



CALL NO. 323

CONTRACT ID. 111027

HARRISON COUNTY

FED/STATE PROJECT NUMBER JL04 049 0027 BYPASS

DESCRIPTION PARIS-COVINGTON ROAD (US 27)

WORK TYPE GRADE & DRAIN AND PAVEMENT ALTERNATES

PRIMARY COMPLETION DATE 202 WORKING DAYS

LETTING DATE: June 17, 2011

Sealed Bids will be received electronically through the Bid Express bidding service until 10:00 AM EASTERN DAYLIGHT TIME June 17, 2011. Bids will be publicly announced at 10:00 AM EASTERN DAYLIGHT TIME.

ROAD AND BRIDGE PLANS

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• STATE CONTRACT NOTES• ASPHALT MIXTURE• INCIDENTAL SURFACING• JPC RIDE QUALITY• ASPHALT PAVEMENT RIDE QUALITY• OPTION A• SPECIAL NOTE(S) APPLICABLE TO PROJECT• RIGHT OF WAY NOTES• UTILITY CLEARANCE• WATERLINE SPECIFICATIONS• DEPT OF ARMY - NATIONWIDE PERMIT• WATER QUALITY CERTIFICATION• KPDES STORM WATER PERMIT, BMP AND NOI• COMMUNICATING ALL PROMISES
PART II	SPECIFICATIONS AND STANDARD DRAWINGS
	<ul style="list-style-type: none">• SPECIFICATIONS REFERENCE• SUPPLEMENTAL SPECIFICATIONS• [SN-1I] PORTABLE CHANGEABLE SIGNS• [SN-9Y] MATERIAL TRANSFER VEHICLE• [SN-10L] CHANNEL CHANGE EROSION CONTROL BLANKET• [SP-69] EMBANKMENT AT BRIDGE END BENT STRUCTURES
PART III	EMPLOYMENT, WAGE AND RECORD REQUIREMENTS
	<ul style="list-style-type: none">• LABOR AND WAGE REQUIREMENTS• EXECUTIVE BRANCH CODE OF ETHICS• KENTUCKY EQUAL EMPLOYMENT OPPORTUNITY ACT OF 1978• PROJECT WAGE RATES
PART IV	INSURANCE
PART V	BID ITEMS

PART I
SCOPE OF WORK

CONTRACT ID - 111027

ADMINISTRATIVE DISTRICT - 06

PROJECT(S) IDENTIFICATION AND DESCRIPTION:

COUNTY - HARRISON

PCN - DE04900271127

JL04 049 0027 BYPASS

PARIS-COVINGTON ROAD (US 27) WEST US 27 CYNTHIANA BYPASS SECTION 1 FROM SOUTH US 27 TO
NORTH US 27 EXCLUDING BRIDGE OVER LICKING RIVER. GRADE & DRAIN AND PAVEMENT ALTERNATES.

SYP NO. 06-00119.20.

GEOGRAPHIC COORDINATES LATITUDE 38^22'37" LONGITUDE 84^19'31"

COMPLETION DATE(S):

202 WORKING DAYS

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/contract)

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 is advised that the Underground Facility Damage Protection Act of 1994, became law January 1, 1995. It is the contractor's responsibility to determine the impact of the act regarding this project, and take all steps necessary to be in compliance with the provision of the act.

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.

04/28/2011

SPECIAL NOTE FOR RECIPROCAL PREFERENCE

Reciprocal preference to be given by public agencies to resident bidders

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

03/01/2011

ASPHALT MIXTURE

The rate of application for all asphalt mixtures shall be estimated at 110 lbs/sy per inch of depth, unless otherwise noted.

INCIDENTAL SURFACING

The quantities established in the proposal include estimated quantities required for resurfacing or surfacing mailbox turnouts, farm field entrances, residential and commercial entrances, and road and street approaches. These items are to be paved to the limits as shown on Standard Drawing RPM 110 or to the limits as directed by the Engineer. In the event signal detectors are present in the intersecting streets or roads, the paving of the crossroads shall be to the right of way limit or back of the signal detector, whichever is the farthest back of the mainline. These areas are to be surfaced or resurfaced as directed by the Engineer and no direct payment will be allowed for placing and compacting.

JPC RIDE QUALITY

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

ASPHALT PAVEMENT RIDE QUALITY

Pavement Rideability Requirements shall apply on this project in accordance with Section 410 of the current Standard Specifications.

OPTION A

The Contractor is advised that the compaction of asphalt mixtures furnished for driving lanes and ramps, at 25mm (1 inch) or greater, on this project will be accepted according to OPTION A in accordance with Section 402 and Section 403 of the current Standard Specification. Joint cores as described in subsection 402.03.02 are required for surface mixtures only. The compaction of all other asphalt mixtures will be accepted by OPTION B.

SPECIAL NOTE

Asbestos Abatement Specifications for Underground Asbestos Water Line Removal

Harrison County

Cynthiana Bypass

Item No. 6-119.20

The Roadway contractor is to be advised that the attached Asbestos Water Line Abatement Specifications shall be adhered to when removing and disposing of any abandoned asbestos water line that may be encountered during construction of the roadway project.

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.

Appendix A

Asbestos Water Line Abatement Specifications

CODES, REGULATIONS, AND STANDARDS

SUMMARY

This Section sets forth governmental regulations and industry standards which are included and incorporated herein by reference and made a part of the Specification. This section also sets forth those notices and permits which are known to the Owner and which must be either applied for and received, or which must be given to governmental agencies before start of work.

Requirements include adherence to work practices and procedures set forth in applicable codes, regulations, and standards.

Requirements include obtaining permits, licenses, inspections, releases and similar documentation, and similar requirements associated with codes, regulations, and standards.

CODES AND REGULATIONS

General Applicability. Except to the extent that more explicit or more stringent requirements are written directly into the Contract Documents, all applicable codes, regulations, and standards have the same force and effect (and are made a part of the Contract Documents by reference) as if copied directly into the Contract documents, or as if published copies are bound herewith.

Contractor Responsibility. The Contractor shall assume full responsibility and liability for the compliance with all applicable federal, state, and local regulations pertaining to work practices, hauling, disposal, and protection of workers, visitors to the site, and persons occupying areas adjacent to the site. The Contractor shall hold the Owner and the Owner's Representative harmless for failure to comply with any applicable work, hauling, disposal, safety, health or other regulation on the part of himself, his employees, or his subcontractors.

Contractor shall indemnify the Owner and Owner's Representative for any and all expense incurred by the Owner and Owner's Representative for fines, penalties and corrective measures that result from acts of commission or omission by the Contractor, his/her agents, employees and assigns in failure to comply with such rules and regulations.

FEDERAL REQUIREMENTS

Federal Requirements which govern asbestos abatement work or hauling and disposal of asbestos waste materials include the following (or any rules, legislation, or standards superseding and/or supplementing those listed):

OSHA: U.S. Department of Labor, Occupational Safety and Health Administration, including but not limited to:

Occupational Exposure to Asbestos, Tremolite, Anthophyllite, and Actinolite; Final Rules
Title 29, Part 1910, Section 1001 and
Title 29, Part 1926, Section 1101 of the Code of Federal Regulations

Respiratory Protection
Title 29, Part 1910, Section 134 of the
Code of Federal Regulations

Construction Industry
Title 29, Part 1926, Section 1101 of the
Code of Federal Regulations

Access to Employee Exposure and Medical Records
Title 29, Part 1910, Section 2 of the
Code of Federal Regulations

Hazard Communication
Title 29, Part 1910, Section 1200 of the
Code of Federal Regulations

Specification for Accident Prevention Signs and Tags
Title 29, Part 1910, Section 145 of the
Code of Federal Regulations

DOT: U.S. Department of Transportation, including but not limited to:

Hazardous Substances (transportation of asbestos waste)
Title 29, Parts 171 and 172 of the
Code of Federal Regulations

EPA: Environmental Protection Agency, including but not limited to:

Asbestos Abatement Projects - Worker Protection Rule
Title 40, Part 763, Subpart G of the
Code of Federal Regulations

NESHAPS: National Emission Standards for Hazardous Air Pollutants
National Emission Standard for Asbestos
Title 40, Part 61, Sub-part A, Asbestos Revision (November 20, 1990)
Code of Federal Regulations

NESHAPS: National Emission Standards for Hazardous Air Pollutants
Title 40, Part 61, Sub-part M (revised Sub-part B) of the
Code of Federal Regulations

STATE REQUIREMENTS

State Requirements which govern asbestos abatement work or hauling and disposal of asbestos waste materials include the following (or any rules, legislation, or standards superseding and/or supplementing those listed):

Kentucky Department for Environmental Protection
Division for Air Quality

401 KAR 58:040. Requirements for asbestos abatement entities.

401 KAR 58:025. 40 C.F.R. Part 61 national emission standard for asbestos.

Kentucky Department for Environmental Protection
Division of Waste Management

NOTIFICATIONS, PERMITS, AND LICENSES

The Contractor shall send written Notification of planned asbestos abatement, as required by the USEPA National Emissions Standards for Hazardous Air Pollutants and the Kentucky Department for Environmental Protection (KDEP) to KDEP at least ten (10) working days prior to beginning any work on asbestos-containing materials. A copy of this notification must be present on the project site during any and all asbestos abatement work on the site.

Division for Air Quality
Florence Regional Office
8020 Veterans Memorial Dr
Suite 100
Florence, Kentucky 41042
Phone: (859) 525-4923

The notification shall be submitted to KDEP on the required form and must include, as a minimum, the following:

1. Name and address of the Contractor
2. Name and address of the Owner
3. Address and description of the building, including size, age, and prior use of the building, and amount of friable and non-friable asbestos-containing materials to be removed
4. Scheduled starting and completion dates for the work
5. Nature of planned abatement and methods to be used

6. Name and address of proposed, approved waste disposal site
7. Documentation that the job will be supervised by a person who is certified as needed under state and federal requirements
8. Procedures to be used to comply with requirements of NESHAP

The Notification shall be sent to the following address:

Division for Air Quality
Forence Regional Office
8020 Veterans Memorial Dr.
Suite 100
Florence, Kentucky 41042

The Contractor shall obtain and maintain current any licenses or permits required by federal, state, or local agencies for all work to be performed.

The Contractor shall be expressly licensed in the State of Kentucky as an Asbestos Abatement Entity. This license shall be current and in effect during the term of the project.

GOVERNING REGULATORY AGENCIES

The following agencies can be contacted by the Contractor regarding information and interpretation of federal, state and local laws, rules, and regulations:

Federal laws, rules, and regulations:

USEPA Region V
Asbestos, NESHAPS Coordinator
(312) 353-2000

Kentucky laws, rules, and regulations:

Division for Air Quality
200 Fair Oaks Lane, 1st Floor
Frankfort, KY 40601
(502) 564-3999

Division of Waste Management
200 Fair Oaks Lane
Frankfort, KY 40601
Phone: (502) 564-6716

AIR MONITORING - LABORATORY SERVICES

SUMMARY

This section describes air monitoring carried out by the Contractor to verify that the area beyond the work zone and the outside environment remains uncontaminated by asbestos fibers during asbestos abatement. This section also sets forth airborne fiber levels both inside and outside the work area as action levels, and describes the actions required by the Contractor if an action level is met or exceeded.

Asbestos air monitoring required by OSHA will be the responsibility of the Contractor.

AIR MONITORING

Work Area Isolation. The purpose of the Contractors air monitoring is to detect faults in the work area isolation such as:

1. Contamination of the area outside of the work area with airborne asbestos fibers.

Work Area Airborne Fiber Count. The Contractor will monitor airborne fiber counts in the work area. The purpose of this air monitoring will be to detect airborne asbestos concentrations which may challenge the ability of the work area isolation procedures to protect the balance of the work area or outside of the work area from contamination by airborne asbestos fibers.

Outside Work Area Monitoring. Spaces located inside the work area, but outside the work area containment barrier shall be monitored regularly to demonstrate the effective containment of airborne asbestos fibers inside the work area.

Personal Monitoring. Personal monitoring of Contractor employees to document worker exposure shall be required during removal of asbestos operations, and as may otherwise be required by OSHA.

STOP ACTION LEVELS

Inside Work Area. Maintain an average airborne fiber concentration in the work area of less than 0.5 fibers per cubic centimeter. If the fiber counts rise above this level for any sample taken, revise work procedures to lower fiber counts. If the Time Weighted Average (TWA) fiber count for any work shift or 8-hour period

exceeds 0.5 fibers per cubic centimeter, stop all work, leave Pressure Differential System in operation and notify Owner's Representative. After correcting cause of high fiber concentration, do not recommence work for 24 hours without authorization, in writing, of the Owner's Representative.

If airborne fiber concentrations exceed 1.0 fibers per cubic centimeter for any period of time, cease all work except corrective action until fiber counts fall below 0.5 fibers per cubic centimeter, and notify Owner's Representative. After correcting cause of high fiber concentration, do not recommence work for 24 hours without authorization, in writing, of the Owner's Representative.

Outside Work Area. If any air sample taken outside of the work area exceeds the base line as established below, immediately and automatically stop all work except corrective action. The Contractor will determine the source of the high reading and so notify the owner in writing.

ANALYTICAL METHODS

The following methods will be used by the Contractor in analyzing filters used to collect air samples. Sampling rates may be varied from printed standards to allow for high volume sampling:

Phase Contrast Microscopy (PCM). PCM analyses will be carried out using the NIOSH 7400 method. This analysis will be conducted at the job site.

Transmission Electron Microscopy (TEM). TEM analysis will be performed using the method set forth in the AHERA regulation 40 CFR Part 763 Appendix A.

Air monitoring by PCM will be used to analyze samples collected for base line monitoring, work area monitoring, outside work area monitoring, personal monitoring, and certain final clearance monitoring. Air monitoring by TEM will be used to analyze samples collected for final clearance testing in accordance with AHERA requirements, where applicable.

SAMPLE SENSITIVITY

The detection limit for PCM analysis shall be as set forth in the analytical method used.

The detection limit for TEM analysis shall be as set forth in the analytical method used or the AHERA regulation.

Analytical Method	Sampling Sensitivity fibers/cc	Minimum Volume liters	Flow Rate LPM
PCM	0.005	1,500	12-15

Base Line. Base line is an action level expressed in fibers per cubic centimeter which is twenty-five percent (25%) greater than the largest of the following:

1. Average of all Background Samples collected prior to the project.
2. Average of all PCM samples collected outside each work area.
3. 0.01 fibers per cubic centimeter.

LABORATORY TESTING

The service of a testing laboratory will be provided by the Contractor to perform laboratory analyses of air samples.

A complete record of all air monitoring and results will be furnished to the Owner, the Owner's Representative, and the Contractor.

Written Reports of all air monitoring tests will be posted on the job site on a daily basis.

ADDITIONAL TESTING

In the event of additional air monitoring by the Contractor, the Contractor shall provide the Owner and the Owner's Representative copies of all analytical results immediately upon his receipt of same from his testing laboratory. If he elects to do this, the cost of such air monitoring and laboratory testing shall be at no additional cost to the Owner.

REMOVAL OF ASBESTOS-CONTAINING MATERIALS

WET REMOVAL

Thoroughly wet the asbestos-containing materials to be removed prior to removal to reduce fiber dispersal into the air. Accomplish wetting by a fine spray (mist) of amended water or removal encapsulant. Saturate material sufficiently to wet to the substrate without causing excess dripping. Allow time for amended water or removal encapsulant to penetrate material thoroughly. If amended water is used, spray material repeatedly during the work process to maintain a continuously wet condition. If a removal encapsulant is used, apply in strict accordance with manufacturer's written instructions. Remove saturated ACM in small sections from all areas.

NOTE: During all phases of the removal and cleaning operation, use work practices that result in an 8-hour TWA airborne asbestos fiber content less than the maximum allowed by law. If airborne fiber counts exceed this level, revise work procedures to maintain airborne fiber levels within the required limit.

WATER LINE REMOVAL

Remove cover material from water line.

Spray exposed water line with amended water or encapsulant. If a removal encapsulant is used, apply in strict accordance with manufacturer's written instructions.

Separate line into manageable lengths.

Remove line from trench and place on a 4.0 or 6.0 mil thick polyethylene sheet. Do not drop onto ground surface causing the line to shatter.

Wrap polyethylene sheet around the water line section to be disposed. Fold excess top edges over and seal.

Load material for disposal.

The Contractor shall require a Kentucky Accredited Asbestos Supervisor to constantly superintend all Work embraced in this Contract in person or by a duly authorized manager acceptable to the Owner.

DISPOSAL OF ASBESTOS-CONTAINING WASTE MATERIALS

GENERAL

DESCRIPTION OF WORK

This section describes the disposal of Asbestos-Containing Materials. Disposal includes packaging of asbestos-containing waste materials. Disposal may be accomplished by landfilling.

PRODUCTS

POLYETHYLENE SHEETING

A single polyethylene film that is the largest sheet size possible to minimize seams, 4.0 or 6.0 mil thick as indicated, clear, frosted, or black, as indicated. Polyethylene film labeled with three (3) labels with text as follows:

First Label: Provide in accordance with 29 CFR 1910.1200(f) of OSHA's Hazard Communication Standard:

DANGER
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND LUNG DISEASE HAZARD
AVOID BREATHING AIRBORNE ASBESTOS

Second Label. Provide in accordance with US Department of Transportation (D.O.T.) shipping requirements as found in 49 CFR Parts 171 and 172 - Hazardous Substances: Final Rule.

RQ HAZARDOUS SUBSTANCE
CLASS 9
NA2212
P. G. III

Also, affix D.O.T. "Class 9" Shipping label to each container

Third Label. Provide Name of Generator, Location of generated waste, and Date of waste generation:

NAME: Elliot County Water District

ADDRESS: Sandy Hook, Kentucky

DATE:

EXECUTION

Load properly containerized and labeled waste containers onto truck or waste container (i.e. roll off box) for transportation to approved landfill for disposal. During loading and unloading of waste, the following signs must be posted at the loading and/unloading site:

DANGER
ASBESTOS
CANCER AND LUNG DISEASE HAZARD
AUTHORIZED PERSONNEL ONLY
RESPIRATORS AND PROTECTIVE CLOTHING
ARE REQUIRED IN THIS AREA

All waste is to be handled by a waste hauler with all required licenses from all state and local authorities with jurisdiction.

Protect interior of truck or dumpster with critical and primary barriers.

Carefully load containerized waste in fully enclosed dumpsters, trucks, or other appropriate vehicles for transport. Exercise care before and during transport, to insure that no unauthorized persons have access to the material.

Do not store containerized materials outside the work area. Take containers from work area directly to a sealed truck or dumpster.

Do not transport wrapped material on open trucks. Label drums (if used) with same warning label as wrapped material. Uncontaminated drums may be reused. Treat drums that have been contaminated as asbestos-containing waste and dispose of in accordance with this Specification.

DISPOSAL OF WASTE

Dispose of asbestos-containing waste at a landfill which is licensed and approved by the appropriate regulatory agencies to accept asbestos waste for disposal.

Make, in advance, necessary notification to landfill that asbestos-containing waste will be delivered for disposal.

At completion of hauling and disposal of each load, submit copy of waste manifest, chain of custody form, and landfill receipt to Owner.

**SPECIAL NOTE FOR ROLLER COMPACTED CONCRETE (RCC)
 6-INCHES OR LESS DEPTH**

This Special Note will apply where indicated on the plans or in the proposal. Section references herein are to the Department’s 2008 Standard Specifications for Road and Bridge Construction.

1.0 DESCRIPTION. Roller Compacted Concrete (RCC) consists of aggregate, Portland cement, possibly mineral admixtures, and water. RCC is proportioned, mixed, placed, compacted, and cured in accordance with these specifications. Ensure that the RCC conforms to the lines, grades, thickness, and typical cross section shown in the plans or otherwise established by the Engineer. When used as base course, it will be covered with one or more lifts of asphalt as shown on the Plans. Otherwise, the RCC will provide the final riding surface.

2.0 MATERIALS AND EQUIPMENT.

2.1 Portland Cement. Use Type I or II Portland cement conforming to Section 801.

2.2 Mineral Admixtures. Conform to Section 844. The Department will allow up to 40 percent, by weight, of the total cementitious content to be mineral admixtures with individual limits on each type as follows:

Mineral Admixture	Maximum by Weight of Cementitious Content
Class F Fly Ash	20%
Class C Fly Ash	30%
Ground Granulated Blast Furnace Slag	30%
Microsilica	10%

2.3 Aggregate. Conform to Sections 804 and 805. Use well-graded aggregate without gradation gaps and conforming to the following:

Sieve Size	Percent Passing by Weight
1 inch	100
3/4 inch	90-100
1/2 inch	70-100
3/8 inch	60-85
No. 4	40-60
No. 16	20-40
No. 100	6-18
No. 200	2-8

2.4 Water. Conform to Section 803.

2.5 Curing Compound. Conform to Section 823.

2.6 Concrete Plant. Conform to Section 601. Ensure the mixing plant is within a 30-minute haul time from the point of RCC placement. Use only plants capable of producing an RCC pavement mixture in the proportions defined by the final approved mix design and within the specified tolerances. The capacity of the plant must be sufficient to produce a uniform mixture at a rate compatible with the placement equipment. If the plant is unable to produce material at a rate adequate to prevent unnecessary cold joints and frequent paver stoppages, the Engineer may halt production until such time that a plant of appropriate capacity is used.

