE COMPLETED PRIOR TO SECOND PAIR OF SAWCUTS AND EXCAVATION FOR THE ADDITIONAL 12" OF CONCRETE ON EACH SIDE OF THE TRENCH.
4. DILUTE SS1H (OR OTHER APPROVED TACK COAT MATERIAL) SHALL BE APPLIED AT THE RATE OF 0.1 GAL. PER SQUARE YARD OVER THE CONCRETE BASE. ALLOW SUFFICIENT TIME FOR IT TO "BREAK" BEFORE THE FINISHED BITUMINOUS CONCRETE IS PLACED, AND SEAL ALL JOINTS SECURELY AFTER PAVING.

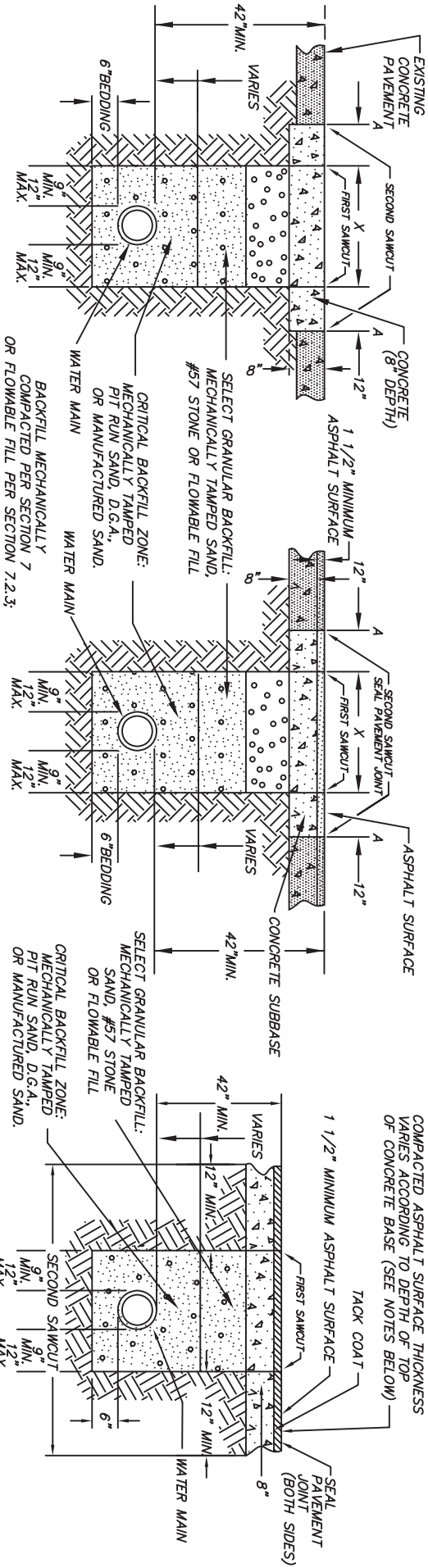


LOUISVILLE WATER COMPANY
 560 S. 3RD STREET - LOUISVILLE, KENTUCKY 40202 - (502) 568-3600
 GREGORY C. HEITZMAN - PRESIDENT
 JAMES H. BRAUNMEL - VICE PRESIDENT/CHIEF ENGINEER

STANDARD DRAWING
 STATE OF KENTUCKY
 BACKFILL AND PAVING
 RESTORATION

DATE	MAR. 2008	SCALE	NONE
DRAWING NO.	4000	SHEET	1 OF 1

NOTE: FROM POINTS "A" (CONCRETE PAVEMENT) TO NEAREST JOINT OR BREAK IN PAVEMENT MUST BE FOUR (4) FEET OR MORE. IF LESS THAN 4 REMOVE PAVEMENT TO JOINT OR BREAK AND REPLACE ENTIRE SLAB. CONCRETE SLAB UNDER BITUMINOUS SURFACE TO EXTEND 12" ON EACH SIDE OF TRENCH.

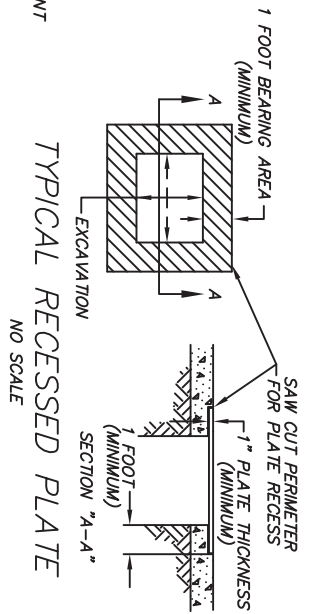


CONCRETE PAVEMENT
(12" CUTBACK IS NOT REQUIRED WHEN FLOWABLE FILL IS USED)
SEE KTC SPECIFICATION FOR SPECIAL PROVISIONS SECTION 76 PAGES 1-12 FOR PAVEMENT REPAIRS.

BITUMINOUS SURFACE
NEW ASPHALT SHALL BE A MINIMUM OF 1 1/2" THICK
(12" CUTBACK IS NOT REQUIRED WHEN FLOWABLE FILL IS USED)
NOTE: THE CONCRETE BASE SHALL BE FLOAT FINISHED OR BROOMED OR LIGHTLY RAKED AFTER FLOATING TO A UNIFORM GRADE.

BASE OTHER THAN CONCRETE HAVING AN ASPHALT SURFACE
(12" CUTBACK IS NOT REQUIRED WHEN FLOWABLE FILL IS USED)
NOTE: THE CONCRETE BASE SHALL BE FLOAT FINISHED OR BROOMED OR LIGHTLY RAKED AFTER FLOATING TO A UNIFORM GRADE.

1. CRITICAL BACKFILL ZONE SHALL CONSIST OF MECHANICALLY TAMPED PIT RUN SAND, DENSE-GRADED AGGREGATE, OR MANUFACTURED SAND.
2. SELECT GRANULAR BACKFILL SHALL CONSIST OF NO. 57 STONE OR SAND. THE NO. 57 STONE SHALL BE PLACED IN 6" LOOSE LIFTS AND MECHANICALLY COMPACTED. THE SAND BACKFILL MAY BE FLUSHED AND LETTED OR MECHANICALLY COMPACTED BY VIBRATORY METHODS TO 95% DENSITY. IN ROADWAY EMBANKMENT SITUATIONS WHEN SAND BACKFILL IS UTILIZED, COMPACTED EARTH SHALL BE PLACED IN THIS ZONE WITHIN 5 FEET (HORIZONTAL DISTANCE) OF THE EMBANKMENT SLOPE.
3. BACKFILLING UP TO BOTTOM OF SUBBASE ELEVATION SHALL BE COMPLETED PRIOR TO SECOND PAIR OF SAWCUTS AND EXCAVATION FOR THE ADDITIONAL 12" OF CONCRETE ON EACH SIDE OF THE TRENCH, UNLESS FLOWABLE FILL IS USED.
4. PLATES MUST BE SECURED AND/OR RECESSED AT ALL TIMES.
5. CONCRETE CAP MUST BE PLACED UNTIL CONCRETE REACHES STRENGTH REQUIREMENTS (MINIMUM 3500 PSI)
6. DILUTE SS1H (OR OTHER APPROVED TACK COAT MATERIAL) SHALL BE APPLIED AT THE RATE OF 0.1 GAL. PER SQUARE YARD OVER THE FINISHED BITUMINOUS SURFACE. ALLOW SUFFICIENT TIME FOR IT TO "BREAK" BEFORE THE FINISHED BITUMINOUS CONCRETE IS PLACED, AND SEAL ALL JOINTS SECURELY AFTER PAVING.
7. PAVEMENT JOINTS SHALL BE SEALED WITH AN APPROVED JOINT SEALER AFTER PLACEMENT OF THE BITUMINOUS CONCRETE SURFACE. SEE SECTION 11.2 AND 11.3.
8. CONTRACTOR WILL BE HELD RESPONSIBLE DURING THE ENSUING 5 YEARS FOR PROPER BACKFILLING AND REPLACEMENT OF SURFACE. DURING THE 5 YEAR PERIOD AFTER THE DATE OF THE FINAL CONTRACT PAYMENT, ANY PAVEMENT SETTLEMENT SHALL BE IMMEDIATELY REPAIRED IN AN APPROVED MANNER AT THE EXPENSE OF THE CONTRACTOR.

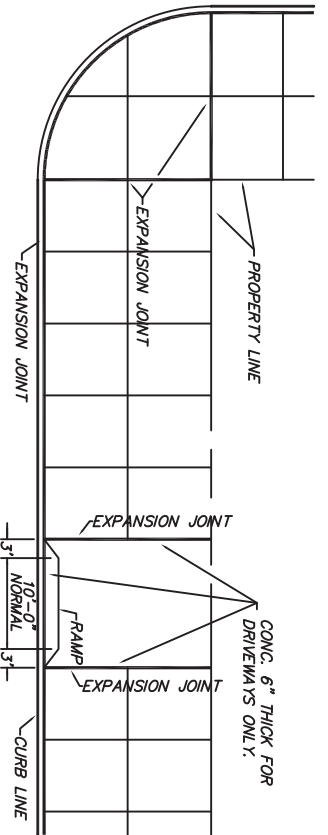
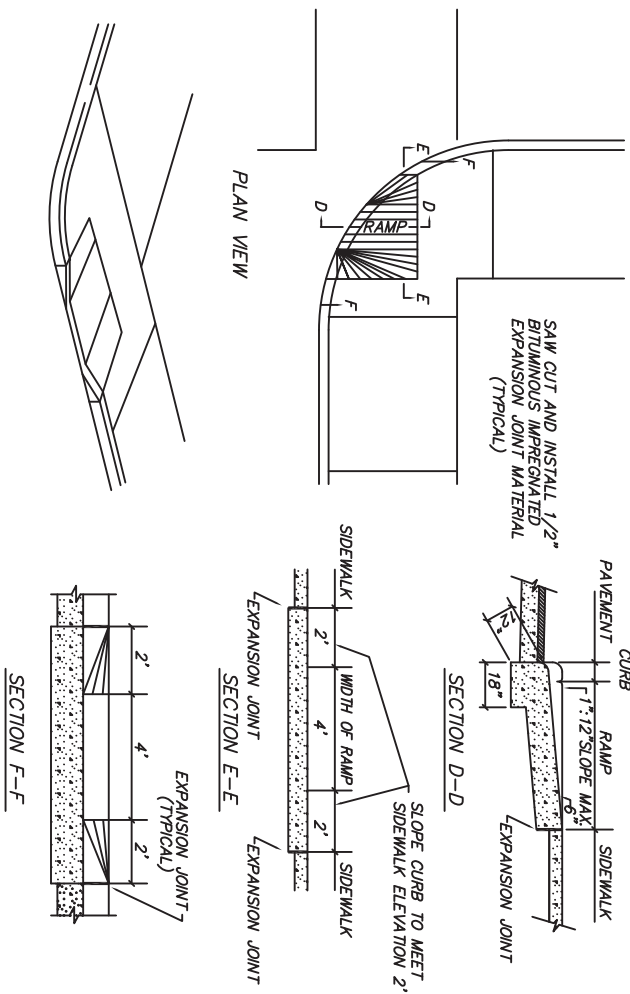
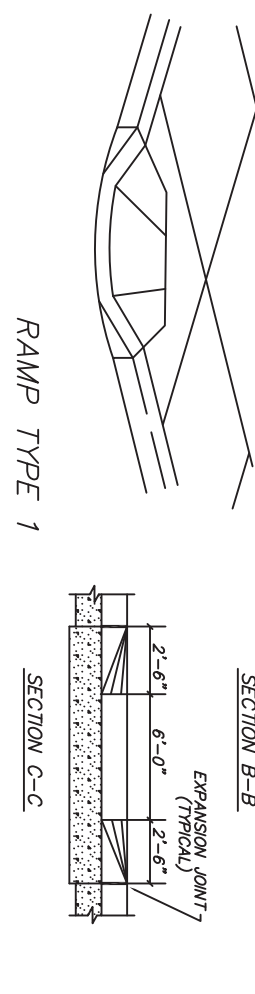
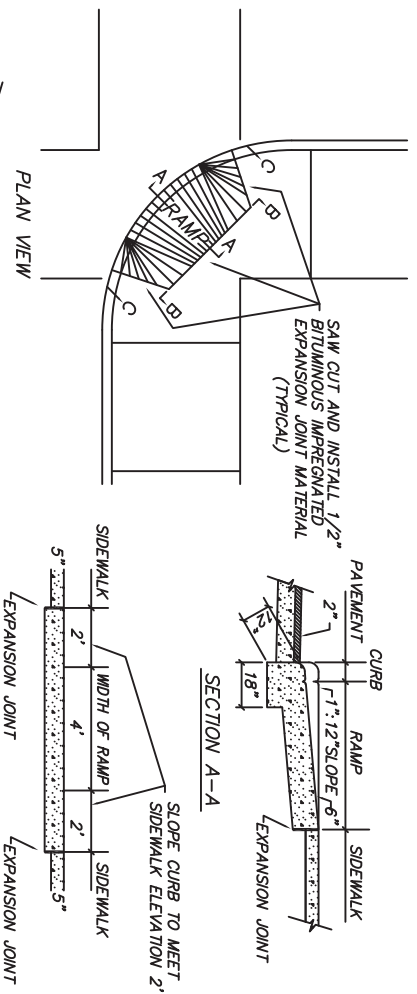


LOUISVILLE WATER COMPANY
550 S. 3RD STREET • LOUISVILLE, KENTUCKY 40202 • (502) 589-5600
GREGORY C. HEITZMAN - PRESIDENT
JAMES H. BRAMMEL - VICE PRESIDENT/CHIEF ENGINEER

STANDARD DRAWING

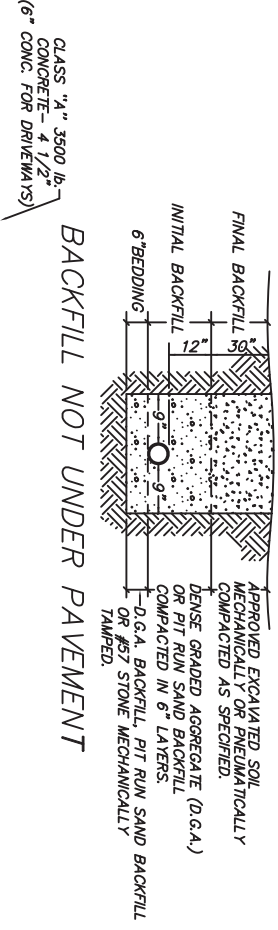
LOUISVILLE-JEFFERSON COUNTY METRO
BACKFILL AND PAVING
RESTORATION

DATE	MAR. 2008	SCALE	NONE
DRAWING NO.	4100	SHEET	1 OF 1

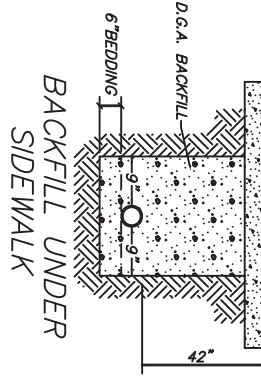


PLAN OF SIDEWALK AND DRIVEWAY-FULL WIDTH

NOTES:
ALL SIDEWALKS SHALL BE 5" THICK. ALL DRIVEWAYS SHALL BE 6" THICK. ALL CONCRETE SHALL BE CLASS "4" (3500 lb. CONCRETE). WOOD FLOAT FINISH FOR ALL WORK. AN APPROVED TYPE OF LIQUID CURING COMPOUND WILL BE PERMITTED. EXPANSION JOINTS ACROSS THE LINE OF THE WALK SHALL BE SPACED NOT MORE THAN 50' APART. EXPANSION JOINTS PARALLEL TO THE LINE OF WALK WILL BE REQUIRED AT THE BACK OF CURB FOR FULL WIDTH WALKS AT DRIVEWAYS. EXPANSION JOINTS SHALL BE USED ON BOTH SIDES AGAINST THE SIDEWALK. OTHER JOINTS DETERMINED BY THIS LOCATION. AT DRIVEWAYS AND ENTRANCE WALKS ACROSS GRASS PLOTS, AN EXPANSION JOINT SHALL BE USED AT BACK OF CURB. ALL EXPANSION MATERIAL SHALL BE APPROVED NON-EXTRUDING PREFORMED STRIPS 1/2" THICK. BLOCKS SHALL BE MARKED OR SCORED IN SUITABLE SIZED BLOCKS, BUT NOT LESS THAN 4' OR MORE THAN 6' ON A SIDE. CONTRACTION JOINTS (PLACES OF WEAKNESS) SHALL BE AT EVERY THIRD BLOCK AND SHALL BE CUT AT LEAST 1 1/2" IN DEPTH (IN LEFT OF A SCORE), AT BACK OF WALK. TERRACE SHALL BE HAND TRIMMED OR FINISHED TO A 1 TO 1 SLOPE OR FLATTER.
ALL SIDEWALK AND DRIVEWAY CONSTRUCTION IN THE PUBLIC WAYS OF THE CITY OF LOUISVILLE SHALL CONFORM WITH THE REQUIREMENTS ON THIS SHEET UNLESS OTHERWISE APPROVED IN WRITING BY THE CHIEF ENGINEER. MINIMUM WIDTH OF SIDEWALK SHALL BE 5' EXCEPT WITH PERMISSION OF CHIEF ENGINEER.