2.7 Paver. Conform to 403.02.07 and ensure that the paver is of suitable weight and stability to spread and finish the RCC material, without segregation, to the required thickness, smoothness, surface texture, cross-section, and grade.

2.8 Compactors. Use self-propelled steel drum vibratory rollers having a minimum static weight of 10 tons for primary compaction. For final compaction, use either a steel drum roller, operated in a static mode, or a rubber-tired roller of equal or greater weight. Only use walk-behind vibratory rollers or plate tampers for compacting areas inaccessible to large rollers.

2.9 Haul Trucks. Use dump trucks equipped with retractable protective covers for protection from rain or excessive evaporation. Use a sufficient number of trucks to ensure an adequate and continuous supply of RCC material to the paver. If the number of trucks is inadequate to prevent frequent starts and stops of the paver, cease production until additional trucks are obtained.

2.10 Water Trucks. Keep at least one water truck, or other similar equipment, on-site and available for use throughout the paving and curing process. Equip such equipment with a spreader pipe containing fog spray nozzles capable of evenly applying a fine spray of water to the surface of the RCC without damaging the final surface.

3.0 CONSTRUCTION.

3.1 RCC Mix Design. At least 45 days prior to the beginning of placing of RCC in the roadway, submit a proposed mix design to the Engineer. If RCC has not been provided to the Department under the submitted mix design a trial batch will be required. Perform batch mixture preparation and testing in the presence of representatives of the District Materials Engineer and the Central Office Division of Materials. Deliver no concrete to the project until an approved mix design has been obtained.

3.2 Trial Batch. Use a mix design that demonstrates a compressive strength of 3500 psi within 28 days. If the pavement is to be opened earlier than 28 days, base the trial batch strengths on the proposed schedule of opening. If the concrete mixture is a design that the producer has not previously furnished to a Department project, have the producer provide trial batches of at least 4 cubic yards to demonstrate that the mixture will conform to the requirements for slump, density, and strength at the placement time frames the project will require. Have the producer make the trial batches using the ingredients, proportions, and equipment (including batching, mixing and delivery time with pavers and proposed rollers) to be used on this project. Have the producer make at least 2 consecutive trial batches conforming to all specified

requirements. Trial batches may be placed on the project, but at a quantity not to exceed 20 cubic yards. Central Office Materials will observe all phases of the trial batches. Provide cores and batch tickets along with a report containing mix proportions and actual gradations for each trial batch to the Engineer for Central Office Materials review and approval.

3.3 Preparation of Subgrade. Before the RCC processing begins, prepare the subgrade in accordance with Section 207. Prior to RCC placement, ensure that the surface of the subbase is clean and free of foreign material, ponded water, and frost. Ensure that the subbase is uniformly moist at the time of RCC placement. If sprinkling of water is required to remoisten certain areas, ensure that the method of sprinkling will not form mud or pools of freestanding water.

3.4 Weather Limitations and Protection. Conform to 501.03.05. Additionally, conduct no placement of RCC pavement during rain conditions. Placement may continue during very light rain or mists provided the surface of the RCC pavement is not eroded, diluted, or damaged in any way. Use dump truck covers during these periods. The Engineer may terminate paving at any time when, in the Engineer's judgement, the rain is detrimental to the finished product.

3.5 Mixing. Mix according to 601.03.08. Use the same mixture for the entire project. If, during production, a material source is changed, then suspend production and submit a new mix design to the Engineer for approval. Do not exceed the manufacturer's rated capacity for dry concrete mixtures in the mixing chamber. Keep the sides of the mixer and mixer blades free of hardened RCC or other buildups. Routinely check mixer blades for wear and replace if wear is sufficient to cause inadequate mixing.

Ensure that the mixing plant receives the quantities of individual ingredients to within the following tolerances:

Material	Variation by Weight
Cementitious Materials	± 1.0% (-0 to +4 for Continuous Mixers)
Water	± 1.0%
Aggregates	± 2.0%

3.6 Transportation. Transport the RCC pavement material from the plant to the areas to be paved in dump trucks equipped with retractable protective covers for protection from rain or excessive evaporation. Ensure that the trucks are dumped clean with no buildup or hanging of RCC material in the corners. Have the dump trucks deposit the RCC material directly into the hopper of the paver or into a secondary material distribution system that deposits the material into the paver hopper. Dump truck delivery must be timed and scheduled so that RCC material is spread and compacted within the specified time limits.

The Department will also allow delivery by performance tested mixer trucks.

3.7 Paving. Do not allow the quantity of RCC material in the paver to approach empty between loads. Maintain the material above the auger at all times during paving. Ensure that the paver proceeds in a steady, continuous operation with minimal starts and stops, except to begin a new lane. Maximum paver speed during laydown is 10 feet per minute. Higher paver speeds may be allowed at the discretion of the Engineer if the higher speeds may be obtained without

distress to the final product or cause additional starts and stops. Ensure that the surface of the RCC pavement is smooth, uniform, and continuous without excessive tears, ridges, or aggregate segregation once it leaves the paver.

Broadcasting or fanning the RCC material across areas being compacted is not permissible. Such additions of materials may only be done immediately behind the paver and before any compaction has taken place. Remove any segregated coarse aggregate from the surface before rolling.

If segregation occurs in the RCC during paving operations, stop placement until the cause is determined and corrected to the satisfaction of the Engineer. If the segregation is judged by the Engineer to be severe, remove and replace the segregated area at no additional cost to the Department.

Pave all areas inaccessible to either roller or paver with cast-in-place Class A concrete.

3.8 Compaction. Ensure that compaction begins with the placement process and is completed within 60 minutes of the start of the mixing at the plant. The time may be increased or decreased at the discretion of the Engineer depending on ambient conditions of temperature and humidity. Do not permit delays in rolling unless approved by the Engineer. Mark all areas where roller compaction operations do not begin within 15 minutes after spreading the RCC mix. Plan operations and supply sufficient equipment to ensure that these criteria are met.

Determine the sequence and number of passes by vibratory and non-vibratory rollers to obtain the specified density and surface finish. Only operate rollers in the vibratory mode while in motion. Rubber-tire rollers may be used for final compaction. Use additional rollers if specific density requirements are not obtained or if placing operations get ahead of the rolling operations.

3.9 Quality Control Testing. Continuously monitor the compaction operation and make cylinders as necessary.

3.9.1 Nuclear Density Gauges. Conduct Field density tests using a nuclear moisture-density gauge as soon as possible, but no later than 30 minutes after the completion of the rolling. Calibrate the gauge for moisture content at the beginning of the work and at any time conditions change during the work. The required minimum density is 98 percent of the maximum laboratory density obtained according to AASHTO T 180 (Method D). If field density readings below 95% of the maximum laboratory density are obtained, stop production until the cause is determined and corrective are made to the Engineer's satisfaction.

3.9.2 Concrete Cylinders. When opening to traffic prior to coring will be necessary, prepare at least two sets of test specimens in accordance with ASTM C 1435 under the direct observation of the Department for each day's production. A set of specimens consists of three cylinders.

3.10 Joints.

3.10.1 Fresh Vertical Joints. A joint is considered a fresh joint when RCC is placed within 60 minutes of placing the previous material or as specified by the Engineer based on ambient conditions. Fresh joints do not require special treatment.

3.10.2 Cold Vertical Joints. Any planned or unplanned construction joints that do not qualify as fresh joints are considered cold joints. Prior to placing fresh RCC mixture against a compacted cold vertical joint, thoroughly clean the cold joint of loose or foreign material. Wet the vertical joint face and maintain it in a moist condition immediately prior to placement the fresh material.

For uncompacted surfaces or slopes more than 15 degrees from the vertical, cut the joint vertically for the full depth. Within 2 hours of final compaction, the edge of a cold joint may be cut with approved mechanical equipment. For edges cut after 2 hours, saw cut to the full depth of the pavement. Demonstrate any modification or substitution of the saw cutting procedure to the Engineer for approval prior to use. In no case allow cutting of the edge to cause raveling or tearing of the surface. Moisten the cut edge immediately prior to placement of the fresh material.

3.10.3 Joints at Structures. Place 1/2-inch expansion joint material against all box inlets, manholes, concrete barriers, retaining walls, bridge abutments, concrete gutter, and similar structures that project through, into, or against the pavement.

3.10.4 Control Joints. Construct transverse contraction joints in the RCC pavement by sawing. The Department will allow soft-cut or green-cut saws used as soon as possible behind the rolling operation and set to manufacturer's recommendations. Conventional cut saws must be used as soon as the sawing operation will not result in raveling or other damage to the RCC pavement, but no later than 18 hours after RCC placement. Cut all joints to 1/4 the depth of the RCC pavement to a single saw blade width. Joints should be spaced at maximum intervals equal to 24 times the nominal pavement thickness unless otherwise indicated on the Plans or directed by the Engineer. Ensure the joints are offset from the JPC pavement joints, as closely to mid-panel as possible.

3.10.5 Longitudinal Construction Joints. Saw cut 1 1/2-inch deep joints and seal with hot-pour elastic joint seal according to the Standard Drawings.

3.11 Finishing. Ensure that the finished surface of the RCC pavement, when tested with a 10-foot straightedge or crown surface template, does not vary from the straightedge or template by more than 1/4 inch at any one point and shall be within 5/8 inch of the specified finished grade. When surface irregularities are outside these tolerances, diamond-grind the surface to meet the tolerance at no additional cost.

3.12 Curing. Immediately after final rolling and compaction testing, cure according to Subsection 501.03.15. Do not use curing compounds when the RCC material is to be promptly covered with asphalt.

3.11 Opening to Traffic. Protect the RCC from vehicular traffic during the curing period. Completed portions of the RCC pavement may be opened for use as shoulder when cylinders or cores attain 2,500-psi strength and for traffic lane use at 3,000-psi strength.

3.12 Thickness and Strength. Take 2 cores to represent each 1,000 linear foot section, or portion thereof, at the locations the Engineer directs. Additionally, core all areas marked for delayed rolling. Immediately provide the cores to the Engineer at the coring site. Repair the core holes using a non-shrink grout or rapid patch material from the Department’s List of Approved Materials. The Engineer will determine the thickness according to KM 64-309 and Strength according to Part 5 of KM 64-314. The Engineer will evaluate areas found deficient in thickness or strength. When the Engineer deems the areas warrant removal, remove and replace the areas with conforming concrete.

4.0 MEASUREMENT.

4.1 Roller Compacted Concrete (RCC). The Department will measure the quantity in square yards according to the Plan dimensions as shown in the Record Plans. The Department will determine the final quantity based on the design quantity with increases or decreases by authorized adjustments. Authorized adjustments include changes in the Record Plan dimensions, additional areas not shown in the Record Plans, and errors and omissions in the design quantity in excess of one percent.

The Department will not measure nuclear density testing, coring, or patching of core holes for payment and will consider them incidental to this item of work.

The Department will not measure rumble strips for payment, unless they are constructed in a separate operation because the shoulder was used to maintain traffic, and will consider them incidental to this item of work.

4.2 Rumble Strips, Type 3. The Department will measure the quantity in linear feet. The Department will not measure Type 3 rumble strips for payment unless they are constructed in a separate operation because the shoulder was used to maintain traffic.

4.3 Thickness. The Department will measure the pavement thickness tolerance according to KM 64-309. The Department will not measure the pavement thickness tolerance as a separate pay unit, but will use the pavement thickness tolerance to calculate an adjusted Contract unit price. The Department will adjust the Contract unit price for by the Schedule for Adjusted Payment for Thickness Deficiency. The Department will not measure coring for payment and will consider it incidental to the concrete pay items.

4.4 Strength. The Department will measure core strength tolerance according to Part 5 of KM 64-314. The Department will not measure the core strength as a separate pay unit, but will use the strength tolerance to calculate an adjusted Contract unit price. The Department will not measure coring for payment and will consider it incidental to the concrete pay items.

5.0 PAYMENT. Department will make payment for the completed and accepted quantities under the following:

<u>Code</u>	<u>Pay Item</u>	<u>Pay Unit</u>
-----	RCC Shoulders, Thickness	Square Yard
02695	Rumble Strips, Type 3	Linear Foot

**Schedule for Adjusted Payment for
Thickness Deficiency**

<u>Thickness Deficiency (inches)</u>	<u>Deduction (Percent of Contract Unit Bid Price)</u>
0.00 to 0.20	0
0.21 to 0.30	20
0.31 to 0.40	28
0.41 to 0.50	32
0.51 to 0.75	43
0.76 to 1.00	50
Greater than 1.00	(1)

(1) *Remove and replace these areas with concrete of the specified thickness at no expense to the Department when the Engineer directs.*

**Schedule for Adjusted Payment for
Compressive Strength Deficiency**

<u>Strength (psi)</u>	<u>Deduction (Percent of Contract Unit Bid Price)</u>
≥ 3325	0
3150 to 3324	15
2975 to 3149	25
2800 to 2974	35
< 2800	(1)

(1) *Remove and replace these areas with concrete no expense to the Department when the Engineer directs.*

August 6, 2010

QWICK KURB NOTE
US 27 - West Cynthiana By-Pass
Harrison County
6-119.20

Special Note for Qwick Kurb: Qwick Kurb is included in this Project for installation in the KY 32 and KY 356 intersections as part of an enhanced safety plan to delineate movements and assist motorists in navigating safely through these new intersections. The installation shall be in accordance with Qwick Kurb, Inc.'s Long Term Installation Manual, available on the company website at qwickkurb.com.

Installation shall be at locations as shown and noted in the plans and include separator units, male and female end units, reflective arcs, air markers with flex, big bollards and anchoring hardware for conventional roadbase as required for a complete installation at each location and in accordance with the manufacturer's product specifications. Bollards (L-104) shall be spaced at 15 foot intervals. The color of bollards shall conform to the Manual on Uniform Traffic Control Devices. For information purposes: the quantity of Reflective Arcs (L-65) is equal to the number of Qwick Kurb Separator Units (L-60), and the number of Black Securing Arcs (S-65) will be double the number of bollards.

The pay item for each complete installation shall be Qwick Kurb and the pay unit shall be Linear Foot. Payment shall be full compensation for all work required to complete the installation in accordance with the plans and manufacturer's specifications.

SPECIAL NOTE FOR SHOULDER PAVEMENT ON JPC ALTERNATE

If the concrete alternate is awarded, the contractor will have the option to replace the 6-inch tied JPC shoulder with a 6-inch Roller Compacted Concrete shoulder to the same widths shown in the plans. See the *Special Note for Roller Compacted Concrete (RCC) 6-Inches of Less Depth* for specifications relating to this item, if necessary. If the contractor elects to substitute the RCC the square yard unit bid price for *JPC Pavement-6 inch Shoulder* will be full compensation for the 6-inch Roller Compacted Concrete Shoulder.

5/17/11

**US 27 Bypass, Harrison Co.
Item Number: 6-119.20**

**SPECIAL NOTE
ALTERNATE PAVEMENT BID ADJUSTMENT**

This project includes alternate bidding for asphalt or concrete pavement. There are specific items listed for each pavement type to be bid with the alternate selected by the Contractor. There is also a line item in the alternate categories for each alternate to adjust for the projected out-year life-cycle costs to the Cabinet. These line item adjustments are as follows:

Asphalt Pavement Adjustment = \$514,672

Concrete Pavement Adjustment = \$242,334

NOTE: The Concrete Pavement Adjustment will be the same regardless of the shoulder alternate chosen.

The amount reflective of the pavement type selected by each contractor will be added to their respective bid for comparison of the low bid. The adjustment *shall be used only for determination of the lowest bidder and shall not be used to determine the final payment* to the contractor when the project is completed.

Please note that these adjustments should not be used for the calculation of the maximum Mobilization amount and are not required to be included in the minimum Demobilization amount.

Proposal Guaranty

As a supplement to Section 102 of the 2008 Standard Specifications, it will not be necessary for the Proposal Guaranty to include an amount necessary to cover the amount of the bid adjustment.

Right-of-Way Certification Form

Revised 2/22/11

- Federal Funded
- State Funded
- Original
- Re-Certification

This form must be completed and submitted to FHWA with the PS&E package for federal-aid funded Interstate, Appalachia, and Major projects. This form shall also be submitted to FHWA for all federal-aid projects that fall under Conditions No. 2 or 3 outlined elsewhere in this form. When Condition No. 2 or 3 apply, KYTC shall resubmit this ROW Certification prior to construction contract Award. For all other federal-aid projects, this form shall be completed and retained in the KYTC project file.

Date: April 21, 2011

Project Name: Cynthiana By- Pass Letting Date: _____
 Project #: _____ County: Harrison
 Item #: 6-119.20 Federal #: _____

Description of Project: Construct By-Pass around Cynthiana. All ROW was acquired under Item No. 6-119.02

Projects that require **NO** new or additional right-of-way acquisitions and/or relocations

- The proposed transportation improvement will be built within the existing rights-of -way and there are no properties to be acquired, individuals, families, and businesses ("relocatees") to be relocated, or improvements to be removed as a part of this project.

Projects that require new or additional right-of-way acquisitions and/or relocations

- Per 23 CFR 635.309, the KYTC hereby certify that all relocatees have been relocated to decent, safe, and sanitary housing or that KYTC has made available to relocatees adequate replacement housing in accordance with the provisions of the current FHWA directive(s) covering the administration of the Highway Relocation Assistance Program and that at least one of the following three conditions has been met. (Check those that apply.)
 - Condition 1.** All necessary rights-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. Fair market value has been paid or deposited with the court.
 - Condition 2.** Although all necessary rights-of-way have 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. Trial or appeal of 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. Fair market value has been paid or deposited with the court for most parcels. Fair market value for all pending parcels will be paid or deposited with the court prior to AWARD of construction contract. (See note 1 below.)

Note 1: The KYTC shall re-submit a right-of-way certification form for this project prior to AWARD of all Federal-Aid construction contracts. Award must not to be made until after KYTC has obtained full legal possession and fair market value for all parcels has been paid or deposited with the court and FHWA has concurred in the re-submitted right-of-way certification.

Right-of-Way Certification Form

Revised 2/22/11

Condition 3. The acquisition or right of occupancy and use of a few remaining parcels are not complete and/or some parcels still have occupants. However, all remaining occupants have had replacement housing made available to them in accordance with 49 CFR 24.204. The KYTC is hereby requesting authorization to advertise this project for bids and to proceed with bid letting even though the necessary rights-of-way will not be fully acquired, and/or some occupants will not be relocated, and/or the fair market value 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. A full explanation and reason for this request, including identification of each such parcel and dates on which acquisitions, payments, and relocations will be completed, is attached to this certification form for FHWA concurrence. (See note 2.)

Note 2: The KYTC may request authorization on this basis only in unique and unusual circumstances. Proceeding to bid letting shall be the exception and never become the rule. In all cases, the KYTC shall make extraordinary efforts to expedite completion of the acquisition, payment for all affected parcels, and the relocation of all relocatees prior to AWARD of all Federal-Aid construction contracts or force account construction.

Approved:	<u>DANIEL R. WHITE</u> Printed Name	<u>[Signature]</u> Signature	Right-of-Way Supervisor
Approved:	<u>Keith McDonald</u> Printed Name	<u>[Signature]</u> Signature	KYTC, Director of ROW & Utilities
Approved:	_____ Printed Name	_____ Signature	FHWA, ROW Officer (when applicable)

Right-of-Way Certification Form

Revised 2/22/11

Date: April 21, 2011

Project Name: Cynthiana By-Pass

Project #: _____

County: Harrison

Item #: 6-119.20

Federal #: _____

Letting Date: _____

This project has _____ total number of parcels to be acquired, and _____ total number of individuals or families to be relocated, as well as _____ total number of businesses to be relocated.

_____ Parcels where acquired by a signed fee simple deed and fair market value has been paid

_____ Parcels have been acquired by IOJ through condemnation and fair market value has been deposited with the court

_____ Parcels have not been acquired at this time (*explain below for each parcel*)

_____ Parcels have been acquired or have a "right of entry" but fair market value has not been paid or has not been deposited with the court (*explain below for each parcel*)

_____ Relocatees have not been relocated from parcels _____, _____, _____, _____, _____, _____, and _____ (*explain below for each parcel*)

Parcel #	Name/Station	Explanation for delayed acquisition, delayed relocation, or delayed payment of fair market value	Proposed date of payment or of relocation

There are 0 billboards and/or 0 cemeteries involved on this project.

There are 0 water or monitoring wells on parcels _____, _____, _____, _____, and _____. All have been acquired and are the responsibility of the project contractor to close/cap.

Form Effective Date: April 1, 2006

Last Revised: February 22, 2011

SPECIAL NOTES FOR UTILITY CLEARANCE IMPACT ON CONSTRUCTION

Harrison County
FD04 049 55080 02U
West Cynthiana Bypass (US27)
Item No. 6-119.20
Section One

GENERAL NOTES AND NOTICES RELATIVE TO ALL UTILITIES

The information provided below in these Special Notes for Utility Clearance, Impact on Construction may not be exact or complete. 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.

Flowable Fill Requirement

The road contractor **MUST** use flowable fill as the backfill media at any location where gas, water and sewer lines cross under existing or proposed roadway surfaces. It should also be noted that the cost of the flowable fill shall be incidental to the cost of the gas, water or sewer line being installed.

Maintenance of Utility Services

All existing gas, water and sanitary sewer services are to be maintained throughout the duration of road construction. Temporary gas, water and sewer facilities to maintain service are to be provided and paid for by the road contractor as incidental to road construction. No additional compensation will be paid the contractor for temporary work and materials to maintain existing gas, water and sewer services. **No unauthorized discharge of sewage due to the road contractor's work will be allowed.**

Utility Shutdowns

The contractor shall notify the utility owner(s) of all planned shutdowns of utility mains or utility service to customers at least three business days in advance. Advance notice will allow for customers to be notified by the utility owner. Any unannounced disruption of gas, water, or sanitary sewer services or mains that may inconvenience any customer is to be avoided.

Damage to Utilities

Any intentional or accidental disruption of service due to damage to gas, sewer or water mains caused by any of the contractor's operations, without three days advance notice to the utility owner, shall be cause for the Cabinet to charge liquidated damages in the amount of five thousand dollars per day (\$5,000.00/day) per occurrence against the contractor until such time as the utility main is restored.

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

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

Asbestos Pipe Removal

A bid item for asbestos pipe removal has been established in the quantities for relocation of facilities owned by the Harrison County Water Association. The quantity shown is for bidding purposes only. The actual quantity of asbestos pipe to be removed is unknown. The contractor shall not construe the amount shown as a true estimate of the quantity to be removed. The actual amount of removal will be measured for payment at the time of removal.

Payment shall be made under this item **only when asbestos pipe is removed, handled, and disposed of in accordance with all governmental environmental regulations** and as specified below. Although this item is only reflected in the quantities for the Harrison County Water Association, the unit cost bid for this item is to be used for payment of asbestos pipe removal as specified below regardless of original ownership.

Payment under this item shall be made only when removal of the pipe is required due to conflicts with the proposed construction. In those areas where there are no conflicts and the pipe will not be disturbed, the pipe shall be left in place. Payment under this item shall be based on the bid unit cost regardless of the size of the pipe being removed.

No payment will be made under this item where asbestos pipe removal is required to make utility connections and tie-ins. Asbestos pipe removal for connections and tie-ins shall be considered incidental to the item of utility work being performed and disposed of in accordance with all governmental environmental regulations.

Asbestos pipe removed other than that required for connections and tie-ins shall be paid based on actual field measured quantities.

Utility Inspection

The Utility Owners will provide inspection for the relocation of their respective facilities by the roadway contractor. It will be the roadway contractor's responsibility to notify the appropriate utility owner for inspection of the relocation work prior to beginning work on the respective facilities.

External Utility Permits

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

Utility Phasing

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

CITY OF CYNTHIANA existing water and sanitary sewer facilities are to be relocated by the road contractor as shown on plans inserted into the roadway plans with specifications contained in the proposal.

Alignment changes to proposed water or sewer facilities to accommodate unforeseen field conditions are possible. However, it is the responsibility of the roadway contractor to communicate any proposed main alignment changes to the water district inspector and the KYTC Resident Engineer or their designated representative prior to actually modifying the proposed main alignment.

This utility owner will provide inspection when the contractor is performing work. It will be the road contractor's responsibility to notify the appropriate utility owner for inspection.

HARRISON COUNTY WATER ASSOCIATION existing water facilities are to be relocated by the road contractor as shown on plans inserted into the roadway plans with specifications contained in the proposal.

Alignment changes to proposed water facilities to accommodate unforeseen field conditions are possible. However, it is the responsibility of the roadway contractor to communicate any proposed main alignment changes to the water association inspector and the KYTC Resident Engineer or their designated representative prior to actually modifying the proposed main alignment.

This utility owner will provide inspection when the contractor is performing work. It will be the road contractor's responsibility to notify the appropriate utility owner for inspection.

COLUMBIA GAS OF KENTUCKY is in the process of relocating their underground gas distribution facilities located along the North side of KY 356 and expects to be finished by August 1, 2011. After August 1, 2011, working days will not be charged for utility relocation delays that are impacting controlling operations. Once work has begun by the roadway contractor, additional compensation for delay costs will not be considered. In the event the utility owner is still relocating their facilities the roadway contractor is expected to cooperate and coordinate with utility owner until completion of relocation. The roadway contractor shall not begin any grading operations on the North side of KY 356 until contacting Columbia Gas of Kentucky. Contact Mr. Bryan Slone (859) 288-0253.

KENTUCKY UTILITIES COMPANY (Electric), BLUEGRASS ENERGY (Electric), AT&T OF KENTUCKY (Telephone), and TIME WARNER CABLE (CATV) are currently in the process of relocating their overhead facilities and are expected to be completed by November 1, 2011. After November 1, 2011, working days will not be charged for utility relocation delays that are impacting controlling operations. Once work has begun by the roadway contractor, additional compensation for delay costs will not be considered. In the event any of these utility owners are still relocating their facilities the roadway contractor is expected to cooperate and coordinate with utility owner until completion of relocation.

KENTUCKY UTILITIES COMPANY (ELECTRIC TRANSMISSION) is currently in the process of relocating their overhead electric transmission line crossing US 27 centerline at approximate station

155+00 and is expected to be complete by July 1, 2011. After July 1, 2011, working days will not be charged for utility relocation delays that are impacting controlling operations. Once work has begun by the roadway contractor, additional compensation for delay costs will not be considered. In the event any of these utility owners are still relocating their facilities the roadway contractor is expected to cooperate and coordinate with utility owner until completion of relocation.

EAST KENTUCKY POWER COOPERATIVE (ELECTRIC TRANSMISSION) is currently in the process of relocating their overhead electric transmission line crossing US 27 centerline at approximate station 183+00 and is expected to be complete by June 3, 2011. After June 3, 2011, working days will not be charged for utility relocation delays that are impacting controlling operations. Once work has begun by the roadway contractor, additional compensation for delay costs will not be considered. In the event any of these utility owners are still relocating their facilities the roadway contractor is expected to cooperate and coordinate with utility owner until completion of relocation.

Railroads are not involved in this project.

PROTECTION OF UTILITIES

THE LOCATION OF UTILITIES PROVIDED IN THE CONTRACT DOCUMENTS HAS BEEN FURNISHED BY THE FACILITY OWNERS AND/OR BY REVIEWING RECORD DRAWINGS. THE INFORMATION MAY NOT BE EXACT OR COMPLETE.

The contractor is instructed to call 1-800-752-6007 to reach KY 811, the one-call system for information on the location of existing underground utilities. The call is to be placed a minimum of two (2) and no more than ten (10) business days prior to excavation. The contractor should be aware that owners of underground facilities are not required to be members of the KY 811 one-call Before-U-Dig (BUD) service. The contractor must coordinate excavation with the utility owners, including those who do not subscribe to KY 811. It may be necessary for the contractor to contact the County Court Clerk to determine what utility companies have facilities in the area.

THE ROAD CONTRACTOR SHALL DETERMINE THE EXACT LOCATION AND ELEVATION OF UTILITIES BY HAND DIGGING TO EXPOSE UTILITIES BEFORE EXCAVATING IN THE AREA OF A UTILITY. THE COST FOR REPAIR AND ANY OTHER ASSOCIATED COSTS FOR ANY DAMAGE TO UTILITIES CAUSED BY THE ROAD CONTRACTORS OPERATIONS SHALL BE BORNE BY THE ROAD CONTRACTOR.

THE CONTRACTOR IS ALSO ADVISED TO REVIEW THE PROJECT IN THE FIELD AND BE AWARE OF OVERHEAD LINES WITHIN THE PROJECT LIMITS. THE CONTRACTOR SHOULD EXERCISE CAUTION WHEN WORKING UNDER THESE LINES. THE CONTRACTOR IS RESPONSIBLE FOR MAKING ANY ARRANGEMENTS HE FEELS PRUDENT TO AVOID CONTACT WITH THESE OVERHEAD LINES.

For Review Only

Technical Specifications

Contract 29

**West Cynthiana
Bypass Water
Main Relocation
Project**

**Harrison County
Water Association,
KY**

April 2011

For Review Only

TECHNICAL SPECIFICATIONS

WEST CYNTHIANA BYPASS WATER MAIN RELOCATION PROJECT
CONTRACT 29
HARRISON COUNTY WATER ASSOCIATION



Chad Bourke
5-2-11

Prepared by:

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April 2011



For Review Only

SECTION 00010

TABLE OF CONTENTS

WEST CYNTHIANA BYPASS WATER MAIN RELOCATION CONTRACT 29 HARRISON COUNTY WATER ASSOCIATION

	Pages Through
<u>DIVISION 1–GENERAL REQUIREMENTS</u>	
SUMMARY OF WORK	01010-4
COORDINATION, FIELD ENGINEERING, AND MEETINGS.....	01039-3
REFERENCE STANDARDS AND DEFINITIONS.....	01090-6
SUBMITTALS.....	01300-4
QUALITY CONTROL.....	01400-2
TEMPORARY FACILITIES	01500-2
TEMPORARY CONTROLS	01560-2
MATERIALS AND EQUIPMENT	01600-4
STARTING OF SYSTEMS.....	01650-3
CONTRACT CLOSEOUT	01700-3
 <u>DIVISION 3–CONCRETE</u>	
CONCRETE.....	03300-6
 <u>DIVISION 5–METALS</u>	
ANCHOR BOLTS, EXPANSION BOLTS, AND RESIN ANCHORS	05560-2
 <u>DIVISION 11–EQUIPMENT</u>	
PREPACKAGED STEEL UNDERGROUND BOOSTER STATION	11304-14
PREPACKAGED SKID MOUNTED BOOSTER STATION.....	11306-
SUBMERSIBLE PUMPS.....	11311-
RESIDENTIAL GRINDER PUMPS	11313-
CHEMICAL PHOSPHORUS REMOVAL EQUIPMENT	11348-
FIRE TUBE BOILERS (DIGESTER GAS-FIRED)	11384-
APPLIANCES	11452-
ENGINE	11510-
CONTROLS AND INSTRUMENTATION EQUIPMENT	11940-
 <u>DIVISION 12–FURNISHINGS</u>	
WINDOW BLINDS	12505-
OFFICE FURNITURE	12620-
FLOOR MATS.....	12692-
 <u>DIVISION 13–SPECIAL STRUCTURES</u>	
TELEMETRY SYSTEM.....	13312-3

TABLE OF CONTENTS Continued

For Review Only

Pages
Through

DIVISION 16-ELECTRICAL

GENERAL ELECTRICAL REQUIREMENTS	16010-8
CONDUIT	16110-4
WIRE	16120-6
ELECTRICAL IDENTIFICATION.....	16195-3
ELECTRICAL SERVICE SYSTEM	16420-2
SECONDARY GROUNDING	16450-3
MOTOR CONTROL	16480-10

<u>DIVISION 20-UTILITY AND STREET CONSTRUCTION</u>	20000-62
--	----------

DRAWINGS

STANDARD DETAIL-STORM SEWER MANHOLES AND INLETS.....	01-975- 41A
STANDARD DETAIL-WATER MAIN VALVE MANHOLES	01-975- 42A
STANDARD DETAIL-SANITARY SEWER APPURTENANCES.....	01-975- 43A
STANDARD DETAIL-SANITARY SEWER LATERALS	01-975- 75A

END OF SECTION

SECTION 01010
For Review Only
SUMMARY OF WORK

PART 1—GENERAL

1.01 DIVISION ONE

- A. The requirements of Division 1 apply to all sections of the Contract(s).

1.02 PROJECT SCOPE

- A. CONTRACTOR shall provide all items, articles, materials, operations or methods mentioned or scheduled on the Drawings or herein specified: including all labor, supervision, equipment, incidentals, taxes and permits necessary to complete the Work as described within the Contract Documents. CONTRACTOR shall install all items provided by OWNER as mentioned or scheduled on the Drawings or herein specified.

1.03 CONTRACT DOCUMENTS—INTENT AND USE

A. Intent of Documents:

1. Singular notations and specifications shall be considered plural where application is reasonably inferred.
2. Mention or indication of extent of work under any division or Specification section is done only for convenience of CONTRACTOR and shall not be construed as describing all work required under that division or section.
3. Some individual sections may contain a list of related sections. The list of related sections in individual sections is provided for the convenience of CONTRACTOR and is not necessarily all-inclusive. CONTRACTOR may not rely upon this listing for determination of scope of work. Other sections of the Specifications, not referenced in individual sections shall apply as required for proper performance of the Work.
4. Command type sentences may be used in the Contract Documents. These sentences refer to and are directed to CONTRACTOR.
5. Symbols for various elements and systems are shown on the Drawings. Should there be any doubt regarding the meaning or intent of the symbols used, a written interpretation shall be obtained from ENGINEER.

B. Use of Documents:

1. CONTRACTOR shall examine all Specifications and Drawings for the Work, including those that may pertain to Work CONTRACTOR does not normally perform with its own forces.
2. CONTRACTOR shall use all of the Project Drawings and Specifications:
 - a. For a complete understanding of the Project.
 - b. To determine the type of construction and systems required.
 - c. For coordination with other contractors.
 - d. To determine what other work may be involved in various parts or phases.
 - e. To anticipate and notify others when work by others will be required.
 - f. And all other relevant matters related to the project.
3. CONTRACTOR is also bound by all requirements of the Contract Documents which are applicable to, pertain to, or affect its Work, as may be shown or inferred by the entire set of Project Drawings and Specifications.

For Review Only

1.04 CONTRACTOR USE OF SITE

A. General:

1. The "area of the site" referred to in these specifications shall be as shown on the Drawings. If the "area of the site" is not shown, OWNER's property lines, the project right-of-way or the easements obtained for the project shall be considered the "area of the site."
2. Construction activities shall be confined within the "area of the site" limits.
3. From the start of work to completion CONTRACTOR is responsible for the care of the site and the premises which are affected by operations of Work of this Contract.
4. Except for permanent site improvements provided under the Contract, CONTRACTOR shall restore property disturbed during the Work, to the conditions which previously existed.
5. Work in occupied spaces shall be restricted to specified Work and essential activities, such as making necessary connections and extending services or constructing temporary access ways. Such work shall be scheduled in advance with OWNER.

B. Parking and Deliveries:

1. CONTRACTOR is responsible for control of traffic by vehicles and persons within the limits of its operations.
2. Parking for employees, subcontractors, and agents of CONTRACTOR shall be in areas subject to approval of OWNER as shown on the Drawings.
3. Access to the site for delivery of construction material or equipment shall be subject to approval of OWNER at locations shown on the Drawings.

1.05 EXISTING SERVICES, STRUCTURES AND UNDERGROUND FACILITIES

- A. Interruption of existing services and systems including heating, ventilating, air conditioning, water, sanitary, lighting and power, signal and security will not be permitted, unless specifically indicated otherwise. Provide temporary facilities to maintain services.
- B. If deemed necessary by OWNER, such work shall be accomplished after OWNER's normal office hours.
- C. Work shall not commence until all labor, materials and equipment are available so Work can continue without interruption or delay.
- D. Should uncharted or incorrectly charted piping or other utilities be encountered during installation, notify OWNER and consult with utility owner immediately for directions.
- E. Cooperate with OWNER and utility companies in keeping respective services and facilities in operation and repair any damaged utilities to satisfaction of utility owner.
- F. CONTRACTOR shall not interrupt existing utilities serving facilities occupied and used by OWNER or others, except when permitted in writing by OWNER.
- G. Any accidental interruption of services shall be repaired immediately, including provision of temporary facilities until permanent repairs can be made.

For Review Only

- H. Prior to any excavation, demolition, or drilling on site, CONTRACTOR shall contact owners of the underground facilities in and near the construction area of the intent to excavate, demolish, or drill. As part of this notification requirement, CONTRACTOR shall contact the utility notification service Kentucky 811 (811 or 1-800-752-6007) at least two but not more than 10 business days in advance of any work. CONTRACTOR shall be aware that not all owners participate in Kentucky 811. A call to this agency shall not absolve CONTRACTOR of the requirements for contacting all owners of underground facilities in and near the construction area. CONTRACTOR shall give reasonable advance notice to Kentucky 811 and other owners—such notification shall not be less than the minimum advance notification required.
- I. CONTRACTOR shall proceed with caution in the excavation and preparation of the Site so the exact location of structures and Underground Facilities can be determined. CONTRACTOR shall include in the Contract Price any costs for temporary or permanent relocations of such structures and Underground Facilities required to complete the Work unless specifically indicated otherwise in the Specifications.
- J. CONTRACTOR shall keep an accurate and complete record of all such structures and Underground Facilities encountered and shall provide OWNER a copy of this record. The record shall include a description of the item encountered, opinion as to conditions, and adequate measurements and depths so that the item can be located in the future.
- K. CONTRACTOR shall inspect all structures and Underground Facilities for condition and soundness. Unsound conditions shall be reported to the structure or facility owner immediately after exposing. CONTRACTOR shall not proceed with the work until the structure or facility owner has been notified. OWNER shall then be given time to inspect and correct, if required, the structure or Underground Facility. CONTRACTOR may make claim under the provisions of Articles 11 and 12 of the General Conditions should CONTRACTOR feel a price or time adjustment is justified.
- L. Any additional costs incurred because of failure of CONTRACTOR to report the condition of any and all existing structure or Underground Facility encountered shall be paid for by CONTRACTOR.
- M. Whenever ENGINEER feels it is necessary to explore and excavate to determine the location of existing structures and Underground Facilities, CONTRACTOR shall make explorations and excavations for such purposes. If CONTRACTOR is required to perform additional work in making the explorations and excavations, extra compensation will be allowed as provided for in the General Conditions.

1.06 PROTECTION OF WORK AND IMPROVEMENTS

- A. CONTRACTOR shall protect the property of OWNER, existing improvements, and the Work installed by CONTRACTOR and others from abuse, damage, dust, debris, and other objectionable materials resulting from construction activities.
- B. CONTRACTOR shall provide suitable covers, partitions, or other dust and fume containment devices to suit construction operations.
- C. CONTRACTOR shall keep property, existing improvements and the Work, including structures, mains, fittings and accessories free from dirt and foreign matter at all times.

For Review Only

- D. CONTRACTOR shall provide temporary plugging of openings, holes and pipe ends that are existing or that CONTRACTOR has installed.
- E. Property, improvements and Work damaged by CONTRACTOR shall be repaired or replaced by CONTRACTOR to the satisfaction of OWNER.

1.07 AVAILABILITY OF LANDS

- A. Easements were obtained for this project. CONTRACTOR shall contain its operation to within the rights-of-way or lands upon which the work is to be performed.

PART 2-PRODUCTS

NOT APPLICABLE

PART 3-EXECUTION

NOT APPLICABLE

END OF SECTION

SECTION 01039 For Review Only

COORDINATION, FIELD ENGINEERING, AND MEETINGS

PART 1—GENERAL

1.01 SUMMARY

- A. Work Included:
 - 1. Coordination.
 - 2. Field engineering.
 - 3. Progress meetings.

1.02 COORDINATION

- A. CONTRACTOR shall coordinate scheduling, submittals, and work of the various sections of the work to assure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- B. CONTRACTOR shall verify utility requirements and characteristics of operating equipment are compatible with building utilities and coordinate Work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- C. CONTRACTOR shall coordinate space requirements and installation of mechanical and electrical work which are indicated diagrammatically on the Drawings and shall follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with line of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- D. In finished areas, except as otherwise indicated, CONTRACTOR shall conceal pipes, ducts, and wiring within the construction and coordinate locations of fixtures and outlets with finish elements.
- E. CONTRACTOR shall coordinate completion and clean up of Work of separate sections in preparation for substantial completion and for portions of Work designated for OWNER's occupancy.
- F. After OWNER occupancy of premises, CONTRACTOR shall coordinate access to Site for correction of defective Work and Work not in accordance with Contract Documents, to minimize disruption of OWNER's activities.