BACKFILL NOT UNDER PAVEMENT

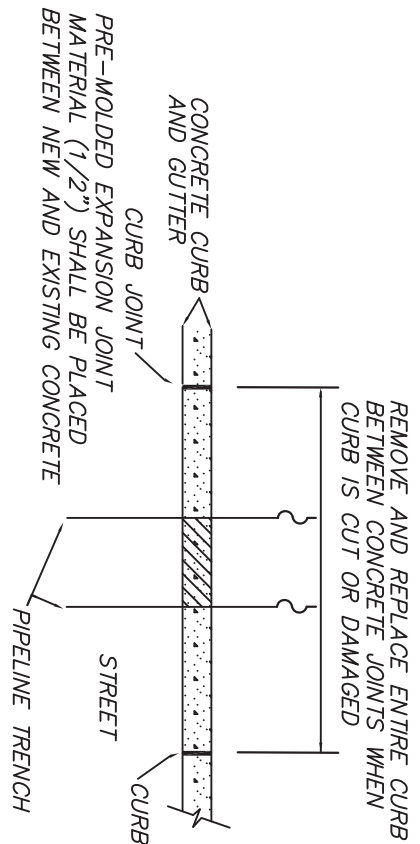


BACKFILL UNDER SIDEWALK

LOUISVILLE WATER COMPANY
560 S. 3RD STREET - LOUISVILLE, KENTUCKY 40202 - (502) 586-3800
GREGORY C. HEITZMAN - PRESIDENT
JAMES H. BRAUNWEL - VICE PRESIDENT/CHIEF ENGINEER

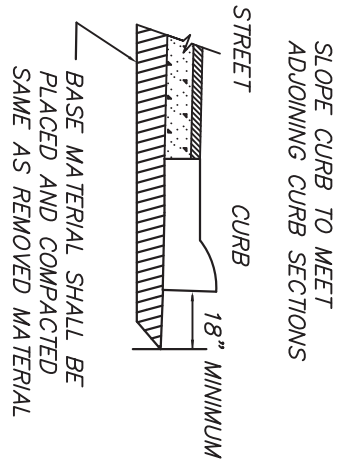
STANDARD DRAWING
SIDEWALK/BACKFILL
DETAIL

DATE	MAR. 2008	SCALE	NONE
DRAWING NO.	4400	SHEET	1 OF 1

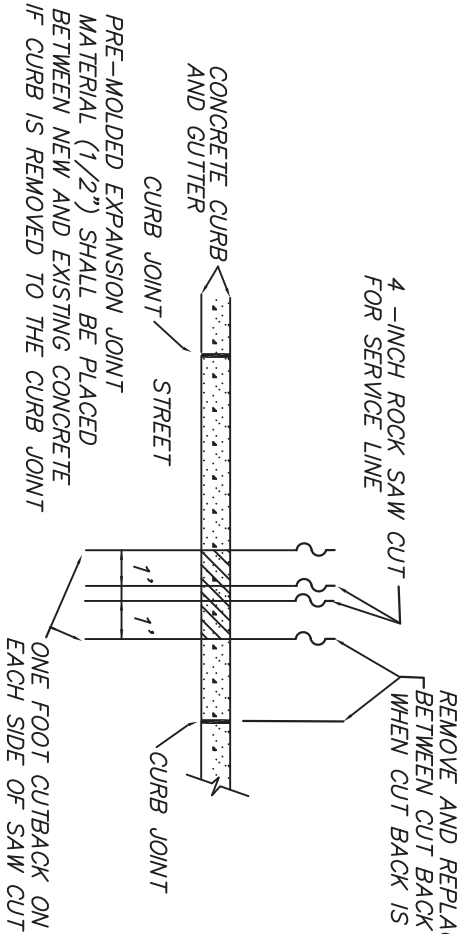


PLAN VIEW

CURB RESTORATION FOR PIPELINE INSTALLATION

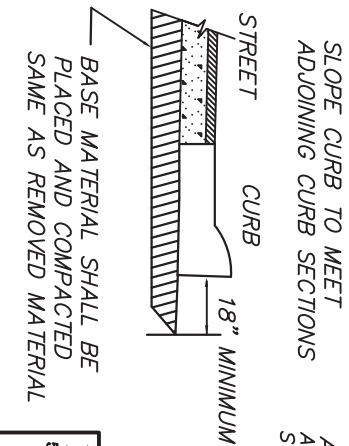


SECTION



PLAN VIEW

CURB RESTORATION FOR SERVICE LINE INSTALLATION



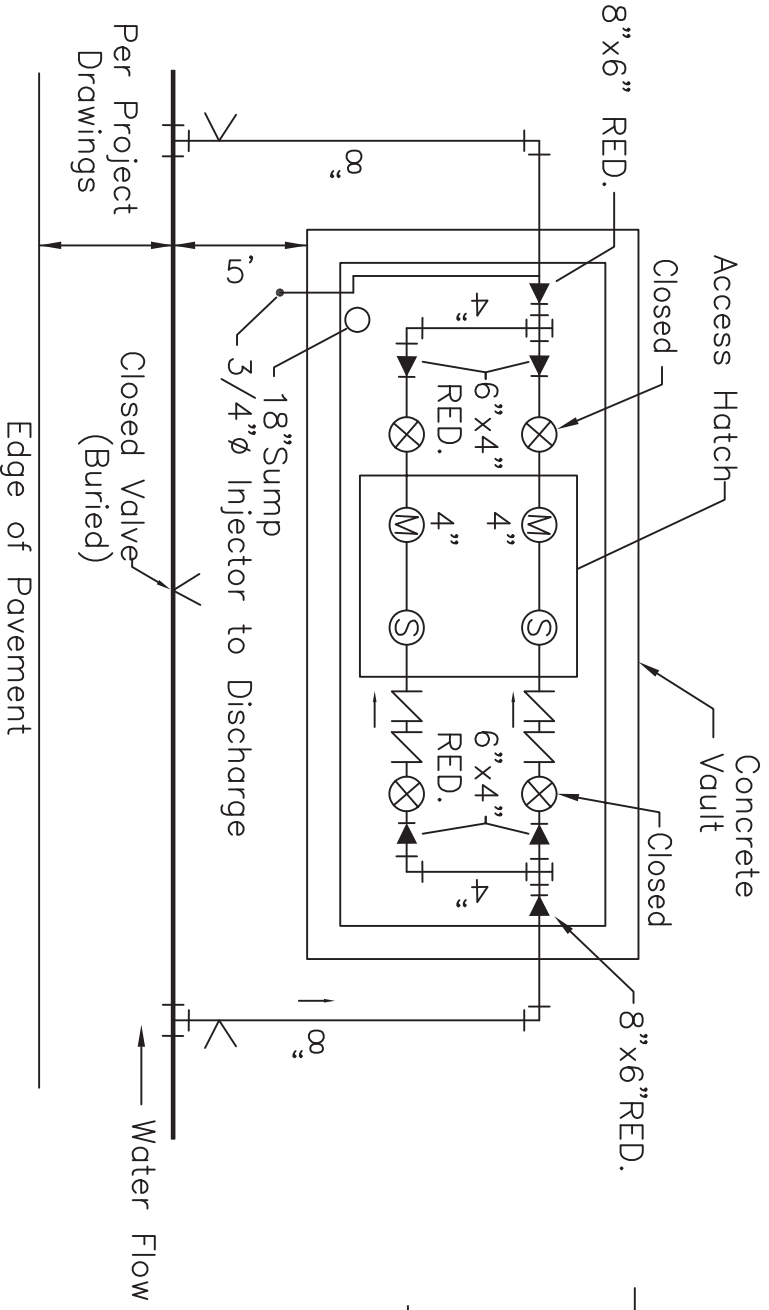
SECTION

NOTES:

- ALL CONCRETE SHALL BE A MINIMUM CLASS "A" (3500 lb. CONCRETE).
- AN APPROVED TYPE OF LIQUID CURING COMPOUND WILL BE REQUIRED ON CONCRETE.
- EXPANSION JOINT MATERIAL SHALL BE USED BETWEEN CURB JOINTS AND CURBS AND ADJOINING SIDEWALKS.
- ALL EXPANSION MATERIAL SHALL BE APPROVED NON-EXTRUDING PREFORMED STRIPS (1/2" THICK).

STANDARD DRAWING
CONCRETE CURB AND GUTTER
RESTORATION DETAIL

LOUISVILLE WATER COMPANY	
550 S. 3RD STREET • LOUISVILLE, KENTUCKY 40202 • (502) 509-3600	
GREGORY C. HEITZMAN - PRESIDENT	
JAMES H. BRAMMEL - VICE PRESIDENT/CHIEF ENGINEER	
DATE: MAR. 2008	
SCALE: NONE	
DRAWING NO.: 4410	
SHEET: 1 OF 1	



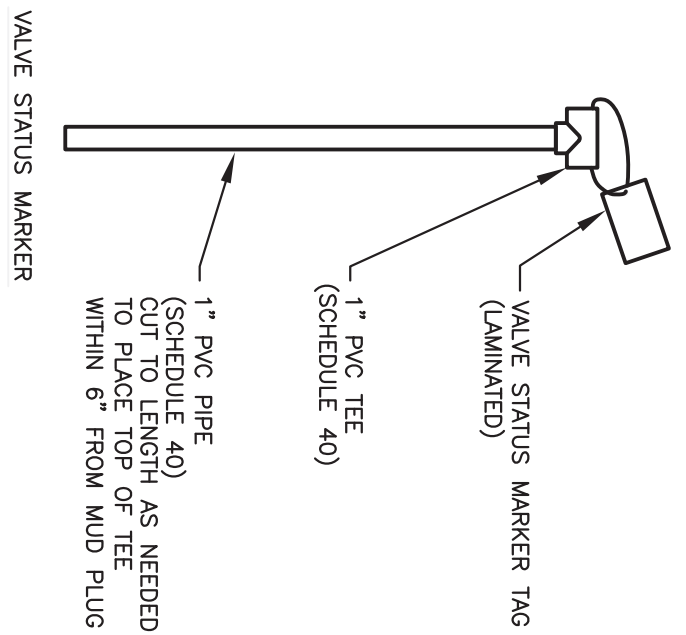
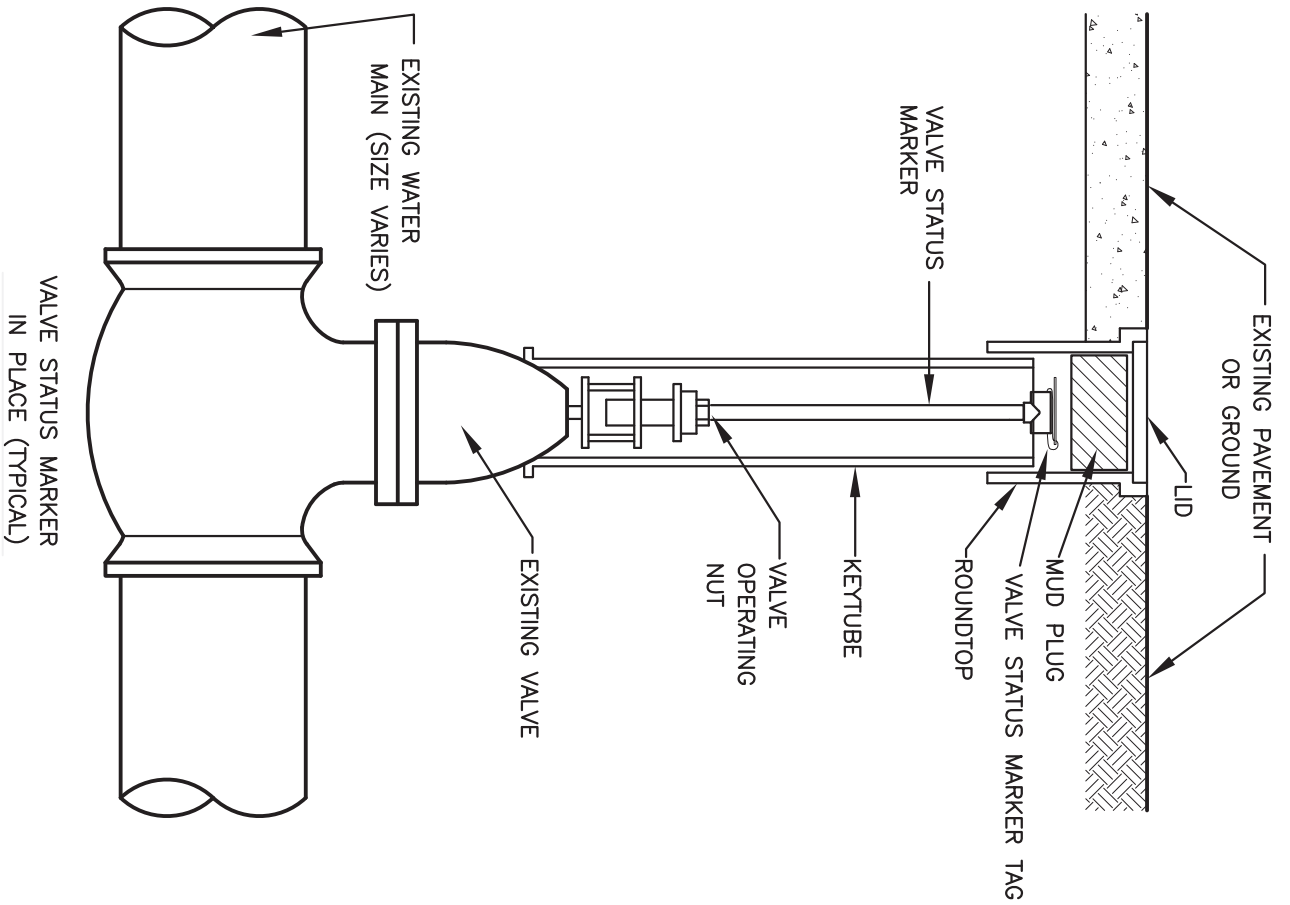
MASTER METER LAYOUT

- N— Double Check
- ⊙ Strainer
- Ⓜ Turbine Meter
- ⊗ Wheel Gate Valve
- K Line Valve
- ▶ Reducer

LOUISVILLE WATER COMPANY
 550 S. 3RD STREET - LOUISVILLE, KENTUCKY 40202 - (502) 586-3600
 GREGORY C. HEITZMAN - PRESIDENT
 JAMES H. BRAMMEL - VICE PRESIDENT/CHIEF ENGINEER

STANDARD DRAWING
 TYPICAL MASTER
 METER DETAIL

DATE	MAR. 2008	SCALE	NONE
DRAWING NO.	4600	SHEET	1 of 1



- TYPICAL MARKER TAG NOTES:**
- "PRESSURE PLANE BOUNDARY VALVE - DO NOT OPEN"
 - "CLOSED VALVE - DO NOT OPEN"
 - "LEFT HAND OPEN"
 - "TEMPORARY CONSTRUCTION - CLOSED VALVE: CONTACT LWC RADIO ROOM OR INSPECTION"
 - "VALVE PARTIAL OPEN #

CONTACT PROJECT
MANAGER OR COMPANY
INSPECTOR FOR APPROVAL
BEFORE OPERATING ANY
VALVE.