1.03 FIELD ENGINEERING

- A. CONTRACTOR shall locate and protect property stakes, legal survey monuments, benchmarks, and survey control and reference points. CONTRACTOR shall pay for replacement of disturbed property stakes and legal survey monuments by a Registered Land Surveyor acceptable to OWNER and for replacement of benchmarks and survey control and reference points provided by ENGINEER.
- B. CONTRACTOR shall provide field engineering services as required to establish elevations, lines, and levels, utilizing recognized engineering survey practices.

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- C. CONTRACTOR shall furnish all required plummets and graduated poles to check all Work.
- D. If stakes and boards have to be reset because of negligence of CONTRACTOR, CONTRACTOR shall bear the cost of such work.
- E. If laser beam is used, CONTRACTOR shall check its Work against intermediate grade stakes provided between manholes. Prior to initial use of the laser, CONTRACTOR shall set up laser on ground surface and check line and gradient controls. Lasers not functioning properly shall be immediately removed.
- F. If existing property stakes, not within the limits of the trench, are removed or damaged by CONTRACTOR, CONTRACTOR shall bear the cost of replacement. Replacement shall be made by a legal survey performed by a licensed Land Surveyor hired by OWNER. Cost for survey shall be deducted from the Contract Price.
- G. See Specifications for additional requirements concerning layout of the Work.

1.04 PROGRESS MEETINGS

- A. Progress meetings will be held throughout progress of the Work at intervals agreed to by OWNER, ENGINEER, and CONTRACTOR. Interval will generally be monthly.
- B. CONTRACTOR's project manager, job superintendent, major subcontractors and suppliers shall attend as appropriate to address agenda topics for each meeting. CONTRACTOR's representatives shall have authority to bind CONTRACTOR to decisions at the meetings.
- C. The project schedule shall be updated monthly and shall be reviewed at each progress meeting. CONTRACTOR shall provide the following information in written form at each meeting.
 - 1. Construction progress, including:
 - a. Activities completed this reporting period.
 - b. Activities in progress this reporting period.
 - c. Activities scheduled to commence this reporting period.
 - 2. Description of problem areas.
 - 3. Current and anticipated delays.
 - a. Cause of the delay.
 - b. Corrective action and schedule adjustments to correct the delay.
 - c. Impact of the delay on other activities, on milestones, and on completion dates.
 - 4. Changes in construction sequence.
- D. ENGINEER will prepare and distribute minutes to all attending parties.

PART 2—PRODUCTS

NOT APPLICABLE

PART 3—EXECUTION

NOT APPLICABLE

END OF SECTION

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SECTION 01090 For Review Only

REFERENCE STANDARDS AND DEFINITIONS

PART 1—GENERAL

1.01 SUMMARY

- A. Work Included:
1. Reference Standards:
 - a. Throughout the Contract Documents, reference is made to codes and standards which establish qualities and types of workmanship and materials, and which establish methods for workmanship and materials, and which establish methods for testing and reporting on the pertinent characteristics.
 - b. Where materials or workmanship are required by these Contract Documents to meet or exceed the specifically named code or standard, it is CONTRACTOR's responsibility to provide materials and workmanship which meet or exceed that specifically named code or standard.
 - c. It is also CONTRACTOR's responsibility, when so required by the Contract Documents, to deliver to ENGINEER all required proof that the material or workmanship, or both, meet or exceed the requirements of the specifically named code or standard.
 2. Definitions:
 - a. A substantial amount of specification language constitutes definitions for terms found in other Contract Documents, including the Drawings which must be recognized as diagrammatic in nature and not completely descriptive of requirements indicated thereon.
 - b. Certain terms used in the Contract Documents are defined generally in this section to supplement definitions of the Agreement, General Conditions, Supplementary Conditions, and other general contract documents.
 - c. Definitions and explanations of this section are not necessarily either complete or exclusive, but are general for the Work.
- B. Related Work Described Elsewhere: The specific naming of codes or standards occurs on the Drawings and in other sections of these Specifications.

1.02 QUALITY ASSURANCE

- A. Familiarity with Pertinent Codes and Standards:
1. It is CONTRACTOR's responsibility to verify the requirements of the specifically named codes and standards and to verify that the items procured for use in this Work meet or exceed the specified requirements.
 2. When required by individual sections of these specifications, CONTRACTOR shall obtain a copy of each pertinent code or standard and maintain the copies at the job site during submittals, planning, and progress of the Work until Substantial Completion of the Work is attained.
- B. Overlapping or Conflicting Requirements:
1. Where compliance with two or more industry standards or sets of requirements are specified, and the overlapping of those standards or requirements establishes different or conflicting minimums or levels of quality, the most stringent requirement (which is

For Review Only

generally recognized to be also not costlier is intended and will be enforced, unless more detailed language written directly into Contract Documents clearly indicates that a less stringent requirement is acceptable.

2. Refer all uncertainties to ENGINEER for decision before proceeding.

1.03 REFERENCE STANDARDS

- A. Applicable standards of the construction industry are made a part of the Contract Documents by reference as if copied directly into the Contract Documents, or as if published copies were bound herewith. See Article 3.02 of the General Conditions for additional provisions regarding references.
- B. Standards referenced directly in the Contract Documents or by governing regulation, have precedence over nonreferenced standards which are recognized in industry for applicability to the Work.
- C. Nonreference standards are hereby defined to have no particular applicability to the work except as a general measurement of whether the Work complies with standards recognized in the construction industry.
- D. Reference standards and codes listed in these specifications may include, but are not necessarily limited to, standards or codes published by the following agencies and organizations:

1. AA Aluminum Association
900 19th Street, NW, Washington, DC 20006
2. AAMA American Architectural Manufacturer's Association
1827 Walden Office Square, Schaumburg, IL 60173
3. AASHTO American Association of State Highway & Transportation Officials
444 North Capitol Street, NW, Washington, DC 20001
4. ACI American Concrete Institute
38800 Country Club Drive, Farmington Hills, MI 48331
5. AI Asphalt Institute
Research Park Drive, P.O. Box 14052, Lexington, KY 40512-4052
6. AISC American Institute of Steel Construction
One East Wacker Drive, Suite 3100, Chicago, IL 60601-2001
7. AISI American Iron and Steel Institute
1101 17th Street, NW, Suite 1300, Washington, DC 20036
8. ANSI American National Standards Institute
11 West 42nd Street, New York, NY 10036
9. APA American Plywood Association
7011 So. 19th, Tacoma, WA 98466

For Review Only

10. API American Petroleum Institute
12201 L Street, NW, Washington, DC 20005-4070
11. ARI Air-Conditioning & Refrigeration Institute
4100 N. Fairfax Drive, Suite 200, Arlington, VA 22203
12. ASHRAE American Society of Heating, Refrigerating, and Air Conditioning Engineers
1791 Tullie Circle, NE; Atlanta, GA 30329
13. ASME American Society of Mechanical Engineers
Three Park Avenue, New York, NY 10016-5990
14. ASSE American Society of Sanitary Engineering
901 Canterbury, Suite A, Westlake, OH 44145
15. ASTM American Society for Testing and Materials
100 Barr Harbor Drive, West Conshohocken, PA 19428-2959
16. AWI Architectural Woodwork Institute
1952 Isaac Newton Square West, Reston, VA 20190
17. AWPA American Wood-Preserver's Association
P.O. Box 388, Selma, AL 36702-0388
18. AWS American Welding Society
550 N.W. LeJune Road, Miami, FL 33126
19. AWWA American Waterworks Association
6666 West Quincey Avenue, Denver, CO 80235
20. BHMA Builder's Hardware Manufacturers Association
355 Lexington Avenue, 17th floor; New York, NY 10017
21. BIA Brick Industry Association
11490 Commerce Park Drive, Reston, VA 20191-1525
22. CRSI Concrete Reinforcing Steel Institute
9333 N. Plum Grove Road, Schaumburg, IL 60173
23. EJMA Expansion Joint Manufacturers Association
25 North Broadway, Tarrytown, NY 10591
24. FM Factory Mutual System
FM Global Corporate Offices, 1301 Atwood Avenue, PO Box 7500,
Johnston, RI 02919

For Review Only

- 25. FS Federal Specification (General Services Admin.
Bldg. 197, Washington Navy Yard; Washington, DC 20407
- 26. FTI Facing Tile Institute
Box 8880, Canton, OH 44711
- 27. GA Gypsum Association
810 1st St., NE, Washington, DC 20002
- 28. GANA Glass Association of North America
2945 SW Wanamaker Drive, Suite A, Topeka, KS 66614
- 29. IESNA Illuminating Engineering Society of North America
120 Wall Street, Floor 17, New York, NY 10005
- 30. MIL Military Specifications
Naval Publications and Forms Center
5801 Tabor Avenue, Philadelphia, PA 19120
- 31. NAAMM National Association of Architectural Metal Manufacturers
8 South Michigan Avenue, Suite 1000, Chicago, IL 60603
- 32. NCMA National Concrete Masonry Association
13750 Sunrise Valley Drive, Herndon, VA 20171-4662
- 33. NECA National Electrical Contractors Association
3 Bethesda Metro Center, Suite 1100, Bethesda, MD 20814
- 34. NEMA National Electrical Manufacturers Association
1300 North 17th Street, Suite 1847, Rosslyn, VA 22209
- 35. NFPA National Fire Protection Association
1 Batterymarch Park, Quincy, MA 02169-7471
- 36. NIS National Institute of Standards
(U.S. Department of Commerce), 100 Bureau Drive, Stop 3460
Gaithersburg, MD 20899-3460
- 37. NRCA National Roofing Contractors Association
10255 W. Higgins Road, Suite 600, Rosemont, IL 60018
- 38. NSF National Sanitation Foundation International
P.O. Box 130140, 789 N. Dixboro Road, Ann Arbor, MI 48113-0140
- 39. OSHA Occupational Safety & Health Administration
200 Constitution Avenue, NW, Washington, DC 20210
- 40. PCA Portland Cement Association
5420 Old Orchard Road, Skokie, IL 60077
- 41. PCI Prestressed Concrete Institute
209 W. Jackson Blvd., Chicago, IL 60606-6938

For Review Only

- 42. SAE Society of Automotive Engineers
SAE World Headquarters
400 Commonwealth Drive, Warrendale, PA 15096-0001
- 43. SDI Steel Deck Institute
P.O. Box 25, Fox River Grove, IL 60021
- 44. SDI Steel Door Institute
30200 Detroit Rd., Cleveland, OH 44145-1987
- 45. SIGMA Sealed Insulating Glass Manufacturers Assoc.
401 N. Michigan Avenue, Chicago, IL 60611-4267
- 46. SJI Steel Joist Institute
3127 10th Ave. North Ext., Myrtle Beach, SC 29577-6760
- 47. SMACNA Sheet Metal and Air Conditioning
Contractor's National Association
4201 Lafayette Center Drive, Chantilly, VA 20151-1209
- 48. SSPC Society for Protective Coatings
40 24th Street, 6th Floor, Pittsburgh, PA 15222-4656
- 49. TCA Tile Council of America
100 Clemson Research Blvd., Anderson, SC 29625
- 50. UBC Uniform Building Code
5360 Workman Mill Road; Whittier, CA 90601-2298
- 51. UL Underwriters' Laboratories
333 Pfingston Road; Northbrook, IL 60062

1.04 SUBMITTALS

- A. For OWNER's records, CONTRACTOR shall submit copies of permits, licenses, certifications, inspection reports, and similar documents, correspondence and records established in conjunction with compliance with standards and regulations bearing upon performance of the Work.

1.05 DEFINITIONS

- A. Indicated:
 - 1. The term "indicated" is a cross-reference to details, notes, or schedules on the drawings, to other paragraphs or schedules in the specifications and to similar means of recording requirements in the Contract Documents.
 - 2. Where terms such as "shown," "noted," "scheduled," and "specified" are used in lieu of "indicated", it is for the purpose of helping the reader locate cross-reference, and no limitation is intended except as specifically noted.

For Review Only

- B. Approve (or Words of Similar Nature)
1. Where used in conjunction with ENGINEER's response to submittals, requests, applications, inquiries, reports, and claims by CONTRACTOR, the meaning of the term "approve" will be held to the limitation of ENGINEER's responsibilities and duties as specified in Paragraph 1.02.B.1. of the General Conditions.
 2. In no case will "approval" by ENGINEER be interpreted as a release of CONTRACTOR from responsibility to fulfill requirements of the Contract Documents.
- C. Minimum Requirements:
1. Indicated requirements are for a specific minimum acceptable level of quality or quantity, as recognized in the industry.
 2. Actual work must comply with (or within specified tolerances) or exceed minimums.
 3. CONTRACTOR shall refer uncertainties to ENGINEER before proceeding.
- D. Abbreviations: Abbreviations, where not defined in the Contract Documents, will be interpreted to mean the normal construction industry terminology.

PART 2-PRODUCTS

NOT APPLICABLE

PART 3-EXECUTION

NOT APPLICABLE

END OF SECTION

SECTION 01300
For Review Only
SUBMITTALS

PART 1—GENERAL

1.01 SUMMARY

- A. Work Included:
 - 1. Whenever possible throughout the Contract Documents, the minimum acceptable quality of workmanship and materials has been defined either by manufacturer's name and catalog number or by reference to recognized industry standards.
 - 2. To facilitate CONTRACTOR's understanding of the design intent, procedures have been established for advance submittal of design data and for its review or rejection by ENGINEER.
 - 3. The type of submittal requirements specified in this section include shop drawings, product data, samples, and other miscellaneous work related submittals.
- B. Related work described elsewhere: More detailed requirements for submittals are described in other sections of these specifications for some materials and equipment. They are to be considered additional requirements to supplement the requirements specified in this section. Submittals shall conform to Article 6 of the General Conditions.
- C. Definitions: "Electronic Submittal" is defined as any submittal transmitted electronically to ENGINEER for review.

1.02 IDENTIFICATION OF SUBMITTALS

- A. CONTRACTOR shall completely identify each submittal and resubmittal by showing at least the following information:
 - 1. Name and address of submitter, plus name and telephone number of the individual who may be contacted for further information.
 - 2. Name and location of project and identification number.
 - 3. Drawing number and specifications section number to which the submittal applies.
 - 4. Include the date of each submittal or resubmittal.

1.03 GROUPING OF SUBMITTALS

- A. Unless otherwise specifically permitted by ENGINEER, CONTRACTOR shall make all submittals in groups containing all associated items so that information is available for checking each item when it is received.
- B. Partial submittals may be rejected as not complying with the provisions of the Contract Documents.

1.04 TIMING OF SUBMITTALS

- A. CONTRACTOR shall make all submittals far enough in advance of scheduled dates of installation to provide required time for reviews, for securing necessary approval, for possible revision and resubmittal, and for placing orders and securing delivery.

For Review Only

- B. The review period for submittals that are received after 3:00 P.M. shall commence on the following business day.

1.05 SHOP DRAWINGS

- A. Shop drawings shall include specially prepared technical data for this project including drawings, diagrams, performance curves, data sheets, schedules, templates, patterns, reports, calculations, instructions, measurements, and similar information not in standard printed form for general application to a range of similar projects. Shop drawings shall be submitted for all manufactured or fabricated items. See individual technical sections for special requirements.
- B. CONTRACTOR shall make all shop drawings accurately to scale and sufficiently large to show all pertinent aspects of the item and its method of connection to the work.
- C. Shop drawings shall be checked, approved, and stamped by CONTRACTOR in accordance with the General Conditions before transmittal to ENGINEER for review and approval.
- D. Complete shop drawings and descriptive data shall be submitted on all manufactured or fabricated items prior to 25% completion of the Work. Applications for payment beyond 25% of the Contract amount will not be recommended for payment until all shop drawings are submitted or a revised schedule for any remaining submittals is agreed to by OWNER and ENGINEER.
- E. CONTRACTOR shall submit shop drawings following the procedure described below. Except as noted, six color copies of shop drawings and descriptive data shall be submitted to ENGINEER for approval. Three copies of these will be returned to CONTRACTOR if approved. If shop drawings are not approved or if they are stamped "Approved as Noted-Resubmit," two corrected copies will be returned to CONTRACTOR for use in resubmittal. If CONTRACTOR desires more than three approved copies, submitted quantity shall be increased accordingly.
- F. Shop drawings submitted to ENGINEER will be reviewed and stamped "Approved," "Approved as Noted," "Approved as Noted-Resubmit," or "Not Approved." CONTRACTOR shall resubmit the above number of corrected shop drawings for all shop drawings stamped "Approved as Noted-Resubmit" and "Not Approved" and will continue this process until shop drawings are stamped "Approved" or "Approved as Noted." If drawings are stamped "Approved as Noted-Resubmit," fabrication may proceed in accordance with the marked-up shop drawings. Installation shall not proceed until shop drawings have been resubmitted and stamped "Approved" or "Approved as Noted."
- G. If shop drawings are stamped "Approved as Noted" or "Approved as Noted-Resubmit" and CONTRACTOR does not agree with revisions or cannot conform with revisions, fabrication shall not proceed and shop drawings shall be resubmitted with explanation of CONTRACTOR's position.
- H. All shop drawings used for construction site activities shall bear the "Approved" or "Approved as Noted" stamp of ENGINEER.
- I. Arrangements may be made between CONTRACTOR and ENGINEER to provide additional copies of "Approved" shop drawings for field activity purposes.

For Review Only

1.06 PRODUCT DATA

- A. CONTRACTOR shall provide product data as required to supplement shop drawings.
- B. Product data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams, and other information furnished by CONTRACTOR to illustrate a material, product, or system for some portion of the work.
- C. CONTRACTOR shall collect required product data into one submittal for each unit of work or system.
- D. CONTRACTOR shall include manufacturer's standard printed recommendations for application and use, compliance with standards, performance characteristics, wiring and piping diagrams and controls, component parts, finishes, dimensions, required clearances, and other special coordination requirements.
- E. CONTRACTOR shall mark each copy of standard printed data to identify pertinent products, models, options, and other data.
- F. CONTRACTOR shall supplement manufacturer's standard data to provide information unique to the work.

1.07 RESUBMISSION REQUIREMENTS

- A. Make any corrections or changes in the submittals required by ENGINEER.
- B. Shop Drawings and Product Data:
 - 1. Revise initial drawings or data and resubmit as specified for initial submittal.
 - 2. Itemize in a cover letter any changes which have been made other than those requested by ENGINEER.

1.08 MANUFACTURER'S DIRECTIONS

- A. Manufactured articles, materials, and equipment shall be stored, commissioned, operated, applied, installed, connected, erected, used, cleaned, and conditioned as directed by the manufacturer, unless specified to the contrary.
- B. Wherever specifications call for work to be performed or materials to be installed in accordance with the manufacturer's printed instructions or directions, CONTRACTOR shall furnish copies as required for shop drawings of those instructions or directions to ENGINEER before installing the material or performing the work.

1.09 MAINTENANCE MANUAL

- A. Prior to 50% completion of the Contract or at a minimum of 45 days prior to the scheduled start-up date of any individual item of equipment, whichever is earlier, CONTRACTOR shall furnish to ENGINEER four complete copies of a maintenance manual for all equipment furnished. Applications for payment beyond 50% of the contract amount will not be recommended for payment until all maintenance manuals are submitted or a revised schedule for remaining maintenance manuals is agreed to by OWNER and ENGINEER.

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- B. The manuals shall include manufacturer's instructions for maintenance and operation for each item of mechanical and electrical equipment. Manuals shall be specific for the equipment as installed; provide project specific inserts as required. Manuals shall contain: operation instructions, lubrication schedules, types and quantities, preventative maintenance program, spare parts list, parts lists, I.D. No. and exploded views, assembly instructions, parts supplier location, trouble shooting and startup procedures and, where applicable, test data and curves.

- C. All sheets have reduced dimensions as described for shop drawings, and shall be furnished in 3-ring binders or 3-tab report covers.

PART 2-PRODUCTS

NOT APPLICABLE

PART 3-EXECUTION

NOT APPLICABLE

END OF SECTION

SECTION 01400
For Review Only
QUALITY CONTROL

PART 1—GENERAL

1.01 SUMMARY

- A. Work Includes:
 - 1. Quality Assurance—Control of Installation.
 - 2. Tolerances
 - 3. Manufacturers' Field Services and Reports.

1.02 QUALITY ASSURANCE—CONTROL OF INSTALLATION

- A. CONTRACTOR shall monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.
- B. CONTRACTOR shall comply with manufacturers' instructions, including each step in sequence.
- C. Should manufacturers' instructions conflict with Contract Documents, CONTRACTOR shall request clarification from ENGINEER before proceeding.
- D. CONTRACTOR shall comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Work shall be performed by persons qualified to produce workmanship of specified quality.
- F. CONTRACTOR shall secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.