LOUISVILLE WATER COMPANY
550 S. 3RD STREET • LOUISVILLE, KENTUCKY 40202 • (502) 569-3600
GREGORY C. HEITZMAN - PRESIDENT
JAMES H. BRAMMELL, P.E., P.S. - VICE PRESIDENT, CHIEF ENGINEER

STANDARD DRAWING
VALVE STATUS MARKER

DATE	SCALE	SHEET	OP
MAR. 2008	NONE	1	1

DRAWING NO. 5005

KYTC BMP Plan for Project PCN ## - #####; KYTC Item No. 05-0478.70



Kentucky Transportation Cabinet

Highway District 5

And

_____ **(2), Construction**

Kentucky Pollutant Discharge Elimination System

Permit KYR10

Best Management Practices (BMP) plan

Groundwater protection plan

For Highway Construction Activities

For

***Jefferson County; US 31W
US 31 W Dixie Hwy Tiger Project***

Project: PCN ## - #####; KYTC Item No. 05-0478.70

KYTC BMP Plan for Project PCN ## - #####; KYTC Item No. 05-0478.70

Project information

Note – (1) = Design (2) = Construction (3) = Contractor

1. Owner – Kentucky Transportation Cabinet, District **5**
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) - **US 31 W**
6. Latitude/Longitude (project mid-point) **38.156083/-85.834517**
7. County (project mid-point) -**Jefferson**
8. Project start date (date work will begin): (2)
9. Projected completion date: (2)

KYTC BMP Plan for Project PCN ## - #####; KYTC Item No. 05-0478.70

A. Site description:

1. Nature of Construction Activity (from letting project description) – ***Improve Dixie Hwy from Gene Snyder Freeway (KY 841) to Downtown Business District at 2nd Street. Improvements include complete streets, ITS, and bus rapid transit.***
2. Order of major soil disturbing activities (2) and (3)
3. Projected volume of material to be moved – ***10,913 cubic yards***
4. Estimate of total project area (acres) – ***50 acres***
5. Estimate of area to be disturbed (acres) – ***50 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.
7. Data describing existing soil condition – ***Sca-moderately well drained, alluvial soil in the Ohio Valley. Erosion is not a hazard. LaB-deep, excessively drained soil on terraces along the Ohio River. Erosion slight concern in cultivated fields. Previously disturbed/Urban area- A large portion has been previously modified and built up in the urban area. & (2)***
8. Data describing existing discharge water quality (if any) – ***None known & (2)***
9. Receiving water name – ***Storm Sewer System***
10. TMDLs and Pollutants of Concern in Receiving Waters: - ***None.***
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.

KYTC BMP Plan for Project PCN ## - #####; KYTC Item No. 05-0478.70

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. All DDA's will have adequate BMP's in place before being disturbed.
3. As DDAs are prepared for construction, the following will be addressed for the project as a whole or for each DDA as appropriate:
 - Construction Access – This is the first land-disturbing activity. As soon as construction begins, bare areas will be stabilized with gravel and temporary mulch and/or vegetation.

KYTC BMP Plan for Project PCN ## - #####; KYTC Item No. 05-0478.70

- At the beginning of the project, all DDAs for the project will be inspected for areas that are a source of storm water pollutants. Areas that are a source of pollutants will receive appropriate cover or BMPs to arrest the introduction of pollutants into storm water. Areas that have not been opened by the contractor will be inspected periodically (once per month) to determine if there is a need to employ BMPs to keep pollutants from entering storm water.
- Clearing and Grubbing – The following BMP's will be considered and used where appropriate.
 - Leaving areas undisturbed when possible.
 - Silt basins to provide silt volume for large areas.
 - Silt Traps Type A for small areas.
 - Silt Traps Type C in front of existing and drop inlets which are to be saved
 - Diversion ditches to catch sheet runoff and carry it to basins or traps or to divert it around areas to be disturbed.
 - Brush and/or other barriers to slow and/or divert runoff.
 - 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

KYTC BMP Plan for Project PCN ## - #####; KYTC Item No. 05-0478.70

- 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 : **None.**

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.

KYTC BMP Plan for Project PCN ## - #####; KYTC Item No. 05-0478.70

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

KYTC BMP Plan for Project PCN ## - ####; KYTC Item No. 05-0478.70

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.

KYTC BMP Plan for Project PCN ## - #####; KYTC Item No. 05-0478.70

- Materials and equipment necessary for spill cleanup will be kept in the material storage area. Equipment and materials will include as appropriate, brooms, dust pans, mops, rags, gloves, oil absorbents, sand, sawdust, and plastic and metal trash containers.
- All spills will be cleaned up immediately after discovery.
- The spill area will be kept well ventilated and personnel will wear appropriate protective clothing to prevent injury from contact with a hazardous substance.
- Spills of toxic or hazardous material will be reported to the appropriate state/local agency as required by KRS 224 and applicable federal law.
- The spill prevention plan will be adjusted as needed to prevent spills from reoccurring and improve spill response and cleanup.
- Spills of products will be cleaned up promptly. Wastes from spill clean up will be disposed in accordance with appropriate regulations.

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. **None.**

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. **None.**

KYTC BMP Plan for Project PCN ## - #####; KYTC Item No. 05-0478.70

F. Inspections

Inspection and maintenance practices that will be used to maintain erosion and sediment controls:

- All erosion prevention and sediment control measures will be inspected at least once each week and following any rain of one-half inch or more.
- Inspections will be conducted by individuals that have successfully completed the KEPSC-RI course as required by Section 213.02.02 of the Standard Specifications for Road and Bridge Construction, current edition.
- 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 from cleaning concrete trucks and equipment.

KYTC BMP Plan for Project PCN ## - ####; KYTC Item No. 05-0478.70

- 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

KYTC BMP Plan for Project PCN ## - ####; KYTC Item No. 05-0478.70

_____ There are no activities for this project as listed in 401 KAR 5:037 Section 2 that require the preparation and implementation of a groundwater protection plan.

The contractor is responsible for the preparation of a plan that addresses the

401 KAR 5:037 Section 3. (3) Elements of site specific groundwater protection plan:

- (a) General information about this project is covered in the Project information;
- (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 ## - #####; KYTC Item No. 05-0478.70

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 signature
 Typed or printed name²

(3) Signed _____, _____
 title signature
 Typed or printed name¹

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, Surface Water Permits Branch, Division of Water, 200 Fair Oaks, Frankfort, Kentucky 40601. Reference the Project Control Number (PCN), KYTC Item No., 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, Surface Water Permits Branch, Division of Water, 200 Fair Oaks, Frankfort, Kentucky 40601. Reference the Project Control Number (PCN), KYTC Item No., and KPDES number when one has been issued.

KYTC BMP Plan for Project PCN ## - #####; KYTC Item No. 05-0478.70

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 name¹ 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, Surface Water Permits Branch, Division of Water, 200 Fair Oaks, Frankfort, Kentucky 40601. Reference the Project Control Number (PCN), KYTC Item No., and KPDES number when one has been issued.

SPECIAL NOTE

Filing of eNOI for KPDES Construction Stormwater Permit

County: Jefferson

Route: US 31W

Item No.: 05-0478.70

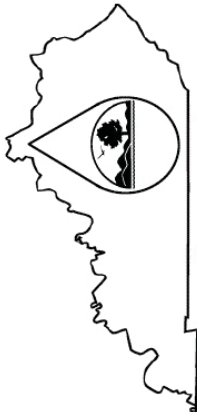
KDOW Submittal ID: 104665

Project Description: Improve Dixie Highway (US 31W) from Gene Snyder Freeway (KY 841) to Downtown Business District at 2nd Street. Improvements include complete streets, ITS, and bus rapid transit.

A Notice of Intent for obtaining coverage under the Kentucky Pollutant Discharge Elimination System (KPDES) General Permit for Stormwater Discharges Associated with Construction Activities (KYR10) has been drafted, copy of which is attached. Upon award, the Contractor will be identified in Section III of the form as the "Building Contractor" and it will be submitted for approval to the Kentucky Division of Water. The Contractor shall be responsible for advancing the work in a manner that is compliant with all applicable and appropriate KYTC specifications for sediment and erosion control as well as meeting the requirements of the KYR10 permit and the KDOW.

If there are any questions regarding this note, please contact David Waldner, Director, Division of Environmental Analysis, TCOB, 200 Mero Street, Frankfort, KY 40622, Phone: (502)564-7250.

Thank you for submitting your information via the Kentucky Department for Environmental Protection eForms website. Please save a copy of this submittal for your records. We recommend saving a copy as a .mht, .html, or .htm file. The Submittal ID for this transaction is 104665 and was submitted on June 15, 2017 11:56 AM Eastern Time. If you need to contact DEP regarding your submission, please reference your Submittal ID. The eForm Submittal ID allows you to use the data from this submittal as a template and/or download a copy of your submittal.

	<p align="center">KENTUCKY POLLUTION DISCHARGE ELIMINATION SYSTEM (KPDES)</p> <p align="center">Notice of Intent (NOI) for coverage of Storm Water Discharge Associated with Construction Activities Under the KPDES Storm Water General Permit KYR100000</p> <p align="center">Click here for Instructions</p> <p align="center">Click here to obtain information and a copy of the KPDES General Permit.</p> <p align="center">(*) Indicates a required field; (a*) indicates a field may be required based on user input or is an optionally required field</p>
<p>Reason for Submittal:(*)</p> <p>Application for New Permit Coverage ▾</p>	<p>Agency Interest ID:</p> <p>Agency Interest ID</p>
<p>If change to existing permit coverage is requested, describe the changes for which modification of coverage is being sought:(/)</p>	<p>Permit Number:(/)</p> <p>KPDES Permit Number</p>
<p>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.</p> <p>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, A8305(b) as impaired for sediment and for which an approved TMDL has been developed.</p>	
<p align="center">SECTION I – FACILITY OPERATOR INFORMATION (PERMITTEE)</p> <p>Company Name:(/)</p> <p>Kentucky Transporation Cabinet</p> <p>Mailing Address:(*)</p> <p>8310 Westport Road</p> <p>City:(*)</p> <p>Louisville</p> <p>State:(*)</p> <p>Kentucky</p> <p>Zip:(*)</p> <p>40242</p> <p>eMail Address:(*)</p> <p>matt.bullock@ky.gov</p> <p>Business Phone:(/)</p> <p>502-210-5400</p> <p>Alternate Phone:</p> <p>Phone</p> <p>First Name:(/)</p> <p>Matt</p> <p>M.I.:</p> <p>MI</p> <p>Last Name:(/)</p> <p>Bullock</p>	
<p align="center">SECTION II – GENERAL SITE LOCATION INFORMATION</p> <p>Project Name:(*)</p> <p>Transforming Dixe Highway</p> <p>Status of Owner/Operator(*)</p> <p>State Government</p> <p>SIC Code(*)</p> <p>1611 Highway and Street C ▾</p> <p>Company Name:(/)</p> <p>Louisville Metro Government</p> <p>First Name:(/)</p> <p>John</p> <p>M.I.:</p> <p>MI</p> <p>Last Name:(/)</p> <p>Callihan</p>	

Site Physical Address:(*) Dixie Highway (US 31W from KY 841 to W. Broadway to Downtown Louisville or about 15 miles)			
City:(*) Louisville	State:(*) Kentucky		
County:(*) Jefferson	Zip:(*) 40216		
Latitude(decimal degrees)(*) 38.156083	Longitude(decimal degrees)(*) -85.834517		
SECTION III -- SPECIFIC SITE ACTIVITY INFORMATION [?]			
Project Description:(*) Improve Dixie Highway from Gene Snyder Freeway (KY 841) to Downtown Business District at 2nd Street. Improvements include complete			
a. For single projects provide the following information			
Total Number of Acres in Project:(/)	Total Number of Acres Disturbed:(/)		
50	50		
Anticipated Start Date:(/)	Anticipated Completion Date:(/)		
9/1/2017	12/31/2019		
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 Unknown at this time			
SECTION IV -- IF THE PERMITTED SITE DISCHARGES TO A WATER BODY THE FOLLOWING INFORMATION IS REQUIRED [?]			
Discharge Point(s):			
Unnamed Tributary#2	Latitude	Longitude	Recessional Water Name
Yes	38.0995063	-85.871736	Pond Creek
Yes	38.0995335	-85.871160	Pond Creek
Yes	38.0995596	-85.871452	Pond Creek

Yes	38.0990623	-85.8717236	Pond Creek
Yes	38.0993325	-85.871160	Pond Creek
Yes	38.0995966	-85.871452	Pond Creek
Yes	38.102685	-85.869987	Pond Creek
Yes	38.102794	-85.868943	Pond Creek
Yes	38.113380	-85.862873	Mill Creek
Yes	38.113485	-85.862157	Mill Creek
Yes	38.124160	-85.853444	Mill Creek
Yes	38.124214	-85.852605	Mill Creek
No	38.146388	-85.838235	Big Run
Yes	38.156083	-85.834517	Big Run
Yes	38.167877	-85.828877	Big Run
No	38.184358	-85.813613	Mill Creek

SECTION V -- IF THE PERMITTED SITE DISCHARGES TO A MS4 THE FOLLOWING INFORMATION IS REQUIRED [2]

Name of MS4:

Date of application/notification to the MS4 for construction site permit coverage:

Date:

Discharge Point(s):(*)
 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: (✓)
 All storm sewer drainage basins. Individual inlets to storm sewer

Is a Clean Water Act 404 permit required?:(*)
 NO

Is a Clean Water Act 401 Water Quality Certification required?:(*)
 NO

SECTION VII -- NOT PREPARER INFORMATION

First Name:(*) M.I.:(*) Last Name:(*)

Company Name:(*)

Will the project require construction activities in a water body or the riparian zone?:(*)		No							
If Yes, describe scope of activity: (✓)		All storm sewer drainage basins. Individual inlets to stomir sewer							
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:(*)	Last Name:(*)	Company Name:(*)							
Jeff	Schaefer	HDR Engineering, Inc.							
M.I.:		State:(*)	Zip:(*)						
MI	City:(*)	Kentucky	40202						
Mailing Address:(*)		Alternate Phone:							
401 West Main Street		502-592-0288							
eMail Address:(*)		Business Phone:(*)							
jeff.schaefer@hdrinc.com		502-909-3247							
SECTION VIII -- ATTACHMENTS									
Facility Location Map:(*)									
<div style="text-align: center;">Upload file</div> <table border="1"> <tr> <td>Files</td> <td></td> </tr> <tr> <td></td> <td>eNOI_exhibit1.pdf (1.0MB) Remove</td> </tr> <tr> <td></td> <td>eNOI_exhibit2.pdf (965KB) Remove</td> </tr> </table>				Files			eNOI_exhibit1.pdf (1.0MB) Remove		eNOI_exhibit2.pdf (965KB) Remove
Files									
	eNOI_exhibit1.pdf (1.0MB) Remove								
	eNOI_exhibit2.pdf (965KB) Remove								
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:(*)								
Matt Bullock	CDE								
First Name:(*)	M.I.:	Last Name:(*)							
Matt	MI	Bullock							
eMail Address:(*)	Business Phone:(*)	Alternate Phone:	Signature Date:(*)						
susan.oatman@ky.gov	5022105400	Phone	6/15/2017						
Click to Save Values for Future Retrieval Click to Submit to DEP									

DISCHARGE POINTS THAT DRAIN TO BIG RUN CREEK
 LAT.: 38.146388
 LONG.: -85.838235

POINT DISCHARGE (BLACK)
DDA 2
DDA 6
DDA 7
DDA 8
DDA 11
DDA 12
DDA 13
DDA 15
DDA 16
DDA 18
DDA 19
DDA 20
DDA 22
DDA 23
DDA 24
DDA 134
DDA 143

DISCHARGE POINTS THAT DRAIN TO MILL CREEK
 LAT.: 38.194358
 LONG.: -85.83513

POINT DISCHARGE (YELLOW)
DDA 227
DDA 228
DDA 229
DDA 232
DDA 233
DDA 234
DDA 235
DDA 236
DDA 237
DDA 242
DDA 243
DDA 245
DDA 245A
DDA 246
DDA 247
DDA 248
DDA 250
DDA 251
DDA 252
DDA 253
DDA 254
DDA 255
DDA 256
DDA 257
DDA 258
DDA 259
DDA 260
DDA 263
DDA 269
DDA 275

END PROJECT
 LAT. 38.192503
 LONG. -85.807307

BEGIN PROJECT
 LAT. 38.142833
 LONG. -85.840072

EXHIBIT #1

DISCHARGE POINTS THAT DRAIN TO UNNAMED TRIBUTARY #2 OF BIG RUN CREEK AT UPPER HUNTERS TRACE RD.
 LAT.: 38.167877
 LONG.: -85.828877

POINT DISCHARGE (RED)
DDA 117
DDA 118
DDA 119
DDA 120
DDA 121
DDA 122
DDA 123
DDA 124
DDA 126
DDA 127
DDA 128
DDA 129
DDA 130
DDA 131
DDA 132
DDA 133
DDA 135
DDA 136
DDA 137
DDA 138
DDA 139
DDA 140
DDA 141
DDA 142
DDA 143
DDA 145
DDA 149
DDA 150
DDA 151
DDA 152
DDA 153
DDA 154
DDA 157
DDA 158
DDA 159
DDA 160
DDA 161
DDA 162
DDA 163
DDA 164
DDA 166
DDA 167
DDA 168
DDA 169
DDA 170
DDA 171
DDA 172
DDA 173
DDA 174
DDA 175
DDA 176
DDA 177
DDA 178
DDA 179
DDA 180
DDA 181
DDA 182
DDA 183
DDA 184
DDA 185
DDA 186
DDA 187
DDA 188
DDA 189
DDA 192
DDA 193
DDA 194
DDA 196
DDA 197
DDA 198
DDA 200
DDA 202
DDA 203
DDA 204
DDA 205
DDA 206
DDA 207
DDA 208
DDA 209
DDA 210
DDA 211
DDA 212
DDA 213
DDA 215
DDA 216
DDA 217
DDA 221
DDA 222
DDA 224
DDA 226
DDA 272

DISCHARGE POINTS THAT DRAIN TO UNNAMED TRIBUTARY #1 OF BIG RUN CREEK AT LOWER HUNTERS TRACE RD.
 LAT.: 38.165085
 LONG.: -85.834517

POINT DISCHARGE (GREEN)
DDA 25
DDA 26
DDA 28
DDA 29
DDA 30
DDA 31
DDA 32
DDA 33
DDA 34
DDA 35
DDA 36
DDA 37
DDA 38
DDA 39
DDA 40
DDA 41
DDA 42
DDA 43
DDA 44
DDA 45
DDA 46
DDA 47
DDA 48
DDA 49
DDA 51
DDA 52
DDA 53
DDA 54
DDA 55
DDA 56
DDA 57
DDA 61
DDA 62
DDA 63
DDA 64
DDA 65
DDA 66
DDA 67
DDA 68
DDA 69
DDA 70
DDA 71
DDA 72
DDA 78
DDA 80
DDA 81
DDA 82
DDA 83
DDA 84
DDA 85
DDA 86
DDA 87
DDA 88
DDA 89
DDA 90
DDA 91
DDA 92
DDA 93
DDA 94
DDA 95
DDA 96
DDA 97
DDA 100
DDA 101
DDA 102
DDA 103
DDA 104
DDA 105
DDA 106
DDA 107
DDA 108
DDA 109
DDA 110
DDA 111
DDA 113
DDA 114
DDA 116

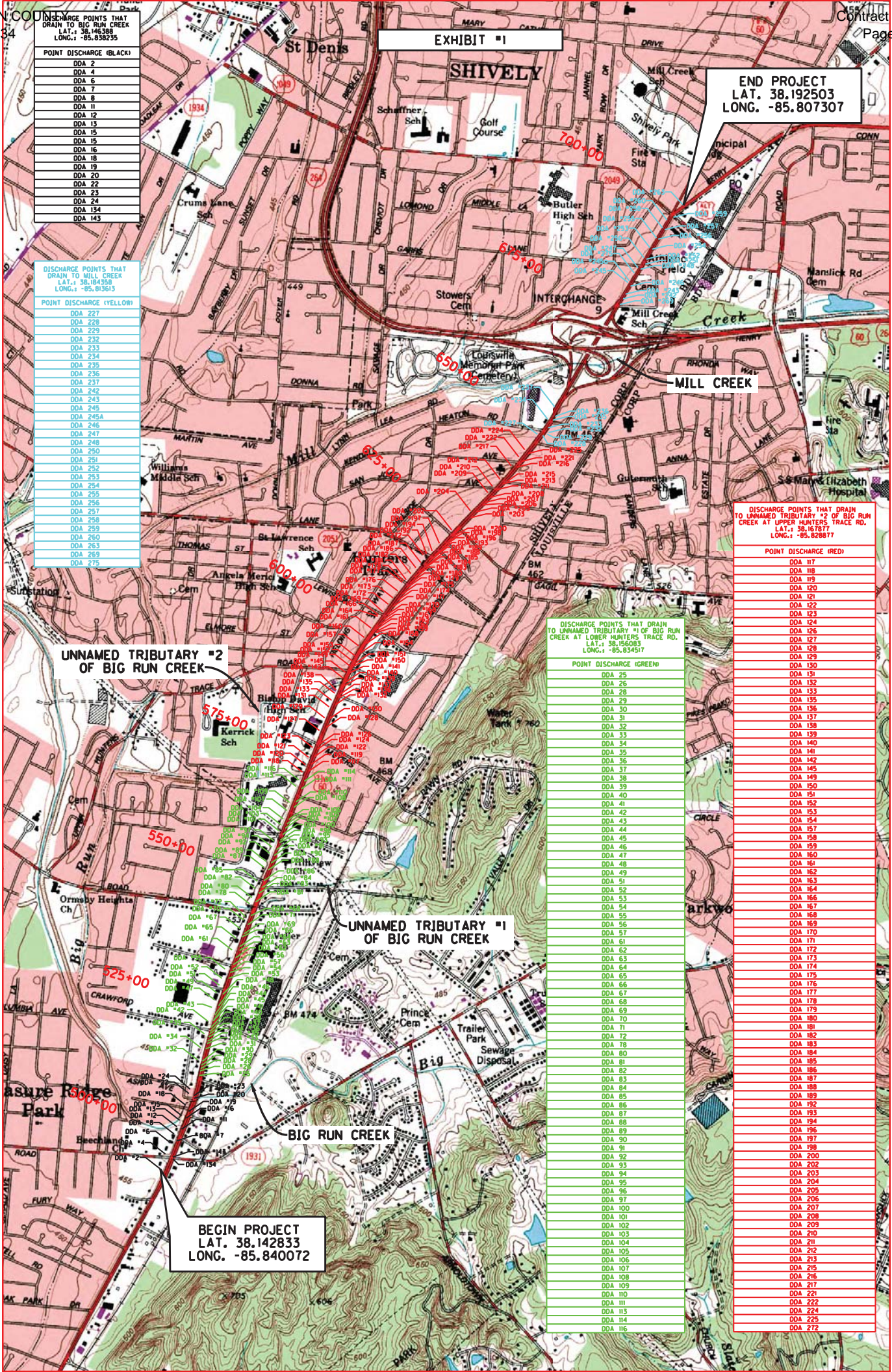
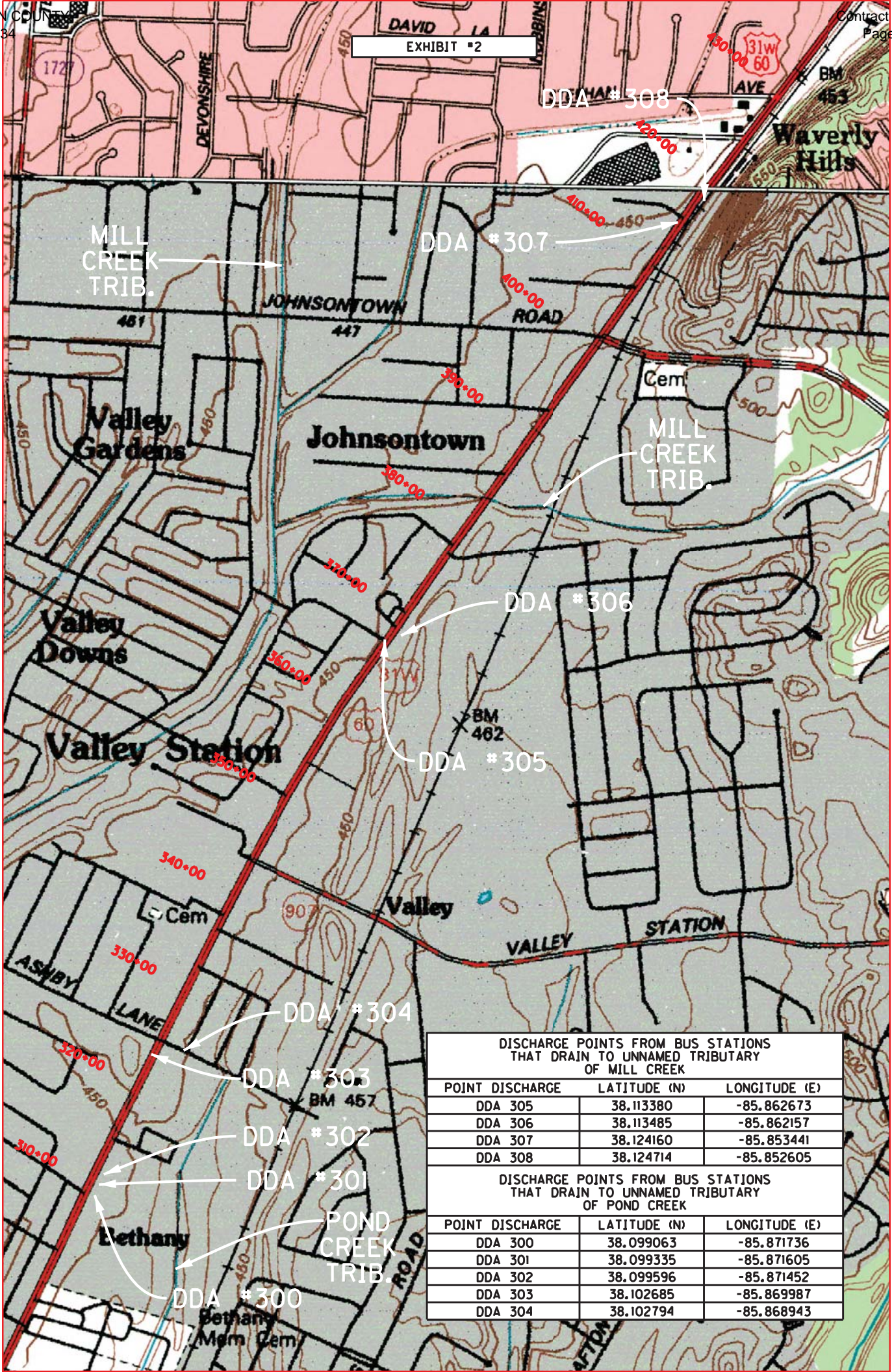


EXHIBIT #2



DISCHARGE POINTS FROM BUS STATIONS THAT DRAIN TO UNNAMED TRIBUTARY OF MILL CREEK		
POINT DISCHARGE	LATITUDE (N)	LONGITUDE (E)
DDA 305	38.113380	-85.862673
DDA 306	38.113485	-85.862157
DDA 307	38.124160	-85.853441
DDA 308	38.124714	-85.852605
DISCHARGE POINTS FROM BUS STATIONS THAT DRAIN TO UNNAMED TRIBUTARY OF POND CREEK		
POINT DISCHARGE	LATITUDE (N)	LONGITUDE (E)
DDA 300	38.099063	-85.871736
DDA 301	38.099335	-85.871605
DDA 302	38.099596	-85.871452
DDA 303	38.102685	-85.869987
DDA 304	38.102794	-85.868943

SPECIAL NOTE
MANDATORY PRE-BID MEETING

Jefferson County

**US 31W (Dixie Highway) from Gene Snyder Freeway (KY 841) to Downtown Business District
at 2nd Street.**

Item No. 05-0478.70

A mandatory pre-bid meeting will be held on **July 28, 2017 at 1:30 P.M.** prevailing time, at the **Department of Highways, District Office 5, 8310 Westport road, Louisville, KY 40242.**

Any company that is interested in bidding on the subject project or being part of a joint venture must be represented at the pre-bid meeting, by at least one person of sufficient authority to bind the company.

No individual can represent more than one company. At the meeting, a roster will be taken of the representatives present. Only companies represented at the meeting will be eligible to have their bids opened at the date of letting.

Department of Highways officials present at the meeting will answer questions concerning the project.

PART II
SPECIFICATIONS AND STANDARD DRAWINGS

SPECIFICATIONS REFERENCE

Any reference in the plans or proposal to previous editions of the *Standard Specifications for Road and Bridge Construction* and *Standard Drawings* are superseded by *Standard Specifications for Road and Bridge Construction, Edition of 2012* and *Standard Drawings, Edition of 2016*.

SUPPLEMENTAL SPECIFICATIONS

The contractor shall use the Supplemental Specifications that are effective at the time of letting.
The Supplemental Specifications can be found at the following link:

<http://transportation.ky.gov/Construction/Pages/Kentucky-Standard-Specifications.aspx>

SPECIAL NOTE FOR PORTABLE CHANGEABLE MESSAGE SIGNS

This Special Note will apply when indicated on the plans or in the proposal.