1.03 TOLERANCES

- A. CONTRACTOR shall monitor tolerance control of installed products to produce acceptable work and shall not permit tolerances to accumulate.
- B. CONTRACTOR shall comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from ENGINEER before proceeding.
- C. CONTRACTOR shall adjust products to appropriate dimensions; position before securing products in place.

1.04 MANUFACTURERS' FIELD SERVICES AND REPORTS

- A. When specified in individual specification sections or when requested by ENGINEER, CONTRACTOR shall require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, and quality of workmanship.

For Review Only

- B. CONTRACTOR shall submit qualifications of observer to ENGINEER 30 days in advance of required observations.
- C. CONTRACTOR shall report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.
- D. CONTRACTOR shall submit report in duplicate within 30 days of observation to ENGINEER for information.

PART 2-PRODUCTS

NOT APPLICABLE

PART 3-EXECUTION

NOT APPLICABLE

END OF SECTION

SECTION 01500 For Review Only

TEMPORARY FACILITIES

PART 1—GENERAL

1.01 SUMMARY

- A. Work Included:
 - 1. Temporary utilities.
 - 2. Temporary stairs and access.
 - 3. Temporary support facilities.
 - 4. Removal of temporary facilities.
- B. CONTRACTOR shall arrange for and provide temporary facilities as required for proper and expeditious prosecution of the Work.
- C. CONTRACTOR shall pay all costs, except as otherwise specified, until final acceptance of the Work unless OWNER makes arrangements for use of completed portions of the Work after substantial completion in accordance with the provisions of the General Conditions.
- D. CONTRACTOR shall make all temporary connections to utilities and services in locations acceptable to OWNER and local authorities having appropriate jurisdiction.
 - 1. Furnish all necessary labor and materials.
 - 2. Make all installations in a manner subject to the acceptance of such authorities and OWNER.
 - 3. Maintain such connections.
 - 4. Remove temporary installation and connection when no longer required.
 - 5. Restore services and sources of supply to proper operating conditions.

1.02 TEMPORARY UTILITIES

- A. Temporary Toilets: CONTRACTOR shall provide and maintain sanitary temporary chemical toilets located where approved by OWNER and in sufficient number required for the work force employed by CONTRACTOR.
- B. Temporary Electrical Services:
 - 1. CONTRACTOR shall make all necessary arrangements, furnish, install, and maintain necessary temporary electrical services at the Site. CONTRACTOR shall remove all temporary services when Project is complete.
 - 2. All utility charges for installation of the temporary services shall be paid for by CONTRACTOR. All metering installation charges and all energy charges for electric current used for temporary lighting and power are to be paid by CONTRACTOR.
 - 3. No permanent electrical equipment or wiring shall be used without express written permission of OWNER. Such approval, if given, shall not affect guarantee period. If OWNER authorizes use of permanent service facilities, CONTRACTOR shall pay all metering costs until acceptance or occupancy (whichever occurs first) of building by OWNER.

For Review Only

- C. Weather Protection and Temporary Heat:
 - 1. CONTRACTOR shall provide weather protection to protect the Work from damage because of freezing, rain, snow, and other inclement weather.
- D. Temporary Water: CONTRACTOR shall supply its own water during construction. CONTRACTOR shall also provide its own piping, valves, and appurtenances for its requirements.
- E. Temporary Fire Protection: CONTRACTOR and Subcontractor(s) who maintain or provide an enclosed shed or trailer shall provide and maintain in operating order in each shed or trailer a minimum of one fire extinguisher. More extinguishers shall be provided as necessary. Fire extinguishers shall be minimum dry chemical, nonfreezing-type, UL rating 2A-30BC, with 10-pound capacity for Class A, B, and C fires.

1.03 TEMPORARY SUPPORT FACILITIES

- A. CONTRACTOR shall provide whatever facilities and services which may be needed to properly support primary construction process and meet compliance requirements and governing regulations.
- B. CONTRACTOR shall not use permanent facilities except as otherwise indicated, unless authorized by OWNER.

1.04 REMOVAL OF TEMPORARY FACILITIES

- A. Remove temporary materials, equipment, services, and construction as soon as practicable but no later than just prior to {substantial} **OR** {final} completion inspection.
- B. Clean and repair damage caused by installation or use of temporary facilities and restore existing facilities used during construction to specified, or to original, condition.

PART 2-PRODUCTS

NOT APPLICABLE

PART 3-EXECUTION

NOT APPLICABLE

END OF SECTION

SECTION 01560
For Review Only
TEMPORARY CONTROLS

PART 1–GENERAL

1.01 SUMMARY

- A. Work Included:
 - 1. Dust Control.
 - 2. Water, Erosion and Sediment Control.
 - 3. Noise Control.
 - 4. Traffic Control.
 - 5. Site Security.
 - 6. Daily Cleanup.

PART 2–PRODUCTS

NOT APPLICABLE

PART 3–EXECUTION

3.01 DUST CONTROL

- A. CONTRACTOR shall execute the Work by methods to minimize raising dust from construction operations.
- B. CONTRACTOR shall provide positive means to prevent air-borne dust from dispersing into atmosphere.

3.02 WATER, EROSION, AND SEDIMENT CONTROL

- A. CONTRACTOR shall grade site to drain and shall maintain excavations free of water. Provide, operate, and maintain pumping equipment.
- B. CONTRACTOR shall protect Site from puddling or running water.
- C. CONTRACTOR shall provide erosion control measures as necessary to control discharge of sediment laden water to surface waters and wetlands.
- D. Except as provided for in the document, overland discharge of water from dewatering operations shall not be allowed. Depending on water quality, such water shall either be piped directly to the surface water or shall be directed to sedimentation basins or other such structures or features prior to discharge to surface waters so as not to cause damage to existing ground and improvements, erosion, or deposition in the discharge area.
- E. CONTRACTOR shall use jute or synthetic netting, silt fences, straw bales, dikes, channels, and other applicable measures to prevent erosion of soils disturbed by its construction operation.

For Review Only

- F. Restoration of the Site shall proceed concurrently with the construction operation. See Drawings and Specifications for erosion control measures in addition to that which may be required above.
- G. Erosion control measures shall comply with the following document: Kentucky's Best Management Practices for Construction Activities.

3.03 NOISE CONTROL

- A. Provide methods, means, and facilities to minimize noise produced by construction operations.

3.04 TRAFFIC CONTROL

- A. CONTRACTOR shall be responsible for providing all signs, barricades, flagmen and other traffic control devices in the construction zone.
- B. Do not close or obstruct roadways without approval of OWNER.
- C. Maintain two-way traffic on streets at all times.
- D. Conduct operations with minimum interference to roadways.

3.05 SITE SECURITY

- A. CONTRACTOR shall have the sole responsibility of safeguarding the Site perimeter to prevent unauthorized entry to the Site throughout the duration of the Project. CONTRACTOR shall at all times provide such permanent and temporary fencing or barricades or other measures as may be necessary to restrict unauthorized entry to its construction area including construction in public rights-of-way or easements. Site security measures shall include safeguards against attractive nuisance hazards as a result of construction activity.
- B. CONTRACTOR shall at all times be responsible for the security of the Work including materials and equipment. OWNER will not take any responsibility for missing or damaged equipment, tools, or personal belongings. CONTRACTOR shall have the sole responsibility of safeguarding the Work and the Site throughout the duration of the Project.

3.06 DAILY CLEANUP

- A. CONTRACTOR shall clean up the Site and remove all rubbish on a daily basis.
- B. CONTRACTOR shall clean up public streets and highways and remove any dirt, mud or other materials due to project traffic on daily basis and shall comply with all local and state ordinances and permit requirements.

END OF SECTION

SECTION 01600 For Review Only

MATERIALS AND EQUIPMENT

PART 1—GENERAL

1.01 SUMMARY

- A. Work Included: CONTRACTOR shall be responsible for the delivery, handling, storage and protection of all material and equipment required to complete the Work as specified herein.
- B. Related Sections and Divisions: Specific requirements for the handling and storage of material and equipment are described in other sections of these Specifications.

1.02 PRODUCTS

- A. Components required to be supplied in quantity within a Specification section shall be the same, and shall be interchangeable.
- B. When any construction deviations from the Drawings and/or Specifications necessary to accommodate equipment supplied by CONTRACTOR, result in additional costs to CONTRACTOR or other contractors, such additional costs shall be borne by CONTRACTOR. CONTRACTOR shall also pay any additional costs necessary for revisions of Drawings and/or Specifications by ENGINEER.
- C. Each major component of equipment shall bear a nameplate giving the name and address of the manufacturer and the catalogue number or designation.

1.03 TRANSPORTATION AND HANDLING

- A. Materials, products and equipment shall be properly containerized, packaged, boxed, and protected to prevent damage during transportation and handling.
- B. CONTRACTOR shall not overload any portion of the structure in the transporting or storage of materials.
- C. CONTRACTOR shall not damage other construction by careless transportation, handling, spillage, staining or impact of materials.
- D. CONTRACTOR shall provide equipment and personnel to handle products, including those provided by OWNER, by methods to prevent soiling and damage.
- E. CONTRACTOR shall provide additional protection during handling to prevent marring and otherwise damaging products, packaging, and surrounding surfaces.
- F. CONTRACTOR shall handle product by methods to avoid bending or overstressing. Lift large and heavy components only at designated lift points.

For Review Only

1.04 DELIVERY AND RECEIVING

- A. CONTRACTOR shall arrange deliveries of products in accordance with the Progress Schedule, allowing time for observation prior to installation.
- B. CONTRACTOR shall coordinate deliveries to avoid conflict with the Work and conditions at the Site; work activities of other contractors or OWNER; limitations on storage space; availability of personnel and handling equipment and OWNER's use of premises.
- C. CONTRACTOR shall deliver products in undamaged, dry condition, in original unopened containers or packaging with identifying labels intact and legible.
- D. CONTRACTOR shall clearly mark partial deliveries of component parts of equipment to identify equipment and contents to permit easy accumulation of parts and to facilitate assembly.
- E. Immediately on delivery, CONTRACTOR shall inspect shipment to assure:
 1. Product complies with requirements of Contract Documents and reviewed submittals.
 2. Quantities are correct.
 3. Accessories and installation hardware are correct.
 4. Containers and packages are intact and labels legible.
 5. Products are protected and undamaged.

1.05 STORAGE AND PROTECTION

- A. General:
 1. CONTRACTOR shall store products, immediately on delivery, in accordance with manufacturer's instructions, with all seals and labels intact and legible.
 2. Available storage space at the Site is limited. Any additional off-site space required shall be arranged by CONTRACTOR.
 3. CONTRACTOR shall allocate the available storage areas and coordinate their use by the trades on the job.
 4. CONTRACTOR shall arrange storage in a manner to provide access for maintenance of stored items and for observation.
- B. In enclosed storage, CONTRACTOR shall:
 1. Provide suitable temporary weather tight storage facilities as may be required for materials that will be damaged by storage in the open.
 2. Maintain temperature and humidity within ranges stated in manufacturer's instructions.
 3. Provide ventilation for sensitive products as required by manufacturer's instructions.
 4. Store unpacked and loose products on shelves, in bins, or in neat groups of like items.
 5. Store solid materials such as insulation, tile, mechanical and electrical equipment, fittings, and fixtures under shelter, in original packages, away from dampness and other hazards.
 6. Store liquid materials away from fire or intense heat and protect from freezing.
- C. At exterior storage, CONTRACTOR shall:
 1. Store unit materials such as concrete block, brick, steel, pipe, conduit, door frames, and lumber off ground, out of reach of dirt, water, mud and splashing.
 2. Store tools or equipment that carry dirt outside.
 3. Store large equipment so as not to damage the Work or present a fire hazard.

For Review Only

4. Cover products subject to discoloration or deterioration from exposure to the elements, with impervious sheet material and provide ventilation to avoid condensation.
5. Completely cover and protect any equipment or material which is prime coated or finish painted with secured plastic or cloth tarps. Store out of reach of dirt, water, mud and splashing.
6. Store loose granular materials on clean, solid surfaces such as pavement, or on rigid sheet materials, to prevent mixing with foreign matter.
7. Provide surface drainage to prevent erosion and ponding of water.
8. Prevent mixing of refuse or chemically injurious materials or liquids.
9. Cover aggregates such as sand and gravel in cold wet weather.
10. Remove all traces of piled bulk materials at completion of work and return site to original or indicated condition.

1.06 MAINTENANCE OF STORAGE

- A. CONTRACTOR shall periodically inspect stored products on a scheduled basis.
- B. CONTRACTOR shall verify that storage facilities comply with manufacturer's product storage requirements, and verify that manufacturer required environmental conditions are maintained continually.
- C. CONTRACTOR shall verify that surfaces of products exposed to the elements are not adversely affected and that any weathering of finishes is acceptable under requirements of Contract Documents.
- D. CONTRACTOR shall perform scheduled maintenance of equipment in storage as recommended by the manufacturer. A record of the maintenance shall be kept and turned over to ENGINEER when the equipment is installed.

1.07 INSTALLATION REQUIREMENTS

- A. Manufactured articles, materials, and equipment shall be applied, installed, connected, erected, used, cleaned, and conditioned as directed by the respective manufacturers, unless otherwise specified.
- B. After installation, CONTRACTOR shall protect all materials and equipment against weather, dust, moisture, and mechanical damage.
- C. CONTRACTOR shall be responsible for all damages that occur in connection with the care and protection of all materials and equipment until completion and final acceptance of the Work by OWNER. Damaged material and equipment shall be immediately removed from the Site.

1.08 CONCRETE EQUIPMENT BASE

- A. Cast-in-place concrete equipment bases shall be provided for all new and relocated equipment including electrical control panels, motor control centers, switchgear, etc. Concrete equipment bases shall be provided by CONTRACTOR except where specifically noted to be provided by others. Bases shall be 3-1/2 inch minimum height and shall be a minimum of 3 inches larger than equipment being supported. Grouting of equipment bases shall be as recommended by equipment manufacturer.

For Review Only

- B. Concrete and grout shall meet applicable sections of the specifications.
- C. Provide all anchor bolts, metal shapes and templates to be cast in concrete or used to form concrete for support of equipment.

PART 2-PRODUCTS

NOT APPLICABLE

PART 3-EXECUTION

NOT APPLICABLE

END OF SECTION

SECTION 01650
For Review Only
STARTING OF SYSTEMS

PART 1—GENERAL

1.01 SUMMARY

- A. Work Included:
 - 1. Starting equipment and systems.
 - 2. Demonstration and instructions.
 - 3. Start-up and testing.
- B. CONTRACTOR shall perform the Work described in the following subsections.

1.02 STARTING EQUIPMENT AND SYSTEMS

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Notify ENGINEER and OWNER a minimum of seven days prior to start-up of each item.
- C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, or for other conditions that may cause damage.
- D. Verify that tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
- E. Verify wiring and support components for equipment are complete and tested.
- F. Execute start-up under supervision of applicable manufacturer's representative and CONTRACTOR's personnel in accordance with manufacturers' instructions.
- G. Require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.
- H. Equipment manufacturer shall provide a written report covering checkout, testing, inspections, and start-up and shall identify any deficiencies noted. Report shall be submitted to ENGINEER. CONTRACTOR shall be responsible for correcting all deficiencies noted in report.
- I. Provide lubricants as recommended by manufacturer appropriate for start-up conditions.

1.03 DEMONSTRATION AND INSTRUCTIONS

- A. Demonstrate operation and maintenance of products to OWNER's personnel.
- B. For all mechanical equipment or systems, demonstrate project equipment and instruct in a classroom environment at a location acceptable to the OWNER and instructed by qualified manufacturers' representative who is knowledgeable about the Project.

For Review Only

- C. For equipment or systems requiring seasonal operation, perform demonstration for noncurrent season at start of noncurrent season.
- D. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with OWNER's personnel in detail to explain all aspects of operation and maintenance.
- E. Demonstrate start-up, operation, control, adjustment, troubleshooting, servicing, maintenance, and shutdown of each item of equipment at agreed time, at equipment location.
- F. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.
- G. Supervision and Start-up: Installation of all equipment furnished under this Contract shall be supervised as required by a qualified representative of equipment manufacturer. All equipment shall be placed in operation by a qualified representative of the equipment manufacturer and the staff shall be trained to the satisfaction of OWNER by a qualified representative of the equipment manufacturer. OWNER may videotape training presentations given by manufacturer's representatives. Final payment for various items of equipment will not be made by OWNER until the equipment is operating to OWNER's satisfaction.
- H. Where items of equipment are placed into service at different times or sequence, manufacturer's services for start-up, field testing, and supervision shall be provided for each time or sequence. Training shall be provided prior to or at the time the first similar item of equipment is placed in service.

1.04 START-UP AND TESTING

- A. Prior to acceptance of any portion of the Work, start-up and testing of all equipment and testing of all materials furnished on the Project by CONTRACTOR shall have been conducted in the presence of representatives of CONTRACTOR, OWNER and ENGINEER and also manufacturer if requested by OWNER or ENGINEER.
- B. CONTRACTOR shall provide whatever temporary installations and conditions are necessary in order to perform start-up and testing operations on all equipment and materials furnished under the Contract. Temporary connections and equipment necessary during start-up and testing operations shall include, but not be limited to, temporary piping and electrical equipment and devices, temporary connection from various parts of the systems and any other labor, materials, fuel, devices or items that may be required for start-up and testing operations. Temporary conditions shall include filling with water, if necessary, to check equipment and materials.
- C. All temporary installations and conditions shall be removed by CONTRACTOR upon completion of start-up and testing.

PART 2-PRODUCTS

NOT APPLICABLE

PART 3-EXECUTION

NOT APPLICABLE

For Review Only

END OF SECTION

SECTION 01700
For Review Only
CONTRACT CLOSEOUT

PART 1—GENERAL

1.01 SUMMARY

- A. Work Included:
 - 1. Closeout procedures.
 - 2. Final cleaning.
 - 3. Adjusting.
 - 4. Project record documents.
 - 5. Warranties.
 - 6. Spare parts and maintenance materials.

1.02 CLOSEOUT PROCEDURES

- A. CONTRACTOR shall provide submittals to ENGINEER that are required by governing or other authorities.
- B. CONTRACTOR shall comply with General Conditions and Supplementary Conditions and complete the following before requesting ENGINEER's observation of the Work, or designated portion thereof, for substantial completion.
 - 1. Submit executed warranties, workmanship bonds, maintenance agreements, inspection certificates, and similar required documentation for specific units of Work, enabling OWNER's unrestricted occupancy and use.
 - 2. Submit record documentation, maintenance manuals, tools, spare parts, keys, and similar operational items.
 - 3. Submit consent of surety (if surety required in Contract).
 - 4. Complete final cleaning, touch-up work of marred surfaces, and remove temporary facilities and tools.

1.03 FINAL CLEANING

- A. It is CONTRACTOR's responsibility to completely clean up the construction site at the completion of the Work.
- B. CONTRACTOR shall clean areas of the building in which painting and finishing work is to be performed just prior to the start of this work, and maintain these areas in satisfactory condition for painting and finishing. This cleaning includes:
 - 1. Removal of trash and rubbish from these areas.
 - 2. Broom cleaning of floors.
 - 3. Removal of any plaster, mortar, dust, and other extraneous materials from finish surfaces, including but not limited to exposed structural steel, miscellaneous metal, masonry, concrete, mechanical equipment, piping, and electrical equipment.
- C. In addition to the cleaning specified above and the more specific cleaning that may be required in various technical sections of the Specifications, CONTRACTOR shall prepare the Project for occupancy by a thorough cleaning throughout, which shall include the following:

For Review Only

1. Clean interior and exterior glass surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.
2. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.
3. Replace filters of operating equipment.
4. Clean debris from roofs, gutters, downspouts, and drainage systems.
5. Clean site; sweep paved areas, rake clean landscaped surfaces.
6. Remove waste and surplus materials, rubbish, and construction facilities from the Site.

1.04 ADJUSTING

- A. CONTRACTOR shall adjust operating products and equipment to ensure smooth and unhindered operation.

1.05 PROJECT RECORD DOCUMENTS

- A. CONTRACTOR shall maintain on Site, one set of the following record documents to record actual revisions to the Work:
 1. Drawings.
 2. Specifications.
 3. Addenda.
 4. Change orders and other modifications to the Contract.
 5. Reviewed shop drawings, product data, and samples.
 6. Manufacturer's instruction for assembly, installation, and adjusting.
- B. CONTRACTOR shall ensure entries are complete and accurate, enabling future reference by OWNER.
- C. CONTRACTOR shall store record documents separate from documents used for construction.
- D. CONTRACTOR shall record information concurrent with construction progress.
- E. Specifications: CONTRACTOR shall legibly mark and record at each Product section description of actual products installed, including the following:
 1. Manufacturer's name and product model and number.
 2. Product substitutions or alternates utilized.
 3. Changes made by addenda and modifications.
- F. Record Documents and Shop Drawings: CONTRACTOR shall legibly mark each item to record actual construction including:
 1. Measured depths of foundations in relation to finish floor datum.
 2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the work.
 4. Field changes of dimension and detail.
 5. Details not on original Contract drawings.