1.0 DESCRIPTION. Furnish, install, operate, and maintain variable message signs at the locations shown on the plans or designated by the Engineer. Remove and retain possession of variable message signs when they are no longer needed on the project.

2.0 MATERIALS.

2.1 General. Use LED Variable Message Signs Class I, II, or III, as appropriate, from the Department's List of Approved Materials.

Unclassified signs may be submitted for approval by the Engineer. The Engineer may require a daytime and nighttime demonstration. The Engineer will make a final decision within 30 days after all required information is received.

2.2 Sign and Controls. All signs must:

- 1) Provide 3-line messages with each line being 8 characters long and at least 18 inches tall. Each character comprises 35 pixels.
- 2) Provide at least 40 preprogrammed messages available for use at any time. Provide for quick and easy change of the displayed message; editing of the message; and additions of new messages.
- 3) Provide a controller consisting of:
 - a) Keyboard or keypad.
 - b) Readout that mimics the actual sign display. (When LCD or LCD type readout is used, include backlighting and heating or otherwise arrange for viewing in cold temperatures.)
 - c) Non-volatile memory or suitable memory with battery backup for storing pre-programmed messages.
 - d) Logic circuitry to control the sequence of messages and flash rate.
- 4) Provide a serial interface that is capable of supporting complete remote control ability through land line and cellular telephone operation. Include communication software capable of immediately updating the message, providing complete sign status, and allowing message library queries and updates.
- 5) Allow a single person easily to raise the sign to a satisfactory height above the pavement during use, and lower the sign during travel.
- 6) Be Highway Orange on all exterior surfaces of the trailer, supports, and controller cabinet.
- 7) Provide operation in ambient temperatures from -30 to + 120 degrees Fahrenheit during snow, rain and other inclement weather.
- 8) Provide the driver board as part of a module. All modules are interchangeable, and have plug and socket arrangements for disconnection and reconnection. Printed circuit boards associated with driver boards have a conformable coating to protect against moisture.
- 9) Provide a sign case sealed against rain, snow, dust, insects, etc. The lens is UV stabilized clear plastic (polycarbonate, acrylic, or other approved material) angled to prevent glare.
- 10) Provide a flat black UV protected coating on the sign hardware, character PCB, and appropriate lens areas.
- 11) Provide a photocell control to provide automatic dimming.

- 12) Allow an on-off flashing sequence at an adjustable rate.
- 13) Provide a sight to aim the message.
- 14) Provide a LED display color of approximately 590 nm amber.
- 15) Provide a controller that is password protected.
- 16) Provide a security device that prevents unauthorized individuals from accessing the controller.
- 17) Provide the following 3-line messages preprogrammed and available for use when the sign unit begins operation:

/KEEP/RIGHT/=>=>=>/	/MIN/SPEED/**MPH/
/KEEP/LEFT/<=<=</	/ICY/BRIDGE/AHEAD/ /ONE
/LOOSE/GRAVEL/AHEAD/	LANE/BRIDGE/AHEAD/
/RD WORK/NEXT/**MILES/	/ROUGH/ROAD/AHEAD/
/TWO WAY/TRAFFIC/AHEAD/	/MERGING/TRAFFIC/AHEAD/
/PAINT/CREW/AHEAD/	/NEXT/***/MILES/
/REDUCE/SPEED/**MPH/	/HEAVY/TRAFFIC/AHEAD/
/BRIDGE/WORK/***0 FT/	/SPEED/LIMIT/**MPH/
/MAX/SPEED/**MPH/	/BUMP/AHEAD/
/SURVEY/PARTY/AHEAD/	/TWO/WAY/TRAFFIC/

*Insert numerals as directed by the Engineer.
Add other messages during the project when required by the Engineer.

2.3 Power.

- 1) Design solar panels to yield 10 percent or greater additional charge than sign consumption. Provide direct wiring for operation of the sign or arrow board from an external power source to provide energy backup for 21 days without sunlight and an on-board system charger with the ability to recharge completely discharged batteries in 24 hours.

3.0 CONSTRUCTION. Furnish and operate the variable message signs as designated on the plans or by the Engineer. Ensure the bottom of the message panel is a minimum of 7 feet above the roadway in urban areas and 5 feet above in rural areas when operating. Use Class I, II, or III signs on roads with a speed limit less than 55 mph. Use Class I or II signs on roads with speed limits 55 mph or greater.

Maintain the sign in proper working order, including repair of any damage done by others, until completion of the project. When the sign becomes inoperative, immediately repair or replace the sign. Repetitive problems with the same unit will be cause for rejection and replacement.

Use only project related messages and messages directed by the Engineer, unnecessary messages lessen the impact of the sign. Ensure the message is displayed in either one or 2 phases with each phase having no more than 3 lines of text. When no message is needed, but it is necessary to know if the sign is operable, flash only a pixel.

When the sign is not needed, move it outside the clear zone or where the Engineer directs. Variable Message Signs are the property of the Contractor and shall be removed from the project when no longer needed. The Department will not assume ownership of these signs.

4.0 MEASUREMENT. The final quantity of Variable Message Sign will be

11

the actual number of individual signs acceptably furnished and operated during the project. The Department will not measure signs replaced due to damage or rejection.

5.0 PAYMENT. The Department will pay for the Variable Message Signs at the unit price each. The Department will not pay for signs replaced due to damage or rejection. Payment is full compensation for furnishing all materials, labor, equipment, and service necessary to, operate, move, repair, and maintain or replace the variable message signs. The Department will make payment for the completed and accepted quantities under the following:

<u>Code</u>	<u>Pay Item</u>	<u>Pay Unit</u>
02671	Portable Changeable Message Sign	Each

Effective June 15, 2012

PART III

EMPLOYMENT, WAGE AND RECORD REQUIREMENTS

FHWA-1273 -- Revised May 1, 2012

**REQUIRED CONTRACT PROVISIONS
FEDERAL-AID CONSTRUCTION CONTRACTS**

- I. General
- II. Nondiscrimination
- III. Nonsegregated Facilities
- IV. Davis-Bacon and Related Act Provisions
- V. Contract Work Hours and Safety Standards Act Provisions
- VI. Subletting or Assigning the Contract
- VII. Safety: Accident Prevention
- VIII. False Statements Concerning Highway Projects
- IX. Implementation of Clean Air Act and Federal Water Pollution Control Act
- X. Compliance with Governmentwide Suspension and Debarment Requirements
- XI. Certification Regarding Use of Contract Funds for Lobbying

ATTACHMENTS

A. Employment and Materials Preference for Appalachian Development Highway System or Appalachian Local Access Road Contracts (included in Appalachian contracts only)

I. GENERAL

1. Form FHWA-1273 must be physically incorporated in each construction contract funded under Title 23 (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).

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.

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). 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 bid proposal or request for proposal 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).

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.

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. The term Federal-aid highway does not include roadways functionally classified as local roads or rural minor collectors.

II. NONDISCRIMINATION

The provisions of this section related to 23 CFR Part 230 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 60, 29 CFR 1625-1627, Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), Title VI of the Civil Rights Act of 1964, as amended, 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 60, and 29 CFR 1625-1627. The contracting agency and the FHWA have the authority and the responsibility to ensure compliance with Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), and Title VI of the Civil Rights Act of 1964, as amended, 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 230, 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 (28 CFR 35, 29 CFR 1630, 29 CFR 1625-1627, 41 CFR 60 and 49 CFR 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 35 and 29 CFR 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.

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, 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 who 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.

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, national origin, age or disability. The following procedures shall be followed:

a. The contractor will conduct periodic inspections of project sites to insure 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. 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, 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, 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 there under. 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, 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 and 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. Assurance Required by 49 CFR 26.13(b):

a. The requirements of 49 CFR Part 26 and the State DOT's U.S. DOT-approved DBE program are incorporated by reference.

b. The contractor 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 contracting agency deems appropriate.

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 \$10,000 or more.

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, 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). The requirements apply to all projects located within the right-of-way of a roadway that is functionally classified as Federal-aid highway. This excludes roadways functionally classified as local roads or rural minor collectors, which are exempt. Contracting agencies may elect to apply these requirements to other projects.

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

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, Employment Standards Administration, 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 Wage and Hour Administrator for determination. The Wage and Hour 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

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

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 at <http://www.dol.gov/esa/whd/forms/wh347instr.htm> or its successor 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 §5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under §5.5 (a)(3)(i) of Regulations, 29 CFR part 5, 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 Regulations, 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 section 1001 of title 18 and section 231 of title 31 of the United States Code.

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

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. 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.

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.

9. Disputes concerning labor standards. 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.

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

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.

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 of \$10 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.

3. Withholding for unpaid wages and liquidated damages. The FHWA or 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 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.

4. Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (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.

VI. SUBLETTING OR ASSIGNING THE CONTRACT

This provision is applicable to all Federal-aid construction contracts on the National Highway System.

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" 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:

- (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.

2. 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. 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.

5. The 30% self-performance requirement of paragraph (1) is not applicable to design-build contracts; however, contracting agencies may establish their own self-performance requirements.

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 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.

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 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).

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 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 1, 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

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

By submission of this bid/proposal or the execution of this contract, or subcontract, as appropriate, the bidder, proposer, Federal-aid construction contractor, or subcontractor, as appropriate, will be deemed to have stipulated as follows:

1. That any person who is or will be utilized in the performance of this contract is not prohibited from receiving an award due to a violation of Section 508 of the Clean Water Act or Section 306 of the Clean Air Act.

2. That the contractor agrees to include or cause to be included the requirements of paragraph (1) of this Section X in every subcontract, and further agrees to take such action as the contracting agency may direct as a means of enforcing such requirements.

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.

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.

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.

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.

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 and 1200. "First Tier Covered Transactions" refers to any covered transaction between a grantee or subgrantee 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 grantee or subgrantee 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.

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.

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. 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 Excluded Parties List System website (<https://www.epls.gov/>), which is compiled by the General Services Administration.

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. 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) 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;

(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; 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.

b. Where the prospective participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

2. 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)

a. By signing and submitting this proposal, the prospective lower tier 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.

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 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 grantee or subgrantee 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 grantee or subgrantee 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.

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.

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 Excluded Parties List System website (<https://www.epls.gov/>), which is compiled by the General Services Administration.

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.

* * * * *

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 is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency.

2. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall 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 20).

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.

**ATTACHMENT A - EMPLOYMENT AND MATERIALS
PREFERENCE FOR APPALACHIAN DEVELOPMENT
HIGHWAY SYSTEM OR APPALACHIAN LOCAL ACCESS
ROAD CONTRACTS**

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 administering agency may direct as a means of enforcing such provisions, including sanctions for non-compliance.

Revised: January 25, 2017

EXECUTIVE BRANCH CODE OF ETHICS

In the 1992 regular legislative session, the General Assembly passed and Governor Brereton Jones signed Senate Bill 63 (codified as KRS 11A), the Executive Branch Code of Ethics, which states, in part:

KRS 11A.040 (7) provides:

No present or former public servant shall, within six (6) months following termination of his office or employment, accept employment, compensation, or other economic benefit from any person or business that contracts or does business with, or is regulated by, the state in matters in which he was directly involved during the last thirty-six (36) months of his tenure. This provision shall not prohibit an individual from returning to the same business, firm, occupation, or profession in which he was involved prior to taking office or beginning his term of employment, or for which he received, prior to his state employment, a professional degree or license, provided that, for a period of six (6) months, he personally refrains from working on any matter in which he was directly involved during the last thirty-six (36) months of his tenure in state government. This subsection shall not prohibit the performance of ministerial functions, including but not limited to filing tax returns, filing applications for permits or licenses, or filing incorporation papers, nor shall it prohibit the former officer or public servant from receiving public funds disbursed through entitlement programs.

KRS 11A.040 (9) states:

A former public servant shall not represent a person or business before a state agency in a matter in which the former public servant was directly involved during the last thirty-six (36) months of his tenure, for a period of one (1) year after the latter of:

- a) The date of leaving office or termination of employment; or
- b) The date the term of office expires to which the public servant was elected.

This law is intended to promote public confidence in the integrity of state government and to declare as public policy the idea that state employees should view their work as a public trust and not as a way to obtain private benefits.

If you have worked for the executive branch of state government within the past six months, you may be subject to the law's prohibitions. The law's applicability may be different if you hold elected office or are contemplating representation of another before a state agency.

Also, if you are affiliated with a firm which does business with the state and which employs former state executive-branch employees, you should be aware that the law may apply to them.

In case of doubt, the law permits you to request an advisory opinion from the Executive Branch Ethics Commission, 3 Fountain Place, Frankfort, Kentucky 40601; telephone (502) 564-7954.

Revised: January 27, 2017

General Decision Number: KY170100 08/11/2017 KY100

Superseded General Decision Number: KY20160100

State: Kentucky

Construction Type: Highway

Counties: Anderson, Bath, Bourbon, Boyd, Boyle, Bracken, Breckinridge, Bullitt, Carroll, Carter, Clark, Elliott, Fayette, Fleming, Franklin, Gallatin, Grant, Grayson, Greenup, Hardin, Harrison, Henry, Jefferson, Jessamine, Larue, Lewis, Madison, Marion, Mason, Meade, Mercer, Montgomery, Nelson, Nicholas, Oldham, Owen, Robertson, Rowan, Scott, Shelby, Spencer, Trimble, Washington and Woodford 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: Under Executive Order (EO) 13658, an hourly minimum wage of \$10.20 for calendar year 2017 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, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least \$10.20 (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2017. The EO minimum wage rate will be adjusted annually. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/06/2017
1	01/13/2017
2	02/03/2017
3	03/10/2017
4	05/19/2017
5	07/14/2017
6	08/04/2017
7	08/11/2017

BRIN0004-003 06/01/2016

BRECKENRIDGE COUNTY

	Rates	Fringes
BRICKLAYER.....	\$ 25.96	11.38

BRKY0001-005 06/01/2016

BULLITT, CARROLL, GRAYSON, HARDIN, HENRY, JEFFERSON, LARUE, MARION, MEADE, NELSON, OLDHAM, SHELBY, SPENCER, & TRIMBLE

COUNTIES:

	Rates	Fringes
BRICKLAYER.....	\$ 25.96	11.38

BRKY0002-006 06/01/2016		

BRACKEN, GALLATIN, GRANT, MASON & ROBERTSON COUNTIES:

	Rates	Fringes
BRICKLAYER.....	\$ 27.01	11.38

BRKY0007-004 06/01/2016		

BOYD, CARTER, ELLIOT, FLEMING, GREENUP, LEWIS & ROWAN COUNTIES:

	Rates	Fringes
BRICKLAYER.....	\$ 32.20	18.78

BRKY0017-004 06/01/2016		

ANDERSON, BATH, BOURBON, BOYLE, CLARK, FAYETTE, FRANKLIN,
HARRISON, JESSAMINE, MADISON, MERCER, MONTGOMERY, NICHOLAS,
OWEN, SCOTT, WASHINGTON & WOODFORD COUNTIES:

	Rates	Fringes
BRICKLAYER.....	\$ 25.64	11.38

CARP0064-001 05/01/2015		

	Rates	Fringes
CARPENTER.....	\$ 27.50	16.06
Diver.....	\$ 41.63	16.06
PILEDRIVERMAN.....	\$ 27.75	16.06

ELEC0212-008 06/05/2017		

BRACKEN, GALLATIN and GRANT COUNTIES

	Rates	Fringes
ELECTRICIAN.....	\$ 27.90	17.56

ELEC0212-014 12/01/2014		

BRACKEN, GALLATIN & GRANT COUNTIES:

	Rates	Fringes
Sound & Communication Technician.....	\$ 22.75	10.08

ELEC0317-012 06/01/2016		

BOYD, CARTER, ELLIOT & ROWAN COUNTIES:

	Rates	Fringes
ELECTRICIAN (Wiremen)		
Cable Splicer.....	\$ 32.68	18.13
Electrician.....	\$ 33.31	22.98

ELEC0369-007 06/01/2016

ANDERSON, BATH, BOURBON, BOYLE, BRECKINRIDGE, BULLITT, CARROLL,
CLARK, FAYETTE, FRAONKLIN, GRAYSON, HARDIN, HARRISON, HENRY,
JEFFERSON, JESSAMINE, LARUE, MADISON, MARION, MEADE, MERCER,
MONTGOMERY, NELSON, NICHOLAS, OLDHAM, OWEN, ROBERTSON, SCOTT,
SHELBY, SPENCER, TRIMBLE, WASHINGTON, & WOODFORD COUNTIES:

	Rates	Fringes
ELECTRICIAN.....	\$ 30.56	16.10

ELEC0575-002 05/29/2017

FLEMING, GREENUP, LEWIS & MASON COUNTIES:

	Rates	Fringes
ELECTRICIAN.....	\$ 32.45	15.38

* ENGI0181-018 07/01/2017

	Rates	Fringes
POWER EQUIPMENT OPERATOR		
GROUP 1.....	\$ 31.95	15.15
GROUP 2.....	\$ 29.09	15.15
GROUP 3.....	\$ 29.54	15.15
GROUP 4.....	\$ 28.77	15.15

OPERATING ENGINEER CLASSIFICATIONS

GROUP 1 - A-Frame Winch Truck; Auto Patrol; Backfiller;
Batcher Plant; Bituminous Paver; Bituminous Transfer
Machine; Boom Cat; Bulldozer; Mechanic; Cableway; Carry-All
Scoop; Carry Deck Crane; Central Compressor Plant; Cherry
Picker; Clamshell; Concrete Mixer (21 cu. ft. or Over);
Concrete Paver; Truck-Mounted Concrete Pump; Core Drill;
Crane; Crusher Plant; Derrick; Derrick Boat; Ditching &
Trenching Machine; Dragline; Dredge Operator; Dredge
Engineer; Elevating Grader & Loaders; Grade-All; Gurries;
Heavy Equipment Robotics Operator/Mechanic; High Lift;
Hoe-Type Machine; Hoist (Two or More Drums); Hoisting
Engine (Two or More Drums); Horizontal Directional Drill
Operator; Hydrocrane; Hyster; KeCal Loader; LeTourneau;
Locomotive; Mechanic; Mechanically Operated Laser Screed;
Mechanic Welder; Mucking Machine; Motor Scraper; Orangepeel
Bucket; Overhead Crane; Piledriver; Power Blade; Pumpcrete;
Push Dozer; Rock Spreader, attached to equipment; Rotary
Drill; Roller (Bituminous); Rough Terrain Crane; Scarifier;

Scoopmobile; Shovel; Side Boom; Subgrader; Tailboom; Telescoping Type Forklift; Tow or Push Boat; Tower Crane (French, German & other types); Tractor Shovel; Truck Crane; Tunnel Mining Machines, including Moles, Shields or similar types of Tunnel Mining Equipment

GROUP 2 - Air Compressor (Over 900 cu. ft. per min.); Bituminous Mixer; Boom Type Tamping Machine; Bull Float; Concrete Mixer (Under 21 cu. ft.); Dredge Engineer; Electric Vibrator; Compactor/Self-Propelled Compactor; Elevator (One Drum or Buck Hoist); Elevator (When used to Hoist Building Material); Finish Machine; Firemen & Hoist (One Drum); Flexplane; Forklift (Regardless of Lift Height); Form Grader; Joint Sealing Machine; Outboard Motor Boat; Power Sweeper (Riding Type); Roller (Rock); Ross Carrier; Skid Mounted or Trailer Mounted Concrete Pump; Skid Steer Machine with all Attachments; Switchman or Brakeman; Throttle Valve Person; Tractair & Road Widening Trencher; Tractor (50 H.P. or Over); Truck Crane Oiler; Tugger; Welding Machine; Well Points; & Whirley Oiler

GROUP 3 - All Off Road Material Handling Equipment, including Articulating Dump Trucks; Greaser on Grease Facilities servicing Heavy Equipment

GROUP 4 - Bituminous Distributor; Burlap & Curing Machine; Cement Gun; Concrete Saw; Conveyor; Deckhand Oiler; Grout Pump; Hydraulic Post Driver; Hydro Seeder; Mud Jack; Oiler; Paving Joint Machine; Power Form Handling Equipment; Pump; Roller (Earth); Steerman; Tamping Machine; Tractor (Under 50 H.P.); & Vibrator

CRANES - with booms 150 ft. & Over (Including JIB), and where the length of the boom in combination with the length of the piling leads equals or exceeds 150 ft. - \$1.00 over Group 1 rate

EMPLOYEES ASSIGNED TO WORK BELOW GROUND LEVEL ARE TO BE PAID 10% ABOVE BASIC WAGE RATE. THIS DOES NOT APPLY TO OPEN CUT WORK.

IRON0044-009 06/01/2017

BRACKEN, GALLATIN, GRANT, HARRISON, ROBERTSON,
BOURBON (Northern third, including Townships of Jackson, Millersburg, Ruddel Mills & Shawhan);
CARROLL (Eastern third, including the Township of Ghent);
FLEMING (Western part, excluding Townships of Beechburg, Colfax, Elizaville, Flemingsburg, Flemingsburg Junction, Foxport, Grange City, Hillsboro, Hilltop, Mount Carmel, Muses Mills, Nepton, Pecksridge, Plummers Landing, Plummers Mill, Poplar Plains, Ringos Mills, Tilton & Wallingford);
MASON (Western two-thirds, including Townships of Dover, Lewisburg, Mays Lick, Maysville, Minerva, Moranburg, Murphysville, Ripley, Sardis, Shannon, South Ripley & Washington);
NICHOLAS (Townships of Barefoot, Barterville, Carlisle, Ellisville, Headquarters, Henryville, Morningglory, Myers & Oakland Mills);

OWEN (Townships of Beechwood, Bromley, Fairbanks, Holbrook, Jonesville, Long Ridge, Lusby's Mill, New, New Columbus, New Liberty, Owenton, Poplar Grove, Rockdale, Sanders, Teresita & Wheatley);

SCOTT (Northern two-thirds, including Townships of Biddle, Davis, Delaplain, Elmville, Longlick, Muddy Ford, Oxford, Rogers Gap, Sadieville, Skinnersburg & Stonewall)

	Rates	Fringes
IRONWORKER		
Fence Erector.....	\$ 23.76	19.15
Structural.....	\$ 27.60	20.10

* IRON0070-006 06/01/2017

ANDERSON, BOYLE, BRECKINRIDGE, BULLITT, FAYETTE, FRANKLIN, GRAYSON, HARDIN, HENRY, JEFFERSON, JESSAMINE, LARUE, MADISON, MARION, MEADE, MERCER, NELSON, OLDHAM, SHELBY, SPENCER, TRIMBLE, WASHINGTON & WOODFORD
BOURBON (Southern two-thirds, including Townships of Austerlity, Centerville, Clintonville, Elizabeth, Hutchison, Littlerock, North Middletown & Paris);
CARROLL (Western two-thirds, including Townships of Carrollton, Easterday, English, Locust, Louis, Prestonville & Worthville);
CLARK (Western two-thirds, including Townships of Becknerville, Flanagan, Ford, Pine Grove, Winchester & Wyandotte);
OWEN (Eastern eighth, including Townships of Glenmary, Gratz, Monterey, Perry Park & Tacketts Mill);
SCOTT (Southern third, including Townships of Georgetown, Great Crossing, Newtown, Stampling Ground & Woodlake);

	Rates	Fringes
IRONWORKER.....	\$ 28.30	21.85

IRON0372-006 07/15/2016

BRACKEN, GALLATIN, GRANT, HARRISON and ROBERTSON
BOURBON (Northern third, including Townships of Jackson, Millersburg, Ruddel Mills & Shawhan);
CARROLL (Eastern third, including the Township of Ghent);
FLEMING (Western part, Excluding Townships of Beechburg, Colfax, Elizaville, Flemingsburg, Flemingsburg Junction, Foxport, Grange City, Hillsboro, Hilltop, Mount Carmel, Muses Mills, Nepton, Pecksridge, Plummers Landing, Plummers Mill, Poplar Plains, Ringos Mills, Tilton & Wallingford);
MASON (Western two-thirds, including Townships of Dover, Lewisburg, Mays Lick, Maysville, Minerva, Moranburg, Murphysville, Ripley, Sardis, Shannon, South Ripley & Washington);
NICHOLAS (Townships of Barefoot, Barterville, Carlisle, Ellisville, Headquarters, Henryville, Morningglory, Myers & Oakland Mills);
OWEN (Townships of Beechwood, Bromley, Fairbanks, Holbrook, Jonesville, Long Ridge, Lusby's Mill, New, New Columbus, New Liberty, Owenton, Poplar Grove, Rockdale, Sanders, Teresita &

Wheatley);
SCOTT (Northern two-thirds, including Townships of Biddle,
Davis, Delaplain, Elmsville, Longlick, Muddy Ford, Oxford, Rogers
Gap, Sadieville, Skinnersburg & Stonewall) COUNTIES

	Rates	Fringes
IRONWORKER, REINFORCING.....	\$ 27.15	20.33

IRON0769-007 06/01/2017

BATH, BOYD, CARTER, ELLIOTT, GREENUP, LEWIS, MONTGOMERY & ROWAN
CLARK (Eastern third, including townships of Bloomingdale,
Hunt, Indian Fields, Kiddville, Loglick, Rightangele & Thomson);
FLEMING (Townships of Beechburg, Colfax, Elizaville,
Flemingsburg, Flemingsburg Junction, Foxport, Grange City,
Hillsboro, Hilltop, Mount Carmel, Muses Mills, Nepton,
Pecksville, Plummers Landing, Plummers Mill, Poplar Plains,
Ringos Mills, Tilton & Wallingford);
MASON (Eastern third, including Townships of Helena, Marshall,
Orangeburg, Plumville & Springdale);
NICHOLAS (Eastern eighth, including the Township of Moorefield
Sprout)

	Rates	Fringes
IRONWORKER		
ZONE 1.....	\$ 31.33	23.97
ZONE 2.....	\$ 31.73	23.97
ZONE 3.....	\$ 33.33	23.97

ZONE 1 - Up to 10 mile radius of Union Hall, Ashland, Ky.,
1643 Greenup Ave.

ZONE 2 - 10 to 50 mile radius of Union Hall, Ashland, Ky.,
1643 Greenup Ave.

ZONE 3 - 50 mile radius & over of Union Hall, Ashland, Ky.,
1643 Greenup Ave.

LABO0189-003 07/01/2016

BATH, BOURBON, BOYD, BOYLE, BRACKEN, CARTER, CLARK, ELLIOTT,
FAYETTE, FLEMING, FRANKLIN, GALLATIN, GRANT, GREENUP, HARRISON,
JESSAMINE, LEWIS, MADISON, MASON, MERCER, MONTGOMERY, NICHOLAS,
OWEN, ROBERTSON, ROWAN, SCOTT, & WOOLFORD COUNTIES

	Rates	Fringes
Laborers:		
GROUP 1.....	\$ 23.14	13.29
GROUP 2.....	\$ 23.39	13.29
GROUP 3.....	\$ 23.44	13.29
GROUP 4.....	\$ 24.04	13.29

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; Bushhammer; 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 Drillers (All Types); Powdermen & Blasters; Troxler & Concrete Tester if Laborer is Utilized

LABO0189-008 07/01/2017

ANDERSON, BULLITT, CARROLL, HARDIN, HENRY, JEFFERSON, LARUE, MARION, MEADE, NELSON, OLDHAM, SHELBY, SPENCER, TRIMBLE & WASHINGTON COUNTIES

	Rates	Fringes
Laborers:		
GROUP 1.....	\$ 23.14	13.29
GROUP 2.....	\$ 23.39	13.29
GROUP 3.....	\$ 23.44	13.29
GROUP 4.....	\$ 24.04	13.29

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; Bushhammer; 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 Drillers (All Types); Powdermen & Blasters; Troxler & Concrete Tester if Laborer is Utilized

LABO0189-009 07/01/2014

BRECKINRIDGE & GRAYSON COUNTIES

	Rates	Fringes
Laborers:		
GROUP 1.....	\$ 22.66	11.10
GROUP 2.....	\$ 22.91	11.10
GROUP 3.....	\$ 22.96	11.10
GROUP 4.....	\$ 23.56	11.10

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; Bushhammer; 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 Drillers (All Types); Powdermen &
Blasters; Troxler & Concrete Tester if Laborer is Utilized

PAIN0012-005 06/11/2005

BATH, BOURBON, BOYLE, CLARK, FAYETTE, FLEMING, FRANKLIN,
HARRISON, JESSAMINE, MADISON, MERCER, MONTGOMERY, NICHOLAS,
ROBERTSON, SCOTT & WOODFORD COUNTIES:

	Rates	Fringes
PAINTER		
Bridge/Equipment Tender and/or Containment Builder..\$	18.90	5.90
Brush & Roller.....\$	21.30	5.90
Elevated Tanks; Steeplejack Work; Bridge & Lead Abatement.....\$	22.30	5.90
Sandblasting & Waterblasting.....\$	22.05	5.90
Spray.....\$	21.80	5.90

PAIN0012-017 05/01/2015

BRACKEN, GALLATIN, GRANT, MASON & OWEN COUNTIES:

	Rates	Fringes
PAINTER (Heavy & Highway Bridges - Guardrails - Lightpoles - Striping)		
Bridge Equipment Tender and Containment Builder.....\$	20.73	9.06

Brush & Roller.....	\$ 23.39	9.06
Elevated Tanks; Steeplejack Work; Bridge & Lead Abatement.....	\$ 24.39	9.06
Sandblasting & Water Blasting.....	\$ 24.14	9.06
Spray.....	\$ 23.89	9.06

PAIN0118-004 06/01/2014

ANDERSON, BRECKINRIDGE, BULLITT, CARROLL, GRAYSON, HARDIN,
HENRY, JEFFERSON, LARUE, MARION, MEADE, NELSON, OLDHAM, SHELBY,
SPENCER, TRIMBLE & WASHINGTON COUNTIES:

	Rates	Fringes
PAINTER		
Brush & Roller.....	\$ 18.50	11.97
Spray, Sandblast, Power Tools, Waterblast & Steam Cleaning.....	\$ 19.50	11.97

PAIN1072-003 12/01/2016

BOYD, CARTER, ELLIOTT, GREENUP, LEWIS and ROWAN COUNTIES

	Rates	Fringes
Painters:		
Bridges; Locks; Dams; Tension Towers & Energized Substations.....	\$ 32.98	16.15
Power Generating Facilities.	\$ 29.74	16.15

PLUM0248-003 06/01/2017

BOYD, CARTER, ELLIOTT, GREENUP, LEWIS & ROWAN COUNTIES:

	Rates	Fringes
Plumber and Steamfitter.....	\$ 35.00	25.12

PLUM0392-007 06/01/2014

BRACKEN, CARROLL (Eastern Half), GALLATIN, GRANT, MASON, OWEN &
ROBERTSON COUNTIES:

	Rates	Fringes
Plumbers and Pipefitters.....	\$ 29.80	17.79

PLUM0502-003 08/01/2016

BRECKINRIDGE, BULLITT, CARROLL (Western Half), FRANKLIN
(Western three-fourths), GRAYSON, HARDIN, HENRY, JEFFERSON,
LARUE, MARION, MEADE, NELSON, OLDHAM, SHELBY, SPENCER, TRIMBLE &
WASHINGTON COUNTIES

	Rates	Fringes
PLUMBER.....	\$ 32.00	20.13

SUKY2010-160 10/08/2001		

	Rates	Fringes
Truck drivers:		
GROUP 1.....	\$ 16.57	7.34
GROUP 2.....	\$ 16.68	7.34
GROUP 3.....	\$ 16.86	7.34
GROUP 4.....	\$ 16.96	7.34

TRUCK DRIVER CLASSIFICATIONS

GROUP 1 - Mobile Batch Truck Tender

GROUP 2 - Greaser; Tire Changer; & Mechanic Tender

GROUP 3 - Single Axle Dump; Flatbed; Semi-trailer or Pole Trailer when used to pull building materials and equipment; Tandem Axle Dump; Distributor; Mixer; & Truck Mechanic

GROUP 4 - Euclid & Other Heavy Earthmoving Equipment & Lowboy; Articulator Cat; 5-Axle Vehicle; Winch & A-Frame when used in transporting materials; Ross Carrier; Forklift when used to transport building materials; & Pavement Breaker

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.
=====

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 www.dol.gov/whd/govcontracts.