For Review Only

1.06 WARRANTIES

- A. CONTRACTOR shall provide warranties beyond project one year warranty as required by technical sections and as follows.
- B. Submit warranty information as follows:
 - 1. Provide notarized copies.
 - 2. Execute and assemble transferable warranty documents from Subcontractors, suppliers, and manufacturers, and provide Table of Contents and assemble in three ring binder with durable cover.
 - 3. Submit with request for certificate of Substantial Completion.
 - 4. For items of work delayed beyond date of Substantial Completion, provide updated submittal within 10 days after acceptance, listing date of acceptance as start of warranty period.

1.07 SPARE PARTS AND MAINTENANCE MATERIALS

- A. CONTRACTOR shall provide spare parts, maintenance, and extra materials in quantities specified in individual specification sections.

PART 2-PRODUCTS

NOT APPLICABLE

PART 3-EXECUTION

NOT APPLICABLE

END OF SECTION

SECTION 03300

For Review Only

CONCRETE

PART 1—GENERAL

1.01 SUMMARY

- A. Work Included: Formwork, reinforcement, cast-in-place concrete, and accessories.
- B. Related Sections and Divisions: Applicable provisions of Division 1 shall govern work in this section.

1.02 REFERENCES

- A. ACI 211-1—Selecting Proportions for Normal and Heavy Weight Concrete.
- B. ACI 301— Structural Concrete for Buildings.
- C. ACI 304—Measuring, Mixing, Transporting, and Placing Concrete.
- D. ACI 305R—Hot Weather Concreting.
- E. ACI 306R—Cold Weather Concreting.
- F. ACI 315—Manual of Standard Practice for Detailing Reinforced Concrete Structures.
- G. ACI 318—Building Code Requirements for Reinforced Concrete.
- H. ACI 347—Recommended Practice for Concrete Formwork.
- I. ASTM A82—Cold-Drawn Steel Wire for Concrete Reinforcement.
- J. ASTM A185—Welded Steel Wire Fabric for Concrete Reinforcement.
- K. ASTM A615—Deformed and Plain Billet—Steel Bars for Concrete Reinforcement.
- L. ASTM C33—Concrete Aggregates.
- M. ASTM C94—Ready Mixed Concrete.
- N. ASTM C143—Slump of Portland Cement Concrete.
- O. ASTM C150—Portland Cement.
- P. ASTM C231—Air Content of Freshly Mixed Concrete by the Pressure Method.
- Q. ASTM C260—Air-Entraining Admixtures for Concrete.
- R. ASTM C494—Chemical Admixtures for Concrete.

For Review Only

- S. ASTM D994—Preformed Expansion Joint Filler for Concrete (Bisminous Type)
- T. ASTM D1752—Performed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.
- U. CRSI—Manual of Standard Practice.

1.03 DESIGN

- A. All formwork shall be designed in accordance with ACI 347.
- B. CONTRACTOR shall assume the responsibility for the complete design and construction of the formwork.

1.04 SUBMITTALS

- A. Submit shop drawings in accordance with Section 01300—Submittals.
- B. Reinforcing shop drawings shall be in accordance with ACI 315.
- C. Submit the following information:
 - 1. Gradation of fine and coarse aggregate—ASTM C33.
 - 2. Specific gravity and dry rodded density of each aggregate.
 - 3. Test of deleterious substances in fine and coarse aggregate—ASTM C33.
 - 4. Design mix of each individual concrete mix to be used.
 - 5. Previous test results or trial batch results with 7- and 28-day compressive strengths of each concrete mix proposed.
 - 6. Certified mill test results for cement identifying brand, type, and chemistry of cement to be used.
 - 7. Brand, type, principal ingredient, and amount of each admixture to be used.

1.05 QUALITY ASSURANCE

- A. Formwork shall comply with the requirements of ACI 301 and ACI 347.
- B. All concrete shall be in accordance with the referenced standards except as specified otherwise.

PART 2—PRODUCTS

2.01 FORMWORK

- A. Forms shall be of wood, plywood, steel, fiberboard lined, or other approved materials which will produce concrete which meets the specified requirements. The type, size, quality, and shape of all materials of which the forms are made are subject to the review of ENGINEER.
- B. Internal wall ties shall contain positive stops at the required wall thickness. The exterior clamp portions of the tie shall be adjustable in length. Ties shall provide a positive disconnection on both ends 1 to 1 1/2 inches inside the finished face of the concrete.

For Review Only

- C. Provide commercial formulation form coating compounds that will not bond with, stain, nor adversely affect concrete surfaces requiring bond or adhesion, nor impede the wetting of surfaces to be cured with water or curing compounds.
- D. Provide 3/4-inch by 3/4-inch wood or plastic chamfer strips at all exposed corners, except as noted.

2.02 REINFORCEMENT

- A. Reinforcing bars shall comply with ASTM A615, Grade 60. Steel wire shall comply with ASTM A82. Welded wire fabric shall comply with ASTM A185.
- B. Reinforcing shall be bent cold in shop and all bends shall conform to ACI standards. Heating of reinforcement will not be permitted, and reinforcement shall not be bent or straightened in any manner that will injure the steel. Fabrication tolerances shall comply with CRSI Manual. Unless otherwise shown on the drawings, all end hook dimensions shall conform with "ACI Standard Hooks."

2.03 CONCRETE

- A. All cement used shall be Portland Cement Type 1 conforming to requirements of ASTM C150. The aggregate shall be well graded from coarse to fine. The maximum size aggregate shall be 1 1/2-inch for concrete pours thicker than 10 inches and 3/4-inch for pours 4 inches to 10 inches thick. All aggregate shall meet the requirements of ASTM C33. Water shall be clean and free from injurious amounts of oil, alkali, and organic matter.
- B. Concrete shall have a 28-day minimum compressive strength of 4,000 psi, minimum cement content of six sacks per cubic yard, and a maximum of 5.5 gallons of total water per sack. The slump of the concrete shall be within the range of 2 to 3 1/2 inches. An air-entraining admixture conforming to ASTM C260, equal to "Darex," shall be used in all concrete to obtain 4% to 7% air content. A water reducer meeting ASTM C494 Type A requirements shall be included in the mix. Mixes shall be designed in accordance with ACI 211.1.

2.04 WATERSTOPS

- A. PVC waterstops shall be as manufactured by W.R. Meadows, Inc., Grace Construction Products, Greenstreak, Vulcan, or equal. They shall be installed in accordance with the manufacturer's suggested procedures.
- B. Bentonite waterstops shall be flexible strips of bentonite waterproofing compound, equal to Waterstop-RX, as manufactured by the Colloid Environmental Technologies Company (CETCO). The strips shall be 1-inch by 3/4-inch.

2.05 JOINT FILLER

- A. Expansion joints shall have standard 1/2-inch-thick cork expansion joint filler; W.R. Meadows or equal; meeting ASTM D1752–Type II. Exceptions to this are expansion joints in exterior concrete walks and between concrete walks and other structures which shall be asphalt expansion joint filler, 1/2-inch thick; Grace, W.R. Meadows, or equal; meeting ASTM D994.

For Review Only

PART 3—EXECUTION

3.01 FORMWORK

- A. Forms shall conform to the shape, line, grade, and dimensions as shown on the drawings. They shall be mortar-tight and sufficiently rigid to prevent displacement or sagging between supports and shall support the loads and pressures without deflection from the prescribed lines. They shall be properly braced or tied together so as to maintain position and shape and insure safety to workmen and passersby.
- B. Variations from plumb shall not exceed 1/4-inch in 10 feet, and variation in linear lines shall not exceed 1/2-inch in 20 feet. These and other tolerances specified in ACI 347 shall be considered a part of this specification.
- C. Supporting forms and shoring shall not be removed until the member has acquired sufficient strength to support its own weight and the construction live loads on it. All form removal shall be accomplished in such a manner that will prevent injury to the concrete and will insure complete safety of the structure.

3.02 REINFORCEMENT

- A. Comply with the specified standards for details and methods of placing reinforcement and supports. Clean reinforcement to remove loose rust, mill scale, earth, and other materials which reduce or destroy bond with concrete.
- B. Splices in reinforcement shall be avoided wherever possible. Splices shall be Class B, Category 1 in accordance with ACI 318. Welded wire fabric shall be lapped at least one full mesh.
- C. After reinforcement is placed, and before placing concrete over it, ENGINEER shall be allowed sufficient time to observe the reinforcing. All reinforcing must be securely positioned prior to placing concrete.
- D. Minimum Reinforcing: Where reinforcing is not shown, provide a minimum of #4 at 8-inch centers each way in members 10 inches or less in thickness and #5 at 12-inch centers each way in each face in members greater than 10 inches thick.

3.03 CONCRETE

- A. Before placing concrete, all equipment, forms, ground, reinforcements, and other surfaces with which the concrete will come in contact are to be thoroughly cleaned of all debris, ice, and water. Ground shall be wetted prior to placement of concrete on it.
- B. Ready mixed concrete shall be batched, mixed, and delivered in accordance with ASTM C94 and ACI 304.
- C. Concrete shall be deposited in approximately horizontal layers not to exceed 18 inches in thickness. Each layer shall be well worked into the preceding layer while both layers are still soft. All concrete shall be compacted with mechanical vibration equipment.
- D. Concrete shall be deposited as nearly as practicable in its final position to avoid segregation due to rehandling or flowing. The maximum allowable lateral movement of the

For Review Only

concrete after being deposited is 3 feet. When concrete placement is started, it shall be carried on as a continuous operation until the placing of the section or panel is completed.

- E. All concrete shall be maintained in a moist condition for seven days by free water, wet covering, or curing compound.
- F. When atmospheric temperature exceeds 80°F during concrete placement, the provisions of ACI 305 shall be followed.
- G. Cold weather concreting shall conform to all requirements of ACI 306.1. Cold weather is defined as a period when, for more than 3 successive days, the average daily temperature drops below 40°F. The average daily temperature is the average of the highest and lowest temperature during the period from midnight to midnight. When temperatures above 50°F occur during more than half of any 24-hour period, the period will no longer be regarded as cold weather.
- H. After the curing period, the temperature of the concrete shall be reduced uniformly at a rate not to exceed 20°F per 24 hours. The use of salt or other chemical admixtures for the prevention of freezing is prohibited.
- I. The top surfaces of floor slabs shall be screeded, floated, and then steel troweled to a smooth, dense finish. Exterior slabs shall then be broomed. All concrete surfaces shall have all fins, burrs, etc. removed by grinding, wire brushed, or tapping off with a hammer as required to be left in a smooth condition.
- J. Sealing:
 - 1. Install in accordance with manufacturer's instructions.
 - 2. Where product will be used for moist curing, sealing and hardening, apply to new concrete as soon as the concrete is firm enough to walk on after troweling. Where product will be used for sealing and hardening only, surface must be free of dust, dirt, laitance, curing compounds, and any material that would inhibit the penetration of the product. In some instances, the floor may need to be stripped and neutralized prior to application.
 - 3. Spray on at rate of 200 square feet per gallon.
 - 4. Keep surfaces wet with cure-seal-hardener for minimum soak-in period of 30 minutes, without allowing drying out or becoming slippery. In hot weather, slipperiness may appear before the 30-minute time period has elapsed. If that occurs, apply more cure-seal-hardener as required to keep entire surface in a non-slippery state for the first 15 minutes. For the remaining 15 minutes, mist the surface as needed with water to keep the material in a non-slippery state.
 - 5. After this period, when treated surface becomes slippery, lightly mist with water until slipperiness disappears.
 - 6. Wait for surface to become slippery again and then flush entire surface with water removing all residue of cure-seal-hardener.
 - 7. Squeegee surface completely dry, flushing any remaining slippery areas until no residue remains.
 - 8. Wet vacuum or scrubbing machines may be used to remove residue, provided manufacturer's instructions are followed.
 - 9. Protect installed floors until chemical reaction process is complete; at least three months.
 - 10. Clean up spills immediately and spot-treat stains with good degreaser or oil emulsifier.

For Review Only

11. Protection and cleaning of floors are the responsibility of CONTRACTOR until final completion. Replace concrete that becomes stained due to improper precautions or lack of cleaning.
- K. CONTRACTOR shall make and have tested three test cylinders for each pour less than 25 cubic yards, four test cylinders shall be made for each pour between 25 and 100 cubic yards, and eight test cylinders made for each pour in excess of 100 cubic yards. CONTRACTOR shall perform one slump test and one air test for each set of 4 cylinders. In no case shall a given concrete mix be represented by less than four cylinders for the entire job. A slump test conforming to ASTM C143 shall be performed for each set of cylinders. An air test conforming to ASTM C231 (pressure method) shall be made for each set of cylinders. All costs of additional testing and sampling of fresh or hardened concrete needed because of suspected or actual violation of the specifications shall be borne by CONTRACTOR. Acceptance of cast-in-place concrete will be based on performance of material tests to those specified. Concrete not meeting the specified range of slump and/or air will be rejected at the site. Concrete not meeting compressive strength requirements as demonstrated by test cylinders may be subject to removal or reduction in payment. ENGINEER shall receive a copy of the test results. All concrete testing costs shall be borne by CONTRACTOR.
- L. When placing new concrete adjacent to existing concrete, the existing concrete shall be thoroughly roughened, cleaned, and saturated with water 24 hours before pouring new concrete. Existing concrete is defined as concrete more than six months old. At time of new pour, remove any standing water, and a bonding agent equal to THOROBOND by Standard Dry Wall Products, Inc., Sonocrete by Sonneborn Contech Co., or equal shall be applied in accordance with manufacturer's recommendations.
- M. When patching existing concrete, remove poor concrete until firm hard concrete is exposed, roughen and clean surface of the existing concrete, clean any exposed reinforcing bars, and pour new concrete. Concrete finish to match existing concrete. New concrete shall be 4,000 psi 28-day strength mixed with ACRYL 60 by BASF, or equal, mixed according to manufacturer's instructions. Concrete shall not be air entrained.

END OF SECTION

SECTION 05560 For Review Only

ANCHOR BOLTS, EXPANSION BOLTS, AND ADHESIVE ANCHORS

PART 1—GENERAL

1.01 SUMMARY

- A. Work Included: Anchor bolts, expansion bolts, and adhesive anchors.
- B. Related Sections and Divisions: Applicable provisions of Division 1 shall govern work in this section.

1.02 REFERENCES

- A. ASTM A36/A36M—Structural Steel.
- B. ASTM F1554—Anchor Bolts, Steel, 36, 55, and 105-ksi yield strength.

PART 2—PRODUCTS

2.01 ANCHOR BOLTS

- A. Anchor bolts complete with washers and nuts shall be fabricated as shown or as specified by the equipment manufacturer and unless otherwise indicated shall be hot-dip galvanized carbon steel or 316 stainless steel. Anchor bolts shall, as a minimum, conform to the requirements of ASTM F1554-Grade 36.
- B. Stainless steel anchor bolts shall be used in all submerged locations, below final grade, and in contact with aluminum and other items not to be painted. Galvanized anchor bolts shall be used elsewhere.

2.02 EXPANSION BOLTS

- A. Expansion bolts shall be Power-Stud + SD2 by Powers Fastening Systems, Strong-Bolt, by Simpson Strong-Tie Anchor Systems, or equal.
- B. Expansion bolts will not be permitted as substitutes for embedded anchor bolts except with the prior written acceptance of ENGINEER or where otherwise specifically called for.
- C. Unless indicated otherwise on the drawings or specified, use the following bolt material for the various installation situations:
 - 1. Stainless Steel: For all submerged locations, below final grade, and in contact with aluminum appurtenances and other items not to be painted. Also for anchoring equipment, unless otherwise specified.
 - 2. Steel: In other locations in contact with items to be painted or encased in concrete.

For Review Only

2.03 ADHESIVE ANCHORS

- A. Adhesive anchors shall be PE 1000+ by Powers Fastening Systems, Set-XP by Simpson Strong-Tie Anchor Systems, or equal.

PART 3—EXECUTION

3.01 ANCHOR BOLTS

- A. Anchor bolts for structural members shall be located as shown and specified.
- B. Anchor bolts for mechanical equipment shall have embedment length, edge distances, and spacing as required by the equipment manufacturer.
- C. All dirt or foreign materials shall be removed prior to embedding into concrete. After anchor bolts have been embedded, their threads shall be protected by grease and by installing the nuts or by other means until the time of installation of the equipment or metal work.

3.02 EXPANSION BOLTS

- A. Unless otherwise noted on the drawings, expansion bolt edge distance and spacing shall be in accordance with manufacturer's recommendations.
- B. Bolt embedment shall at least equal six bolt diameters.
- C. All procedures shall be in accordance with the manufacturer's recommendations.
- D. Where location of anchors is adjustable, reinforcing steel shall be located prior to drilling holes and bolts and shall be located to clear reinforcing steel.

3.03 ADHESIVE ANCHORS

- A. At locations shown on the drawings, reinforcing bars or threaded rod shall be provided in existing concrete by drilling holes, injecting epoxy adhesive, and inserting the reinforcing bar.
- B. All existing surfaces to receive adhesive anchors, including the entire area in contact with the new concrete, shall be cleaned and roughened to amplitude of 1/4 inch.
- C. All procedures shall be in accordance with the manufacturer's recommendations.
- D. Where location of anchors is adjustable, reinforcing steel shall be located prior to drilling holes and bolts and shall be located to clear reinforcing steel.

END OF SECTION

SECTION 11304 For Review Only

PREPACKAGED STEEL UNDERGROUND BOOSTER STATION

PART 1—GENERAL

1.01 SUMMARY

- A. Work includes: This section includes furnishing, installing, and placing into successful operation a fully equipped prepackaged steel underground booster station, including booster pumps, valves, meter, and miscellaneous equipment as shown on the drawings and specified herein. The station and appurtenances shall be furnished by the same supplier.
- B. Related Sections and Divisions: Applicable provisions of Division 1 shall govern work in this section.
- C. Payment Procedures: Any rock excavation if encountered shall be included in the Lump Sum Bid.

1.02 SYSTEM DESCRIPTION

- A. Performance Requirements:
 - 1. Description of Operation: The booster station shall serve to control the flow of water between the high pressure zone and the low pressure zone in the water distribution system.
 - a. The booster station shall include two booster pumps to pump water from the low zone to the high zone.
 - b. Water transfer from the high zone to the low zone will be accomplished with one solenoid-controlled, back pressure sustaining valve, and one automatic pressure relief valve.
 - 2. A single 4-inch meter shall be provided inside the station on the high zone side of the station.
 - 3. The manufacturer of the booster station shall provide all necessary mechanical and electrical equipment to operate the booster pumps and associated equipment. Control signals for both booster pumps shall come from a telemetry panel provided under this contract. Coordination of the required control signals will be the responsibility of the booster station supplier and CONTRACTOR.
 - 4. The station shall lock out the booster pumps when suction pressures fall below 20 psi.
 - 5. After assembly of the station by supplier, the system shall be hydrostatically tested to confirm zero leakage. The station and its connections shall also be tested in the field by CONTRACTOR after final installation.

1.03 SUBMITTALS

- A. General: Full descriptive "Bid Presubmittal" for station and all components within the station shall be submitted in triplicate for review as described below:
 - 1. Bidder shall submit three copies of "Bid Presubmittal" with Bid or manufacturer/supplier may submit directly to ENGINEER in advance of Bid opening.
 - 2. Bid Presubmittal shall contain a minimum of two full-size drawings, size 22-inch by 34-inch; one each covering booster pump station and electrical control schematic. The

For Review Only

booster pump station drawing shall be specific to this project, have at least one front plan and two section views, be to scale and illustrate the National Electrical Code (NEC) clearances per Section 110-16 of the Code. The submittal booklets shall be complete with data sheets covering all individual components that make up the booster pump station, including anchor bolt attachment details, and the UL file number under which the manufacturer is listed.

3. Booster Pump Data/Presubmittal Requirements:
 - a. Submittal shall include performance data and head discharge curves showing capacity, head (not including velocity head), NPSH required, wire to water efficiency, and brake horsepower from shutoff to run out head where driven by the field electric motor.
 - b. Basic pump information shall include:
 - (1) Name of pump manufacturer and type of model designation of pump.
 - (2) Field operating speed of unit. All performance data and tests shall be at this speed.
 - (3) NPSH required at operating point.
 - (4) Impeller diameter and maximum possible impeller.
 - (5) Name of motor manufacturer and type of model designation of motor with full information on frame size, insulation, and temperature rating.
 - (6) Motor rated horsepower without service factor.
 - (7) Motor service factor.
 - (8) Full load and locked rotor current.
 - (9) Motor efficiency at half, three-quarters, and full load.