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 Regional Office for the area in which the survey was conducted because those Regional Offices have 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 DECISION

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 after an employee works eight (8) hours a day or forty (40) hours a week, whichever gives the employee the greater wages. At least time and one-half the base rate is required for all overtime. A laborer, workman or mechanic and an employer may enter into a written agreement or a collective bargaining agreement to work more than eight (8) hours a calendar day but not more than ten (10) hours a calendar day for the straight time hourly rate. 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
11.2%	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 Jefferson County.

PART IV
INSURANCE

INSURANCE

The Contractor shall procure and maintain the following insurance in addition to the insurance required by law:

- 1) Commercial General Liability-Occurrence form – not less than \$2,000,000 General aggregate, \$2,000,000 Products & Completed Aggregate, \$1,000,000 Personal & Advertising, \$1,000,000 each occurrence.
- 2) Automobile Liability- \$1,000,000 per accident
- 3) Employers Liability:
 - a) \$100,000 Each Accident Bodily Injury
 - b) \$500,000 Policy limit Bodily Injury by Disease
 - c) \$100,000 Each Employee Bodily Injury by Disease
- 4) The insurance required above must be evidenced by a Certificate of Insurance and this Certificate of Insurance must contain one of the following statements:
 - a) "policy contains no deductible clauses."
 - b) "policy contains _____ (amount) deductible property damage clause but company will pay claim and collect the deductible from the insured."
- 5) **KENTUCKY WORKMEN'S COMPENSATION INSURANCE.** The contractor shall furnish evidence of coverage of all his employees or give evidence of self-insurance by submitting a copy of a certificate issued by the Workmen's Compensation Board.

The cost of insurance is incidental to all contract items. All subcontractors must meet the same minimum insurance requirements.

PART V
BID ITEMS

PROPOSAL BID ITEMS

Report Date 8/23/17

Section: 0001 - PAVING

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
0010	00001		DGA BASE	3,364.00	TON		\$	
0020	00214		CL3 ASPH BASE 1.00D PG64-22	1,322.00	TON		\$	
0030	02084		JPC PAVEMENT-8 IN (REVISED: 8-15-17)	3,333.00	SQYD		\$	
0040	02101		CEM CONC ENT PAVEMENT-8 IN	13,789.00	SQYD		\$	
0050	02677		ASPHALT PAVE MILLING & TEXTURING	8,958.00	TON		\$	
0060	22906ES403		CL3 ASPH SURF 0.38A PG64-22	11,201.00	TON		\$	

Section: 0002 - ROADWAY

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
0070	00071		CRUSHED AGGREGATE SIZE NO 57	2,354.00	TON		\$	
0080	01547		DROP BOX INLET TYPE 12 (FRAME AND GRATE ONLY)	20.00	LF		\$	
0090	01719		ADJUST INLET	2.00	EACH		\$	
0100	01792		ADJUST MANHOLE	109.00	EACH		\$	
0110	01811		STANDARD CURB AND GUTTER MOD	23,552.00	LF		\$	
0120	01876		STANDARD HEADER CURB MOD	15,783.00	LF		\$	
0130	01921		STANDARD BARRIER MEDIAN TYPE 4	2,662.00	SQYD		\$	
0140	02014		BARRICADE-TYPE III	20.00	EACH		\$	
0150	02015		CEMENT CONCRETE ISLAND	466.00	SQYD		\$	
0160	02200		ROADWAY EXCAVATION	10,956.00	CUYD		\$	
0170	02242		WATER	1,998.00	MGAL		\$	
0180	02545		CLEARING AND GRUBBING (APPROXIMATLEY 53.52 ACRES)	1.00	LS		\$	
0190	02562		TEMPORARY SIGNS	2,400.00	SQFT		\$	
0200	02611		HANDRAIL-TYPE A-1	52.00	LF		\$	
0210	02650		MAINTAIN & CONTROL TRAFFIC	1.00	LS		\$	
0220	02653		LANE CLOSURE	12.00	EACH		\$	
0230	02671		PORTABLE CHANGEABLE MESSAGE SIGN	2.00	EACH		\$	
0240	02676		MOBILIZATION FOR MILL & TEXT	1.00	LS		\$	
0250	02701		TEMP SILT FENCE	5,273.00	LF		\$	
0260	02705		SILT TRAP TYPE C	278.00	EACH		\$	
0270	02708		CLEAN SILT TRAP TYPE C	834.00	EACH		\$	
0280	02720		SIDEWALK-4 IN CONCRETE	18,542.00	SQYD		\$	
0290	02726		STAKING	1.00	LS		\$	
0300	02775		ARROW PANEL	4.00	EACH		\$	
0310	04793		CONDUIT-1 1/4 IN	300.00	LF		\$	
0320	04795		CONDUIT-2 IN	125.00	LF		\$	
0330	04820		TRENCHING AND BACKFILLING	400.00	LF		\$	
0340	04829		PIEZOELECTRIC SENSOR	16.00	EACH		\$	
0350	04830		LOOP WIRE	7,100.00	LF		\$	
0360	04895		LOOP SAW SLOT AND FILL	1,800.00	LF		\$	
0370	05952		TEMP MULCH	52,740.00	SQYD		\$	
0380	05953		TEMP SEEDING AND PROTECTION	39,555.00	SQYD		\$	
0390	05990		SODDING	11,087.00	SQYD		\$	
0400	05997		TOPSOIL FURNISHED AND PLACED	3,902.00	CUYD		\$	

PROPOSAL BID ITEMS

Report Date 8/23/17

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
0410	06510		PAVE STRIPING-TEMP PAINT-4 IN	100,000.00	LF		\$	
0420	06514		PAVE STRIPING-PERM PAINT-4 IN	16,755.00	LF		\$	
0430	06515		PAVE STRIPING-PERM PAINT-6 IN	47,807.00	LF		\$	
0440	06530		PAVE STRIPING REMOVAL-4 IN	60,000.00	LF		\$	
0450	06531		PAVE STRIPING REMOVAL-6 IN	100,000.00	LF		\$	
0460	06550		PAVE STRIPING-TEMP REM TAPE-W	5,000.00	LF		\$	
0470	06551		PAVE STRIPING-TEMP REM TAPE-Y	5,000.00	LF		\$	
0480	06565		PAVE MARKING-THERMO X-WALK-6 IN	10,150.00	LF		\$	
0490	06568		PAVE MARKING-THERMO STOP BAR-24IN (REVISED: 8-15-17)	1,562.00	LF		\$	
0500	06572		PAVE MARKING-DOTTED LANE EXTEN	195.00	LF		\$	
0510	06573		PAVE MARKING-THERMO STR ARROW	7.00	EACH		\$	
0520	06574		PAVE MARKING-THERMO CURV ARROW	143.00	EACH		\$	
0530	06575		PAVE MARKING-THERMO COMB ARROW	20.00	EACH		\$	
0540	06601NC		PAVE MARKING-PAINT WORDS	10.00	EACH		\$	
0550	10020NS		FUEL ADJUSTMENT	26,285.00	DOLL	\$1.00	\$	\$26,285.00
0560	10030NS		ASPHALT ADJUSTMENT	48,964.00	DOLL	\$1.00	\$	\$48,964.00
0570	20000ES724		TREE	6.00	EACH		\$	
0580	20000ES724		TREE (IN TREE GRATE)	30.00	EACH		\$	
0590	20000ES724		TREE (ORNAMENTAL)	7.00	EACH		\$	
0600	20001ES724		SHRUB (LARGE SHRUBS MORE THAN 3' TALL)	33.00	EACH		\$	
0610	20001ES724		SHRUB (SMALL SHRUBS LESS THAN 3' TALL)	993.00	EACH		\$	
0620	20094ES835		TEMP RELOCATION OF SIGNAL HEAD	375.00	EACH		\$	
0630	20359NN		GALVANIZED STEEL CABINET	3.00	EACH		\$	
0640	20360ES818		WOOD POST	6.00	EACH		\$	
0650	20391NS835		ELECTRICAL JUNCTION BOX TYPE A	5.00	EACH		\$	
0660	21341ND		BOLLARDS	5.00	EACH		\$	
0665	22520EN		PAVE MARKING-THERMO YIELD BAR-36 IN (ADDED: 8-15-17)	42.00	LF		\$	
0670	22665EN		REMOVE NON-MOUNTABLE MEDIAN	642.00	SQYD		\$	
0680	23139EN		STRIPING REMOVAL	175,000.00	LF		\$	
0690	23158ES505		DETECTABLE WARNINGS	2,205.00	SQFT		\$	
0700	23214EC		BRICK-PAVERS FOR ROADWAY (VERGE)	150.00	SQYD		\$	
0710	23613EC		PERENNIALS	2,411.00	EACH		\$	
0720	24489EC		INLAID PAVEMENT MARKER	1,830.00	EACH		\$	
0730	24558ED		ORNAMENTAL GRASS	1,361.00	EACH		\$	
0740	24911ED		STRUCTURAL SOIL VAULT SYSTEM	120.00	SQYD		\$	
0750	24912ES724		GROUND COVER	1,462.00	EACH		\$	
0760	24917ED		SELECT BORROW MATERIAL	3,753.00	CUYD		\$	
0770	24918ES601		CONCRETE-CLASS A (VERGE & MEDIAN)	5,849.00	SQYD		\$	
0780	24935EC		CONCRETE PAINT (MEDIAN)	1,233.00	SQYD		\$	

PROPOSAL BID ITEMS

Report Date 8/23/17

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
0790	00520		STORM SEWER PIPE-12 IN	1,975.00	LF		\$	
0800	00521		STORM SEWER PIPE-15 IN	559.00	LF		\$	
0810	00522		STORM SEWER PIPE-18 IN	12.00	LF		\$	
0820	00524		STORM SEWER PIPE-24 IN	4.00	LF		\$	
0830	00525		STORM SEWER PIPE-27 IN	8.00	LF		\$	
0840	00526		STORM SEWER PIPE-30 IN	11.00	LF		\$	
0850	00527		STORM SEWER PIPE-33 IN	8.00	LF		\$	
0860	00528		STORM SEWER PIPE-36 IN	12.00	LF		\$	
0870	00980		SLOTTED DRAIN PIPE-12 IN	1,429.00	LF		\$	
0880	01456		CURB BOX INLET TYPE A	105.00	EACH		\$	
0890	01459		CURB BOX INLET TYPE A MOD	45.00	EACH		\$	
0900	01480		CURB BOX INLET TYPE B	9.00	EACH		\$	
0910	01487		CURB BOX INLET TYPE F	8.00	EACH		\$	
0920	01544		DROP BOX INLET TYPE 11	3.00	EACH		\$	
0930	01545		DROP BOX INLET TYPE 11 MOD	1.00	EACH		\$	
0940	01634		CAP CURB BOX INLET	43.00	EACH		\$	
0950	01650		JUNCTION BOX	7.00	EACH		\$	
0960	08100		CONCRETE-CLASS A	36.10	CUYD		\$	
0970	20569ES710		DROP BOX INLET TY 13G(MOD)	3.00	EACH		\$	
0980	21546ED		CURB BOX INLET TYPE B MODIFIED	4.00	EACH		\$	
0990	23643EC		CURB BOX INLET TY F-MOD	8.00	EACH		\$	

Section: 0004 - SIGNALIZATION

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
1000	04723		BRACKET 10 FT	52.00	EACH		\$	
1010	04780		FUSED CONNECTOR KIT	104.00	EACH		\$	
1020	04792		CONDUIT-1 IN	534.00	LF		\$	
1030	04794		CONDUIT-1 1/2 IN	40.00	LF		\$	
1040	04795		CONDUIT-2 IN (REVISED: 8-15-17)	1,345.00	LF		\$	
1050	04811		ELECTRICAL JUNCTION BOX TYPE B (REVISED: 8-23-17)	265.00	EACH		\$	
1060	04820		TRENCHING AND BACKFILLING (REVISED: 8-15-17)	1,742.00	LF		\$	
1070	04830		LOOP WIRE (REVISED: 8-15-17)	25,525.00	LF		\$	
1080	04832		WIRE-NO. 12 (REVISED: 8-15-17)	22,449.00	LF		\$	
1090	04844		CABLE-NO. 14/5C	28,657.00	LF		\$	
1100	04845		CABLE-NO. 14/7C	1,650.00	LF		\$	
1110	04850		CABLE-NO. 14/1 PAIR	13,919.00	LF		\$	
1120	04885		MESSENGER-10800 LB	3,870.00	LF		\$	
1130	04895		LOOP SAW SLOT AND FILL (REVISED: 8-15-17)	9,799.00	LF		\$	
1140	04899		ELECTRICAL SERVICE	1.00	EACH		\$	
1150	04932		INSTALL STEEL STRAIN POLE	33.00	EACH		\$	
1160	04951		REMOVE SIGNAL EQUIPMENT (REVISED: 8-23-17)	1.00	L S		\$	
1170	06472		INSTALL SPAN MOUNTED SIGN (REVISED: 8-21-17)	38.00	EACH		\$	

PROPOSAL BID ITEMS

Report Date 8/23/17

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
1180	20093NS835		INSTALL PEDESTRIAN HEAD-LED (REVISED: 8-15-17)	84.00	EACH		\$	
1190	20188NS835		INSTALL LED SIGNAL-3 SECTION	116.00	EACH		\$	
1200	20188NS835		INSTALL LED SIGNAL-3 SECTION (TRANSIT)	11.00	EACH		\$	
1210	20189NS835		INSTALL LED SIGNAL-5 SECTION	11.00	EACH		\$	
1220	20266ES835		INSTALL LED SIGNAL- 4 SECTION	8.00	EACH		\$	
1230	21743NN		INSTALL PEDESTRIAN DETECTOR (REVISED: 8-15-17)	84.00	EACH		\$	
1235	22939ND		INSTALL LUMINAIRE POLE (ADDED: 8-15-17)	2.00	EACH		\$	
1240	23157EN		TRAFFIC SIGNAL POLE BASE	145.00	CUYD		\$	
1250	23206EC		INSTALL CONTROLLER CABINET (REVISED: 8-21-17)	6.00	EACH		\$	
1260	23222EC		INSTALL SIGNAL PEDESTAL (REVISED: 8-15-17)	26.00	EACH		\$	
1270	24589ED		LED LUMINAIRE	52.00	EACH		\$	
1280	24901EC		PVC CONDUIT-2 IN-SCHEDULE 80	1,881.00	LF		\$	
1290	24908EC		INSTALL SIGNAL CONTROLLER-TY ATC (W/ 1C ATC MODULE)	35.00	EACH		\$	
1300	24916ED		SYSTEM INTEGRATION	1.00	LS		\$	
1310	24919EC		MULTIMODE PHASE SELECTOR (WITH POLE MOUNTED ANTENNA) (REVISED: 8-21-17)	32.00	EACH		\$	
1320	24937EC		INSTALL EXTERNAL UPS SYSTEM CABINET	2.00	EACH		\$	
1325	24941EC		LED TRANSIT SIGNAL MODULE (ADDED: 8-15-17)	33.00	EACH		\$	