B. Shop Drawings:

1. CONTRACTOR shall submit six copies of complete shop drawings showing detailed station layout and descriptive literature for all items.
2. Shop drawings shall contain all items required in Bid Presubmittal plus structural calculations from licensed structural engineer as described in this section.
3. Additional shop drawing requirements are discussed in Division 1.

C. Factory Test Submittals:

1. All equipment shall be factory tested using the job motors to drive the pumps.
2. Test points shall include shutoff head performance point, cutoff head, plus at least three other points as required for accurate curve plotting. Head shall not include velocity head. Three certified copies of test data, notation of presence or absence of cavitation, computations for performance curve construction, computations for kwh per 1,000 gallons power consumption, field head-discharge curves, field wire to water efficiency curves, and field motor load, all from shutoff to cutoff head, shall be submitted to ENGINEER for approval. Total head shall be as defined herein.
3. Shipment shall not be made until ENGINEER reviews the factory test results.

- D. Submittals for motors associated with equipment specified in this section shall include data sheets from motor manufacturer. Data sheets from the equipment manufacturer or supplier are not acceptable.

1.04 QUALITY ASSURANCE

- A. Equipment shall conform to the standards of the AIEE, NEC, and NEMA requirements.
- B. CONTRACTOR shall have at least ten years of successful experience in providing stations of the type, design, and function as specified herein.

For Review Only

- C. CONTRACTOR shall be required to affix an Underwriter's Laboratories (UL) label to attest that the assembled equipment is in compliance under the Packaged Pumping Systems (QCZJ) UL Listing category. This certification shall be inclusive of the entire pump station with enclosure to demonstrate compliance with National Electrical Code requirements. Equipment manufacturer without this third party certification (UL, NEC) label WILL NOT be allowed.

1.05 WARRANTY

- A. Standard One-Year Warranty: Unless otherwise stated below, manufacturer shall warrant the equipment to be free from defects in material and workmanship for a period of one year from Substantial Completion of the project.

PART 2--PRODUCTS

2.01 MANUFACTURERS

- A. The prepackaged booster station shall be manufactured by Engineered Fluid, Inc. of Centralia, Illinois, or equal. This listed equipment is part of the Base Bid as indicated on the Bid pages and will be considered as establishing the type, function, appearance, and quality required, as defined in the General Conditions.

2.02 MANUFACTURED UNITS

- A. Equipment Chamber:
1. The equipment chamber shall be a vertical cylinder with minimum dimensions as indicated on the drawings.
 2. The equipment chamber shall be fabricated of structural grade steel plate that meets or exceeds the requirement for ASTM A36. The chamber vertical shell and top and bottom sheets shall be a minimum 1/4-inch. The plates forming the top and bottom sheets of the Base Bid equipment chamber shall be cold formed to a rolled edge vertical cylinder or elliptical capsule of no less than 1-inch outer radius and extending at least 1 1/2 inches beyond the radius to facilitate welding. Rolled edge shall have full fillet lap seal weld as specified below.
 3. The equipment chamber shall be reinforced as required to adequately support all soil loads plus H2O live loads. It shall be the responsibility of the station manufacturer to determine the structural requirements of the equipment chamber based on the external and internal loads as indicated on the drawings and suitable for intended use.
 4. Structural calculations shall be provided, certified, and stamped by a registered licensed structural engineer to verify the structural integrity of the chamber.
 5. Lifting eyes incorporated around the perimeter shall be provided outside of the chamber to facilitate lifting and handling the equipment chamber. Lifting eyes shall also be provided inside the equipment chamber located over the two larger booster pumps at an adequate height to permit a hoist to be used for service work. (A one-ton manual chain hoist shall be supplied by the station manufacturer.)
 6. The equipment chamber shall incorporate a sump and concrete antibuoyancy pad as specified herein.

For Review Only

B. Welding:

1. All welding shall be in accordance with standard AWS practices, with proper fillet section and continuity to assure a sound, watertight structure.
2. All welds shall be sound and free from embedded scale or slag. Capsule and structure shall have tensile strength across the weld not less than that of the thinner of the connected sections and shall be watertight.
3. Equipment chamber shall have a rolled edge full fillet weld for top and bottom sheets per requirements of this section.
4. Pipe welds shall be full penetration, butt, or cope welds.
 - a. Pipes of 6-inch size and larger are required to be bevel cut for butt welding.
 - b. Welds on pipes of 6-inch size and larger shall be full penetration welds beginning with a root pass followed by successive cover passes to completely fill the weld groove. No crevices or sharp edges shall remain on the inner or outer face of the weldment.
5. Fillet welds shall be used for flange attachment in accordance with AWWA C207.
6. The Base Bid tank sheet lap joint welds shall be of smooth transition. Lap seam fillet welds shall fully overlay the end of the lapped sheet. Weld joints shall be free of sharp edges or crevices that would serve as corrosion sites.
7. The welds between the top and bottom sheets and the side sheet shall be a full fillet weld lap joint seam (UL58, Figure 6.1, No. 23) or a full penetration built weld seam welded both sides (UL58, Figure 6.1, No. 13).
8. Any ferrous metal device/structure passing through the capsule wall will be welded fully along its circumference or length on both sides of the capsule wall.
9. Field welding to complete the capsule or attach the entrance hatch will not be allowed.
10. Pipe welds shall be pressure tested following the full assembly of the piping, valves, fittings, connectors, pumps, and related devices that make up the transmission system. Test pressure shall be applied to the water-filled system at 150 psi for 20 minutes, during which time a visual leak survey will be made. Any leaking or otherwise defective welds or connections will be remade and the unit retested.

C. Capsule/Protective Coating:

1. All mill scale, rust, weld flux, and other foreign matter shall be removed from all steel surfaces by sandblasting to SSPC SP-10 specification for near-white blast cleaning. Surface irregularities shall be removed by grinding.
2. Capsule interior and exterior surfaces plus outside of piping and equipment shall be coated as follows: One prime coat of Tnemec Series N69 Epoxoline applied in a thickness as necessary to achieve at least 4.0 mils dry film thickness; one intermediate coat of Tnemec Series N69 Epoxoline (white) applied in a thickness as necessary to achieve at least 5.0 mils dry film thickness; and one final coat of Tnemec Series N69 Epoxoline applied in a thickness as necessary to achieve at least 5.0 mils dry film thickness. The final exterior system shall have a minimum 14 mils dry film thickness with no runs, sags, or pinholes.
3. All weldments on the exterior and interior of the capsule and all surfaces and points where coating spray will not reach will be manually hand painted to avoid corrosion points.
4. Upon completion of the station and following testing and quality assurance acceptance, station floor will be wiped down thoroughly and one coat of Tnemec Hi-Build N69 Epoxoline coating will be roll-applied to the floor.

- D. Sump: A sump 18 inches in diameter by 8 inches deep shall be incorporated into the capsule for incorporation of sump pump.

For Review Only

- E. Capsule Foundation Support:
1. The equipment capsule shall be equipped with necessary structural beams and stiffeners to allow capsule to be attached to reinforced concrete pad to counteract buoyant water forces for a submerged condition to ground surface.
 2. Design of beam support system shall be responsibility of equipment manufacturer and approved by a registered structural engineer to provide for adequate bracing of underside of capsule with and without buoyant forces.
 3. CONTRACTOR shall provide details for side anchor and end anchor connections from concrete pad to support system based on manufacturer's standard anchoring system.
- F. Entrance Hatch:
1. The capsule shall be fitted with an entrance hatch. The entrance hatch shall be Bilco Model MNB-50 roof scuttle with a minimum clear inside opening of 30 inches by 54 inches as indicated on the drawings. The entrance hatch shall extend a minimum of 12 inches above finished grade. Minimum capsule cover shall be 1 foot.
 2. The entrance hatch shall contain a UL and OSHA Type I heavy-duty approved aluminum ladder. The ladder shall be provided with a Bilco ladder up safety post.
 3. The ladder will have 1 1/4-inch-diameter tempered, serrated rungs with 3 by 1 1/4-inch full I-beam side rails. The uppermost ends of the side rails will be protected by plastic caps bolted into place.
 4. The entrance hatch shall be provided with a scuttle cover including an 11 gauge aluminum exterior, 1-inch fiberglass insulation, and 18 gauge aluminum interior. The cover shall have a suitable drip lip around the edge and shall be fitted with a weatherproof lock of the pin-and-tumbler-type with an inside keyless release. The lock shall be self-locking upon closing the cover. When the cover is in the full-open position, a lock open device will engage to prevent accidental closing of the cover.

2.03 COMPONENTS

- A. Pipe and Fittings:
1. All internal transmission piping and fittings shall be of Schedule 40 black, seamless steel pipe and shall be manufactured in accordance with the dimensional tolerances and material specifications of the AWWA C-200-91 for steel pipe and steel butt-welded fittings. Sump pump and pressure relief piping shall also be steel meeting these specifications.
 2. Provide piping as indicated on the drawings, including flange adapters for disassembly. Manufacturer shall provide all necessary fittings and transitions to provide the minimum clearances for the equipment specified. Manufacturer shall lay out piping and perform all adjustments required for equipment to be supplied.
 3. Transmission piping shall exit station with a minimum cover of 3 feet over the top of pipe. Sump piping shall include a union to allow for removal of the sump pump and winter drain provisions with valving. All piping shall be coated on the interior as well as on the exterior. Coatings shall be as specified herein.
 4. Provide supports for all piping. Piping shall not be supported from attached equipment.
 5. Provide four restraining points on or near main inlet and outlet pipes to facilitate attachment of tension tie rods for positive restraint of piping.
- B. Interior Pipe Coating:
1. Fusion Bonded Epoxy Coating: The interior of all pipes shall be fusion bonded epoxy coated to meet the following requirements:
 - a. The internal surfaces of all steel transmission and pump piping shall be grit blasted to an SSPC-SP10 finish.

For Review Only

- b. Immediately following grit blasting, the internal surfaces of all steel transmission and pump piping shall be coated with fusion bonded epoxy coating applied in full accordance with AWWA C-213-91.
 - c. The coating material shall be applied to a minimum dry-film thickness of 12 mils.
 - d. The coating material shall be National Sanitation Foundation (NSF) Standard 61 certified material; said certification shall be included in the submittals.
 - e. Upon completing the fusion bonded epoxy coating, any and all welding upon this pipe shall be prohibited. Hangers, brackets, mounts, and points of penetration must all be welded prior to the fusion bonding process requiring the fusion bonded pipe to be bolted or coupled together and likewise be bolted to mounts, supports, and restraining points.
 - f. Where fusion bonded pipe is to penetrate a steel floor plate or tank wall, a penetration sleeve will be required. The sleeve shall fit closely over the pipe and be welded to the pipe at both ends, prior to fusion bonding. The tank wall or floor penetration weld shall be made upon the sleeve so as to sink weld heat away from the coated inner pipe surfaces.
- C. Booster Pumps:
- 1. Design Requirements:
 - a. Pumps shall be end suction centrifugal, nominal 1,750 rpm.
 - b. Pumps shall each have a performance point capacity of 250 gpm against a total head exterior to the pump of 125 feet.
 - c. The head on the pumps may vary between 110 and 130 feet.
 - d. A steep head discharge curve, maintaining high efficiency to each side of the performance point is desired and these characteristics will be considered in awarding the Contract.
 - e. The pumps shall be PACO Model 2512-3 or equal.
 - f. The pumps shall have a 6-inch suction and a 6-inch discharge.
 - g. Total head as specified is the sum of suction and discharge pressure heads measured through piezometer connections on the horizontal centerline of the suction and discharge nozzles, with no credit for difference in velocity heads at these points.
 - h. The pump design shall be such that the units operate satisfactorily without cavitation, excessive noise, or vibration in excess of 4 mils at any point on the pumping units installed and operating within the range of heads and suction conditions specified.
 - 2. Pump Construction:
 - a. Casings:
 - (1) The casings shall be cast iron, horizontal with ASA 125 psi flanged suction and discharge connections in lower half of casing.
 - (2) Provide 1/4-inch tapped piezometer connections on horizontal centerline of suction and discharge nozzles and 1-inch tapped priming connection at high point of casing.
 - b. Impellers:
 - (1) Impellers shall be cast bronze, mechanically and hydraulically balanced.
 - (2) Provide renewable bronze wearing rings on impellers and bronze or cast iron rings on casings.
 - c. Shaft:
 - (1) Shaft shall be constructed of stainless steel of sufficient size to carry maximum loads imposed and shall have renewable stainless steel or bronze sleeves in the seal area.

For Review Only

- (2) Shaft shall be sealed against leakage by a mechanical seal installed in a one-piece cast iron housing. The seal shall be of a Carbon/Ni-Resist construction held in a mating position by a stainless steel spring.
 - d. Bearings and Couplings: Motor Bearings shall be cartridge-type ball bearing-type, grease lubricated, designed to resist radial and thrust loads.
 - e. Base: A one-piece cast iron or fabricated steel base shall be provided complete with vibration isolation pad upon which both the pump and/or motor are mounted.
3. Motors:
- a. Motors shall conform to all applicable requirements of NEMA, ANSI, IEEE, and NEC standards and shall be UL listed for the service specified.
 - b. Motors provided shall meet the following requirements. Motors shall not be loaded beyond nominal rating, not including service factor, at any design condition.
 - (1) Physical Construction:
 - (a) Copper leads and windings with ball or roller bearings in end brackets of steel or cast iron or aluminum brackets with steel bearing sleeves. Motor shall be constructed with two windings for all two-speed motors.
 - (b) Rotor bars shall be copper. Where installed in NEMA 4X and Class I, Division 1 locations, a 45% non-phosphorous silver copper brazing shall be applied.
 - (c) Motor shaft shall be high strength steel protected by a bronze shaft sleeve secured to the shaft to prevent rotation. The maximum allowable no-load shaft run-out shall be 0.002-inch.
 - (d) Motors shall be equipped with grease fittings and automatic grease reliefs. Bearings shall be prelubricated and field regreasable. Openings for addition of grease shall have grease fittings provided.
 - (2) Mounting: Horizontal
 - (3) Enclosure: Washdown duty TEFC.
 - (4) Efficiency: Premium efficiency as noted in schedule below.
 - (5) Service Factor: 1.15
 - (6) Power requirements: 60 Hz, Three phase, 230/460 volt, $\pm 10\%$ voltage variation.
 - (7) Load type: Variable torque.
 - (8) NEMA Design: B.
 - (9) Insulation: Class F.
 - (10) Nominal operating speed: 1,750 rpm.
 - (11) Nameplate: Stainless steel engraved attached to motor frame or enclosure with stainless steel rivets.
 - (12) Conduit/Junction Box: Cast iron, diagonally split, fully rotatable, gasketed between cover and bar, and between box and frame. Motor lead opening in the frame shall also be gasketed. A clamp-type terminal shall be provided inside each motor conduit box for grounding.
 - (13) Accessories:
 - (a) Over-sized motor junction box.
 - (b) Lifting eyes.
- D. Motor Schedule:
1. If motor horsepower is increased to meet the requirements of this specification, CONTRACTOR is responsible for increasing all wiring, starters, drives, and other electrical components as required by Code, at no additional cost to OWNER.

For Review Only

Pump	Horsepower	Nominal Speed (rpm)	Efficiency
P1	15	1,750	68%
P2	15	1,750	68%

- E. Valve Materials:
 - 1. Gate valves: Resilient.
 - 2. Tilted disk check valves.
 - 3. Swing check valves.
 - 4. Silent check valves: Wafer.
 - 5. Butterfly valves. Wafer.
 - 6. Air release valves.
 - 7. Miscellaneous valves.
 - 8. Surge relief/refill valves.
 - 9. Sample taps.
 - 10. Hose Bibb with vacuum breaker.

- F. Couplings and Restraint Materials:
 - 1. Pipe coupling.
 - 2. Rubber expansion.
 - 3. Tension tie rods.

- G. Water Meter:
 - 1. US gallon type, Hersey Meter.

- H. Pressure Relief Valve:
 - 1. General:
 - a. To relieve high pressures in the high pressure zone, a 3-inch-diameter pilot-controlled, hydraulically operated, diaphragm-type automatic controlled relief valve shall be installed.
 - b. The valve shall be manufactured in accordance with AWWA C508.
 - c. The pilot control shall be set for the normally closed position to open the main valve whenever the sensed pressure is above the adjustable pilot spring setting.
 - d. The relief pilot shall be factory set to open at 100 psi and shall be adjustable between 75 and 125 psi.
 - e. The relief valve shall be quick to open and slow to close.
 - f. The pressure relief valve shall discharge to atmosphere as shown on drawings.
 - 2. Construction:
 - a. The valve shall be globe angle pattern and flanged to meet ANSI Class 152 for a maximum pressure rating of 250 psi. Valve shall have fusion bonded epoxy coating inside and out.
 - b. The valve shall be furnished with a stainless steel replaceable seat.
 - c. The pilot control shall be direct acting, adjustable, spring loaded, and set for the normally closed position.
 - d. A valve equal to a Cla-Val Model 50-01 is indicative of the valve intended.

- I. Electrical and Controls:
 - 1. General:
 - a. All wiring shall comply with the NEC and applicable state and local codes.

For Review Only

- b. Wiring to be completely factory installed, except for the electrical feed that runs to the control panel continuously from the external disconnect switch. Wiring shall be type THHN, 12 AWG minimum. All wiring within control panels shall be insulation type MTW, minimum size 16 AWG.
 - c. All wiring within the equipment chamber and outside the control panel shall be run in rigid aluminum conduit.
 - d. Liquid-tight flexible metal conduit shall be used to connect the pump motors.
 - e. The electrical apparatus and control panel design, assembly and installation, and the integration of component parts will be the responsibility of the manufacturer of record for this booster pumping equipment.
 - f. All control and starting equipment panels shall be constructed in accordance with Underwriter's Laboratories (UL) Standard 508 "Industrial Control Equipment" and be so labeled.
2. Equipment Grounding:
 - a. Each electrical equipment item in the installation shall be properly grounded per Section 250 of the National Electrical Code.
 - b. All ground wires from installed equipment shall be in conduit and shall lead back to the control panel to a copper ground buss specific for grounding purposes and so labeled. The ground buss shall be complete with a lug large enough to accept the installing electrician's bare copper earth ground wire. The bus shall serve as a bond between the earth ground and the equipment ground wires.
3. Control Panel:
 - a. The panel shall have, at a minimum, the following devices:
 - (1) 200 amp main, 240 volt, three phase.
 - (2) Two NEMA starters; size based on motor amperage.
 - (3) 7.5 KVA, 480 volt-120/240 volt, single phase transformer.
 - (4) Lighting panel as described under 5. Panelboard.
 - b. The control panel shall be UL-labeled as an assembled unit.
4. Lights:
 - a. The equipment chamber shall be lighted by two dual lamp, 32 watt, rapid start fluorescent light fixtures with guards provided within the equipment chamber.
 - b. A manual light switch shall be provided and conveniently located at the top of the entrance tube. Automatic control of the lights shall be as described under Ventilation System.
5. Panelboard
 - a. A 120/240 volt lighting panel shall be provided.
 - b. Panel to be Square D Catalog No. MH26WP, 16 circuit, with 60 amp, 2-pole main breaker, or equal
 - c. Panel to have twelve 20 amp, single-pole circuit breakers to feed lights, outlets, sump pump, heater, ventilation system, dehumidifier, cathodic protection system, chart recorder, pump control panel, and SCADA panel.
6. Control Philosophy (General):
 - a. The booster station will receive control signals to start-stop the pumps from a remote supervisory control signal.
 - b. Individual push-to-test indicating lights shall be provided on the pump control panel to show pumping running "Green," failed "Red," and required "Amber." All pilot lights shall be 30 mm, heavy duty, oil tight.
 - c. Low system side, suction side of the booster pumps shall have a pressure switch to shut off the booster pumps if a pressure below 20 psi is sensed. Shutoff shall be delayed by a timer with an adjustable setting from 0 to 30 seconds that requires the pressure to be below the setpoint for the time setting on the timer before the pump is shut off. When the pump is shut off because of low pressure, an alarm

For Review Only

shall be sent to the SCADA panel and to a "Red" low pressure push-to-test indicating light on the pump control panel.

7. Booster Pumps:

a. The booster pump controls shall be as follows:

- (1) Provide a H-O-A switch for each pump which will perform the following functions:
 - (a) When the H-O-A switch is in the "Hand" position the pump shall start bypassing all controls.
 - (b) "Off" shall shut down the pump.
 - (c) When in the "Auto" position, the pump shall be controlled by the start-stop outputs from the SCADA panel.
 - (d) Booster pump failure shall consist of a signal from a limit switch on the booster pump check valve arm. If this signal is not sensed following a 0 to 360 second time delay after a call to run, a fail signal shall be given. Failure shall also consist of pump motor not being energized and staying energized when supervisory controls call for operation (call to run fail) or from an auxiliary overload relay contact on the motor starter.
- (2) Provide an elapsed time meter on the pump control panel for each pump to monitor pump run time.
- (3) Provide automatic alternator for the pumps. Provide position selector switch on the front of the control panel to select either pump as the lead or auto alternation of the pumps.
- (4) All selector switches and pushbuttons shall be 30 mm, heavy duty, oil tight.