Section: 0005 - INTELLIGENT TRANSPORTATION SYSTEMS

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
1340	01650		JUNCTION BOX	29.00	EACH		\$	
1350	04792		CONDUIT-1 IN	4,645.00	LF		\$	
1360	04795		CONDUIT-2 IN	7,392.00	LF		\$	
1370	04797		CONDUIT-3 IN (REVISED: 8-15-17)	3,711.00	LF		\$	
1380	04820		TRENCHING AND BACKFILLING	4,965.00	LF		\$	
1390	04888		MESSENGER-4500 LB	2,105.00	LF		\$	
1400	04899		ELECTRICAL SERVICE	36.00	EACH		\$	
1410	21077ED		FIBER OPTIC CABLE (AIRBLOWN/PUSHABLE, 144 STRAND)	33,775.00	LF		\$	
1420	21077ED		FIBER OPTIC CABLE (AIRBLOWN/PUSHABLE, 48 STRAND)	756.00	LF		\$	
1430	21077ED		FIBER OPTIC CABLE (FIBER OPTIC DROP CABLE, 12 STRAND) (REVISED: 8-21-17)	17,590.00	LF		\$	
1440	21543EN		BORE AND JACK CONDUIT (REVISED: 8-15-17)	5,984.00	LF		\$	
1450	24543EC		CLEAN (EXISTING CONDUIT)	5,800.00	LF		\$	
1460	24921EC		CONDUIT RISER-2 IN	73.00	EACH		\$	
1470	24922EC		FIBER OPTIC SPLICE ENCLOSURE	42.00	EACH		\$	
1480	24923EC		CABINET FIBER TERMINATION PANEL	37.00	EACH		\$	

PROPOSAL BID ITEMS

Report Date 8/23/17

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
1490	24924EC		AIR LINK COMMUNICATION	2.00	EACH		\$	
1500	24925EC		LAYER 2 ETHERNET SWITCH-FLD MOUNT-6 PORT	37.00	EACH		\$	
1510	24926EC		INTERIOR FIBER OPTIC PATCH PANEL	2.00	EACH		\$	
1520	24927EC		LAYER 2 ETHERNET SWITCH-RACK MOUNT	3.00	EACH		\$	
1530	24928EC		FIREWALL UNIT-RACK MOUNT	3.00	EACH		\$	
1540	24929EC		MICROTRENCHING	20,177.00	LF		\$	
1550	24930EC		MICRO-DUCT PATHWAY-2 CELL	17,108.00	LF		\$	
1560	24931EC		MICRO-DUCT PATHWAY-3 CELL	12,768.00	LF		\$	
1570	24932EC		CONDUIT REPAIR	100.00	LF		\$	
1580	24933EC		JUNCTION BOX REPAIRED	5.00	EACH		\$	

Section: 0006 - WATERLINE

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
1590	14021		W FIRE HYDRANT REMOVE	6.00	EACH		\$	
1600	14036		W PIPE DUCTILE IRON 06 INCH	12.00	LF		\$	
1610	14037		W PIPE DUCTILE IRON 08 INCH	15.00	LF		\$	
1620	14039		W PIPE DUCTILE IRON 12 INCH	1,522.00	LF		\$	
1630	14050		W PIPE DCTL IRON RSTRND JOINT 12 IN	1,350.00	LF		\$	
1640	14076		W REMOVE TRANSITE (AC) PIPE	100.00	LF		\$	
1650	14095		W TIE-IN 08 INCH	1.00	EACH		\$	
1660	14097		W TIE-IN 12 INCH	38.00	EACH		\$	
1670	14105		W VALVE 06 INCH	1.00	EACH		\$	
1680	14106		W VALVE 08 INCH	1.00	EACH		\$	
1690	14108		W VALVE 12 INCH	9.00	EACH		\$	
1700	14156		W METER REMOVE	5.00	EACH		\$	
1710	14510		W FIRE HYDRANT ASSEMBLY INST (REVISED: 8-15-17)	15.00	EACH		\$	
1720	14514		W METER 1 INCH INST	2.00	EACH		\$	
1730	14516		W METER 2 INCH INST	1.00	EACH		\$	
1740	14517		W METER 3/4 INCH INST	4.00	EACH		\$	
1750	14518		W METER VAULT INST	5.00	EACH		\$	
1760	14634		W SERV COPPER SHORT SIDE 3/4 IN INST (REVISED: 8-15-17)	17.00	EACH		\$	
1770	14631		W SERV COPPER SHORT SIDE 1 IN INST	8.00	EACH		\$	
1780	14632		W SERV COPPER SHORT SIDE 1-1/2 IN INST	2.00	EACH		\$	
1790	14633		W SERV COPPER SHORT SIDE 2 IN INST	1.00	EACH		\$	

Section: 0007 - MISCELLANEOUS - BUS STATION

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
1800	00001		DGA BASE	1,091.00	TON		\$	
1810	01810		STANDARD CURB AND GUTTER	401.00	LF		\$	
1820	01811		STANDARD CURB AND GUTTER MOD	43.00	LF		\$	
1830	01875		STANDARD HEADER CURB	1,951.00	LF		\$	
1840	01877		SPECIAL HEADER CURB	1,702.00	LF		\$	
1850	02101		CEM CONC ENT PAVEMENT-8 IN	139.00	SQYD		\$	

PROPOSAL BID ITEMS

Report Date 8/23/17

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
1860	02653		LANE CLOSURE	25.00	EACH		\$	
1870	02677		ASPHALT PAVE MILLING & TEXTURING	575.00	TON		\$	
1880	02720		SIDEWALK-4 IN CONCRETE	1,481.00	SQYD		\$	
1890	05990		SODDING	98.00	SQYD		\$	
1900	06407		SBM ALUM SHEET SIGNS .125 IN (REVISED: 8-21-17)	164.00	SQFT		\$	
1910	06514		PAVE STRIPING-PERM PAINT-4 IN	673.00	LF		\$	
1920	06515		PAVE STRIPING-PERM PAINT-6 IN	3,621.00	LF		\$	
1930	06568		PAVE MARKING-THERMO STOP BAR-24IN	40.00	LF		\$	
1940	06574		PAVE MARKING-THERMO CURV ARROW	3.00	EACH		\$	
1950	06601NC		PAVE MARKING-PAINT WORDS	8.00	EACH		\$	
1960	20000ES724		TREE	16.00	EACH		\$	
1970	20000ES724		TREE IN TREE GRATE	42.00	EACH		\$	
1980	20194ED		REMOVE & RESET TRAFFIC SIGN	10.00	EACH		\$	
1990	21373ND		REMOVE SIGN	3.00	EACH		\$	
2000	22415EN		CONCRETE-CLASS A FOR PAD (BUS PAD-10 IN)	1,457.00	SQYD		\$	
2010	22415EN		CONCRETE-CLASS A FOR PAD (BUS PAD-6 IN)	1,743.00	SQYD		\$	
2020	22415EN		CONCRETE-CLASS A FOR PAD (SHELTER PAD-4 IN)	1,104.00	SQYD		\$	
2030	22415EN		CONCRETE-CLASS A FOR PAD (SHELTER PAD-8 IN)	471.00	SQYD		\$	
2040	23158ES505		DETECTABLE WARNINGS	871.00	SQFT		\$	
2050	23214EC		BRICK-PAVERS FOR ROADWAY (VERGE)	232.00	SQYD		\$	
2060	23403EC		BUS SHELTER (TYPE 1)	5.00	EACH		\$	
2070	23403EC		BUS SHELTER (TYPE 2)	14.00	EACH		\$	
2080	23403EC		BUS SHELTER (TYPE 3)	12.00	EACH		\$	
2090	23404EC		BENCH	48.00	EACH		\$	
2100	23405EC		TRASH RECEPTACLE	37.00	EACH		\$	
2110	23613EC		PERENNIALS	157.00	EACH		\$	
2120	24558ED		ORNAMENTAL GRASS	39.00	EACH		\$	
2130	24605ED		RELOCATE (LIGHT POLE)	1.00	EACH		\$	
2140	24731EC		REMOVE AND RESET (MAILBOX)	2.00	EACH		\$	
2150	24731EC		REMOVE AND RESET (SPRINKLER HEAD)	1.00	EACH		\$	
2160	24894EC		REMOVE (BUS BENCH)	23.00	EACH		\$	
2170	24894EC		REMOVE (BUS SHELTER)	8.00	EACH		\$	
2180	24894EC		REMOVE (BUS TRASH CAN)	17.00	EACH		\$	
2190	24894EC		REMOVE (PARKING METER)	2.00	EACH		\$	
2200	24911ED		STRUCTURAL SOIL VAULT SYSTEM	218.00	SQYD		\$	
2210	24913ED		PYLON	36.00	EACH		\$	
2220	24914ED		MODIFIED PYLON	1.00	EACH		\$	

PROPOSAL BID ITEMS

Report Date 8/23/17

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
2230	24918ES601		CONCRETE-CLASS A (VERGE & MEDIAN)	347.00	SQYD		\$	

Section: 0008 - DEMOBILIZATION &/OR MOBILIZATION

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
2240	02568		MOBILIZATION	1.00	LS		\$	
2250	02569		DEMOBILIZATION	1.00	LS		\$	

RECOMMENDATION FOR PICKUP OF ITEMS TO BE INSTALLED
 ON TRAFFIC SIGNALS/LIGHTING

Item Number: 5-478.7

County: Jefferson

Description: Transforming Dixie Highway (US 31W)
 Bethany mp 7.72 to Garland mp 19.285, Broadway / 9th

Cabinets	Master code	Description of Item
0	T-01-0000	Aluminum Cabinet (Beacon)
0	T-01-0010	Pole Mounted 336 Cabinet
6	T-01-0020	Base Mounted 332 Cabinet
2	T-01-0030	Battery Backup System (Piggyback)
0	T-01-0100	170 Controller
35	T-01-0105	ATC Controller
35	T-01-0106	1C w/Maxtime (this should go with item ATC controller)
0	T-01-0200	School Clock
0	T-01-0501	Conflict Monitor, Model 2018
56	T-01-0510	Isolator, Model 242 (for ped detector and railroad)
58	T-01-0600	Loop Detector, Model 222
85	T-01-0700	Load Switches

Signals	Master code	Description of Item
0	T-02-0001	1-section beacon backplate
127	T-02-0009	Siemens 3 Section Signal
127	T-02-0032	Siemen 3 section backplate
8	T-02-0033	Siemen 4 section 12" signal (poly)
0	T-02-0034	Siemen 4 section 12" signal double red
11	T-02-0040	Siemen 5 section, 12 inch signal (poly)
11	T-02-0041	Siemen 5 section backplate
0	T-02-0042	4-sec dbl red backplate only
8	T-02-0043	Siemen 4-sec. straight signal backplate
0	T-02-0051	2" wide fluorescent yellow reflective tape
0	T-02-0080	12 inch red/yellowbeacon
84	T-02-0090	Pedestrian signal housing
0	T-02-0099	Audible pedestrian detector
21	T-02-0300	LED Module 12" red arrow
32	T-02-0310	LED Module 12" yellow arrow
40	T-02-0320	LED Module 12" green arrow
114	T-02-0330	LED Module 12" red ball
114	T-02-0340	LED Module 12" yellow ball
114	T-02-0350	LED Module 12" green ball
84	T-02-0365	LED Countdown Pedestrian Module

Special items	Master code	Description of Item	
0	T-02-0400	Video Detection System Camera Detector, SP	# of left turns put here
0	T-02-0401	Camera Mounting System	
0	T-02-0500	MDS Radios 9810	
0	T-02-0507	Ethernet/Serial Data Radio	
0	T-02-0510	Antenna 6 db omni	
0	T-02-0520	Antenna 10 db yagi	
0	T-02-0530	Antenna 9 db omni	
3	T-02-0640	Mast Arm Mount Signal Bracket (3-section)	
0	T-03-0230	Jumper 3' N-N RG-58	
0	T-03-0240	Jumper 60' N-N RG-213	
0	T-06-0800	Surge Protector for Radio	
0	T-09-0410	Sign Hanger for 48" signs	
37	T-09-0415	30 X 36 through 36 X 36 sign hanger (New)	
26	T-02-0650	Pedstl.top mntg.bkt One-way	
0	T-02-0660	Pedstl.top mntg.bkt Two-way	
0	T-02-0661	Post Top for Pedestal (each)	
26	T-02-0670	Pedestal	
2	T-06-0600	Transformer Base for Luminaire Poles w/o anchor bolts	
8	T-06-0601	Anchor Bolts for Luminaire Poles	
84	T-06-0710	Ped Detector Pole Mount FSA Box	
0	T-06-0730	Ped Button w/o Plunger	
0	T-17-0015	9 X 15 Countdown Ped Sign DBL Sided	
0	T-01-0609	Epoxy Applicator	Special Order
0	T-01-0611	Access Point Controller Card	Special Order
0	T-01-0612	Access Point Expansion Card	Special Order
0	T-01-0613	Access Point Remote Radio	Special Order
0	T-01-0614	Access Point Accessory Isolator	Special Order
0	T-01-0615	Repeater	Special Order
0	T-01-0616	Type T Sensor	Special Order
0	T-01-0618	Sensor Clamshell Enclosure	Special Order
0	T-01-0619	Sensor Installation Kit	Special Order

Poles	Master code	Description of Item
0	T-04-0010	Steel Strain Pole 28 foot
18	T-04-0020	Steel Strain Pole 30 foot
14	T-04-0030	Steel Strain Pole 32 foot
1	T-04-0040	Steel Strain Pole 34 foot
0	T-04-0051	Steel Strain Pole 36 foot
0	T-04-0054	Steel Strain Pole 38 foot
0	T-04-0055	Steel Strain Pole 40 foot
2	T-04-0150	Lighting Pole 30' w/no mongoose luminaire

Electrical Contractor Name _____
 Electrical Contractor Supervisor _____ Contact number for Supervisor _____
 Project Engineer David Lee, PE (502) 909-3255 Contact number for Project Engineer _____
 Project Engineer attests that the mentioned contractor is the actual electrical contractor on this project
 Signature of Project Engineer or Designee _____

KYTC

Transforming Dixie Highway

Item 5-478.7

Special Note Regarding Area 1 (defined as Greenwood to Blanton)

The contractor is advised that there is an active project on Dixie Highway adjacent to this contract (CID 17-1024) that has a completion date of May 15, 2018. It is anticipated that resurfacing work on the existing project will occur in early 2018 and will extend north to approximately 900' south of the Greenwood Road intersection. All work for this contract will need to be coordinated with the adjacent active project to ensure that work does not impede the construction or completion of the adjacent project.