J. Chamber Appurtenances:

1. Sump Pump:

- a. The equipment chamber sump shall be provided with an automatic operated submersible sump pump with a vertical close-coupled motor complete with controls.
- b. The motor housing, pump volute, and impeller shall be of high-grade cast iron construction. The integral pump and motor shaft shall include sealed bearings and a replaceable mechanical shaft seal to exclude water from the motor housing.
- c. The pump motor shall be 120 volt, single phase, and be thermally protected and of adequate horsepower to meet the operating conditions of 1,000 gph at minimum 15 feet TDH design head.

2. Dehumidifier:

- a. A packaged dehumidifier assembly with hermetically sealed Freon refrigeration-type compressor, expansion coil, fan, and condenser coil shall be provided to maintain the relative humidity of the air to prevent condensation on the walls. The dehumidifier shall be controlled automatically by an adjustable humidistat located on the dehumidifier. A low-temperature thermostat shall be provided for the dehumidifier.
- b. The dehumidifier shall be housed in a heavy steel enclosure securely fastened to the wall of the station. The condensate shall be drained to the station sump.
- c. The dehumidifier shall have a capacity of 24 pints per 24 hours at 80°F and 60% relative humidity. The dehumidifier performance shall be as certified by the Association of Home Appliance Manufacturers.

For Review Only

3. Ventilation System:
 - a. A ventilating system shall be provided to maintain a fresh air system in the equipment chamber. The exhaust blower shall be sized and rated to change the equipment chamber air six times per hour with a minimum 100 scfm.
 - b. The blower shall be of the centrifugal, squirrel cage design with statically balanced wheel to assure quiet performance and maximum air delivery. The blower shall be thermostatically controlled and shall also be provided with an automatic and a manual switch located near the top of the access tube. Automatic control shall be such that when the hatch to the station is open the fan shall start and the lights shall come on. There shall be a manual switch on the interior and exterior of the station to shut off the fan. Exterior switch shall be NEMA 4X.
 - c. The exterior exhaust duct shall be fabricated of Schedule 40 steel pipe terminating above grade in a screened 180 degree elbow for protection against weather and foreign objects.
 - d. An inlet air duct shall be provided to direct air to within 18 inches of the station floor. A 180 degree return bend with insect screen shall be provided at the inlet.
 4. Heater:
 - a. The equipment chamber shall be provided with a wall-mounted 1500 watt electric heater suitable for 120 volt, single phase service.
 - b. The heater shall be of the fan-forced-type complete with an integral automatic dial type thermostat, copper anodized aluminum reflector and safety grill. The heater shall be provided with a UL-approved electric cord and 3-prong plug.
 5. Fire Extinguisher:
 - a. Fire extinguisher shall be provided with wall mounting bracket.
 - b. Extinguisher shall be UL-approved dry chemical-type fire extinguisher for Class A, B, and C fires; 10-pound capacity.
 6. Floor Mats: The floor in all working areas within the station shall be protected with heavy duty 1/2-inch-thick open slotted, ribbed underside matting; flat backed matting is prohibited.
- K. Pressure Gauges:
1. Locate two gauges as shown on the drawings and specified herein.
 2. Gauges shall be aluminum 4 1/2-inch ASA grade AA combination bourdon gauges.
 3. Gauges shall be equipped with properly sized ray pressure snubbers and brass shutoff valves.
 4. Gauges shall be graduated in psi with a range from 0 to 100 psi.
 5. Provide tap locations on the low and high pressure sides of the transmission pipe as it enters and leaves the station for pressure locations. Include manual sample tap faucets at same location.
 6. Mount pressure gauges and transducers on common panel on wall at convenient location for operation to view.
- L. Pressure Transducers:
1. Provide two pressure transducers with 4-20 mA output signals to the SCADA panel.
 2. Transducers shall be Foxboro Model IGP20, or equal. Provide two valve manifold with isolation provisions for transducers for proper operation and maintenance.
 3. Mount pressure gauges and transducers on common panel on wall at convenient location for operators to view.
- M. Pressure Switch:
1. Switches shall be differential pressure-type as manufactured by Allen Bradley.
 2. Switches shall have a fixed deadband with a single adjustment.

For Review Only

3. The switch shall be rated at 7.5 amps at 120 vAC.
4. The switch deadband shall be a maximum of 1 psig.
5. Initial switch setting shall be minimum 20 psi with a maximum setting of 50 psi.

N. Float Switch: Provide a float switch to indicate station flooding at the SCADA panel. Float switch shall be US Filter Model 101G, or equal.

2.04 ACCESSORIES

- A. Cathodic Protection: The effects of underground corrosion upon the equipment chamber shall be attenuated by means of a cathodic protection system. Protection shall be provided by a minimum of six 17-pound magnesium anode packs with insulated copper leads.
- B. Provide two 2 1/2-inch NPT threaded flushing tees with isolation valves on suction and discharge pipe where shown on drawings. Provide threaded caps for openings.
- C. Labeling: Manufacturer shall provide painted stencil labeling for all capsule penetrations and the following: Interior Components:
 1. Low pressure/suction main (with flow arrow).
 2. High pressure/discharge main (with flow arrow).
 3. Booster pump identification.
 4. Pressure relief value.
 5. Pressure sustaining valve.
 6. Rate of flow valve.

2.05 FINISHES

- A. Unless otherwise specified, valves, piping, and fabricated mechanical equipment items shall be furnished with all surfaces (except galvanized, stainless steel, rubber, copper, PVC, and underground piping) cleaned to near white grade SSPC Specification No. 10 removing all dirt, rust scale, and foreign materials. Cleaning shall be done at such time during the assembly process as to preclude damage to the equipment once assembled.
- B. Exterior surface finish coats shall be Tnemec Series N69 Hi-Build Epoxoline II as previously specified for capsule exterior.
- C. It is the intent of this specification that all equipment, supports, and appurtenances shall be furnished factory shop-primed, clean, and ready to accept finish painting by CONTRACTOR with a minimal amount of surface preparation. Preparation and painting shall conform to all requirements and provisions specified in Division 9. Unless otherwise specified, mechanical equipment and accessories shall be furnished with all surfaces (except galvanized, stainless steel, rubber, copper, PVC) prepared in accordance with near white grade SSPC Specification No. 10 removing all dirt, rust scale, and foreign materials. Surface preparation shall be done at such time during the assembly process to preclude damage to the equipment once assembled. Cleaned surfaces shall then be factory shop-primed. Factory shop-priming shall be with one coat of Tnemec 140-1255 Beige Pota-Pox Primer, or equal, shall be NSF approved, and applied to a minimum of 5.0 mils dry thickness. Primer used shall be compatible with proposed finish coats; CONTRACTOR shall verify. Motors and speed reducers shall be factory shop-primed and finished-painted using the manufacturer's standard paint system for the specified application.

2.06 ANCHOR BOLTS

For Review Only

- A. Provide all anchor bolts required for equipment furnished. Anchor bolts shall be 316 stainless steel of ample strength for the intended service. Provide anchor bolts in accordance with Division 5.

PART 3—EXECUTION

3.01 GENERAL

- A. Refer to requirements specified in Division 1 for equipment installation quality control, testing, supervision, start-up, and operator training.

3.02 INSTALLATION

- A. Booster Station:
 - 1. Below grade booster station shall be installed in accordance with these specifications and manufacturer's instructions.
 - 2. Booster station shall be secured to a concrete slab with anchor bolts as noted in Section 03300—Concrete Base Slab.
 - 3. Prior to installation, booster station shall be inspected for apparent defects.
 - 4. After the installation is complete, the manufacturer of the station shall provide the services of a factory trained representative to perform initial start-up of the booster station and to instruct OWNER's operating personnel in the operation and maintenance of all equipment in a manner acceptable to ENGINEER. CONTRACTOR to coordinate initial start-up with OWNER, ENGINEER, and manufacturer.
- B. Utility Meter Disconnect, Station Electrical, and Controls:
 - 1. The utility company is Kentucky Utilities. CONTRACTOR shall coordinate with the utility company for the new electrical service to the booster station. All equipment, conduit, and devices not provided by the utility company, but required, shall be provided by CONTRACTOR.
- C. Sump Pump: Route sump pump discharge out of station to downturned screened double elbow with splash pad and 2 cubic yards of stone riprap. Provide 24-inch free clearance above ground surface for discharge location. Location of discharge to be approved by OWNER.
- D. Crushed Stone Mat, Concrete Base Slab and Fill Concrete: CONTRACTOR shall anchor station to concrete base slab which is placed on crushed stone mat with anchor bolts as described in Section 03300—Concrete Base Slab. Void area between concrete slab and booster station shall be filled with Class X fill concrete.
- E. Pressure Testing:
 - 1. After the station is installed, the exterior water main and pressure piping within the station, including valves, pumps, control valves, fittings, and connections as make up the entire system shall be hydrostatically tested at a pressure of 150 psi or a pressure equal to the lowest test pressure rating of the equipment within the tested system.
 - 2. CONTRACTOR shall utilize flushing taps inside station to permit flushing of station and water main connections with temporary hoses routed outside of station.

For Review Only

- F. Factory Startup Service: Startup service will be provided by booster station manufacturer. CONTRACTOR shall coordinate startup activities with manufacturer.
- G. Disinfection: CONTRACTOR shall flush and disinfect water main and station piping.
- H. Corrosion Protection:
 - 1. Magnesium anode packs shall be placed vertically in the ground at equidistant intervals around the equipment chamber. The bottom end of the anodes shall be at the same elevation as the base of the equipment chamber and shall be located approximately 5 feet from the structure. A NEMA 4X junction box shall be installed above grade and the anode leads shall be wired to a terminal strip in the junction box.
 - 2. An anode tester with controls shall be wired to an enclosure provided within the equipment chamber. The location of each anode bag shall be marked with a minimum 2-foot-long, 2-inch by 2-inch wooden post driven flush to the ground surface with a minimum 40d nail securely tapped into a predrilled hole on the post's end.

END OF SECTION

SECTION 13312
For Review Only
TELEMETRY SYSTEM

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

- A. OWNER utilizes a radio telemetry system comprised of Aquatrol and Control Microsystems equipment to monitor and control all pumping stations and tank sites in the existing distribution system. Work included in this Contract related to the telemetry system is listed below.
 - 1. Make modifications to the existing telemetry master panel located at OWNER's main office.
 - 2. Furnish, install, and place into operation telemetry equipment at the proposed US 62 Pumping Station to control pump operation and monitor miscellaneous data.
- B. It is the intent of these specifications that CONTRACTOR provide a complete and successfully operating system as herein described. CONTRACTOR shall assume responsibility for the satisfactory operation of any equipment provided. Refer to the Drawings for further installation details.
- C. All equipment provided in this Contract shall be compatible with the existing Aquatrol/Control Microsystems telemetry system.

1.02 RELATED WORK

- A. Special requirements for equipment are included in Divisions 0 and 1.
- B. Electrical is specified in Division 16.

1.03 SUBMITTALS

- A. Shop Drawings
 - 1. Shop drawings shall be submitted in accordance with Division 1.
 - 2. Shop drawing submittals shall include, as a minimum:
 - a. Installation instructions
 - b. Descriptive literature
 - c. Wiring diagrams
 - d. Operation and maintenance instructions
 - e. Parts list

PART 2 - PRODUCTS

2.01 AVAILABLE MANUFACTURERS

- A. Subject to compliance with the complete requirements of these Specifications, manufacturers offering products that may be incorporated into the Work includes, but are not limited to Control Microsystems.

2.02 EQUIPMENT

For Review Only

- A. US 62 Pumping Station Terminal Units (RTU)
1. An RTU shall be located at the US 62 Pumping Station as shown on the Drawings. The RTU equipment shall be housed in two (2) NEMA 12 enclosures. One enclosure shall house pressure switches and pressure gauges, the other enclosure shall house the remaining RTU equipment. A conduit seal shall be provided in the conduit between the two panels. A strip heater shall be provided for condensation protection.
 2. The RTU shall control the two booster pumps based on water elevation in the controlling Kelat Tank, and shall monitor the following status points:
 - a. Pump No. 1 Run
 - b. Pump No. 2 Run
 - c. Station Intrusion
 - d. Low Station Temperature
 - e. Pump No. 1 In Auto
 - f. Pump No. 2 In Auto
 - g. High Discharge Pressure
 - h. Low Discharge Pressure
 - i. Low Suction Pressure Cut-Out
 - j. Low Suction Pressure RestoreRefer to 2.02 D. for a description of how these alarms are to be detected.
 3. All communication shall be with the telemetry master panel via FM radio communication.
 4. A "GEL CELL" battery and regulated power supply with integral trickle charger shall be provided for stand-by power in the event of a power failure. The RTU shall have the ability to operate up to 24 hours on its internal battery.
 5. The RTU shall include light emitting diodes which shall indicate the operational status of the RTU as well as the current status of the various digital outputs and inputs. The RTU shall be furnished with on-board diagnostics and indication of data fail condition.
 6. The status of all inputs monitored by the telemetry system shall be communicated to the master panel at the main office.
- B. Telemetry Master Panel Modifications
1. The existing telemetry master panel shall be modified to add the US 62 Pumping Station.
 2. The following modules shall be added to the telemetry master panel for the US 62 Pumping Station:
 - a. 1 - 6 point alarm annunciator.
 - b. 2 - Dual set-point controllers for lead/lag pump on/off control.
 - c. 2 - Pump H-0-A selector and pump call for/run/fail modules.
 - d. 2 - Indicators for "pump auto mode selected" and "pump in lead" (one indicator for each pump).These modules shall be mounted in an arrangement similar to other existing pumping stations, and provided with a nameplate reading "US 62 Pumping Station".
 3. The master panel controls pump operation at various pumping stations are based on tank water elevations. In this Contract, the master panel shall be modified for the KY 32 Tank's water level to control the proposed US 62 Pumping Station.
 4. All data points added on this Contract shall be included in the reports generated by the master panel. An alarm horn is provided on the panel front. All additional alarm points provided in this Contract shall cause the alarm horn to be energized.

For Review Only

C. Communication Equipment

1. Transmission between the RTUs and master panel shall be via a VHF FM radio communication system. Proposed radio equipment shall operate on the same frequency as the existing system (154.47125 MHz) and shall be compatible with existing equipment. All antennas, coaxial cables, and accessories shall be furnished under this specification division. CONTRACTOR shall be responsible for obtaining all FCC licenses for each site. All costs associated with FCC licensing shall be borne by CONTRACTOR.

D. Monitoring of Alarm and Status Conditions

1. The following describes how each of the alarm and status conditions will be monitored. Unless noted otherwise, all sensors shall be provided under this specification section.
 - a. Data Fail: From telemetry master panel, when the master is unable to communicate with the remote unit.
 - b. Telemetry Cabinet Low Temperature: Thermostat mounted in the transducer cabinet.
 - c. Telemetry Cabinet Entry: Limit switch mounted on telemetry cabinet door.
 - d. High Pumping Station Discharge Pressure: Pressure switch in RTU panel.
 - e. Low Pumping Station Discharge Pressure: Pressure switch in RTU panel.
 - f. Pumping Station Low Suction Pressure Cut-Out: Pressure switch in RTU panel.
 - g. Pumping Station Low Suction Pressure Restore: Pressure switch in RTU panel.
 - h. Pump In Automatic Mode: Auxiliary contact in pump control circuit H-0-A switch, provided under this specification section.
 - i. Pumping Station Intrusion Alarm: Limit switch mounted on pumping station access hatch, provided by pumping station manufacturer (Division 11).
 - j. Pumping Station Low Temperature: Thermostat mounted in pumping station capsule, provided by pumping station manufacturer (Division 11).
 - k. Pump Run: Micro-switches mounted on pump discharge check valves, provided by pumping station manufacturer (Division 11).

PART 3 - EXECUTION

3.01 INSTALLATION/APPLICATION/ERECTION

- A. The telemetering equipment shall be installed in accordance with the manufacturer's instruction and in compliance with applicable FCC requirements.
- B. The telemetry equipment supplier shall perform a radio path study to verify adequate communication reliability. This study shall be submitted with shop drawings and shall include any manufacturers' recommendations.

END OF SECTION

SECTION 16010 For Review Only

GENERAL ELECTRICAL REQUIREMENTS

PART 1—GENERAL

1.01 SUMMARY

- A. Work includes general requirements for all electrical work.
- B. Related Sections and Divisions: Applicable provisions of Division 1 shall govern work in this section.

1.02 REFERENCES

- A. ANSI/NFPA 70—National Electric Code.
- B. ANSI/IEEE C2.

1.03 CONTRACT DOCUMENTS

- A. Any device roughed-in improperly and not positioned on implied centerlines, or as dictated by good practice, must be repositioned at no cost to OWNER.
- B. The drawings are generally diagrammatic, and CONTRACTOR shall coordinate the work so that interferences are avoided. Provide all offsets in conduit, fittings, etc., necessary to properly install the work. All offsets, fittings, etc., shall be provided without additional expense to OWNER.

1.04 REGULATORY REQUIREMENTS

- A. Conform to ANSI/NFPA 70.
- B. Conform to ANSI/IEEE C2.
- C. The rules and regulations of the federal, state, local, civil authorities, and utility companies in force at the time of execution of the Contract shall become a part of this specification.
- D. Obtain electrical permits and inspections from authority having jurisdiction. Costs for permits and inspections shall be by CONTRACTOR.

1.05 CODES AND ORDINANCES

- A. CONTRACTOR is expected to know or to ascertain, in general and in detail, the requirements of all codes and ordinances applicable to the construction and operation of systems covered by this Contract. CONTRACTOR shall know or ascertain the rulings and interpretations of code requirements being made by all authorities having jurisdiction over the work to be performed by him.

For Review Only

- B. In preparing his Bid, CONTRACTOR shall include the cost of all items and procedures necessary to satisfy the requirements of all applicable codes, ordinances, and authorities whether or not these are specifically covered by the drawings and specifications. All cases of serious conflict or omission between the drawings, specifications, and codes shall be brought to ENGINEER's attention as herein before specified. CONTRACTOR shall carry out work and complete construction as required by applicable codes and ordinances and in such manner as to obtain approval of all authorities whose approval is required.
- C. When requested by ENGINEER, CONTRACTOR shall provide written calculations to show compliance with applicable codes or the Contract Documents. This shall include, but not be limited to, conduit and wire sizing, junction and pull box fill and sizing, manhole sizing, conductor derating, and voltage drop. CONTRACTOR shall indicate calculation method used as well as compliance with applicable code, drawing, or specification.

1.06 EQUIPMENT PROVIDED UNDER OTHER DIVISIONS

- A. Included in this Contract are electrical connections to equipment provided under other divisions. This CONTRACTOR shall refer to final shop drawings for equipment being furnished under other divisions for exact location of electrical devices and the various connections.

1.07 ELECTRICAL DISTRIBUTION SYSTEM

- A. Provide a complete electrical distribution system consisting of components indicated on the drawings or specified herein, including, but not limited to:
 - 1. All miscellaneous equipment coordination and related appurtenances required by power company.
 - 2. 240/120 volt, 3 phase, 4 wire service entrance conductors.
 - 3. Feeders, branch wiring, electrical distribution equipment.
 - 4. All control wiring.
 - 5. Access panels and access doors for access to equipment installed by Division 16.
 - 6. Wiring between system components if equipment is not prewired.
 - 7. Support system design and supports for electrical raceways.
 - 8. Code required disconnects.
- B. CONTRACTOR shall connect the following equipment furnished by Division 11 consisting of components indicated on the drawings or specified herein, including, but not limited to:
 - 1. Pump Station Capsule.
- C. CONTRACTOR shall instruct OWNER's representative in the operation and maintenance of all equipment. The instruction shall include a complete operating cycle on all apparatus.
- D. Provide miscellaneous items for a complete and functioning system as indicated on the drawings and specified herein.
- E. A partial list of work not included in Division 16 is as follows: Painting (except as otherwise specified herein).

For Review Only

1.08 NOISE

- A. Eliminate any abnormal noises which are not considered by ENGINEER to be an inherent part of the systems as designed. Abnormal buzzing in equipment components will not be acceptable.

1.09 DRAWINGS

- A. The drawings indicate approximate locations of the various items of the electrical systems. These items are shown approximately to scale and attempt to show how these items should be integrated with construction. Locate all the various items by on-the-job measurements in conformance with Contract Documents and cooperation with other trades.
- B. The drawings are schematic in nature and are not intended to show exact locations of conduit but rather to indicate distribution, circuitry, and control.
- C. In certain instances, receptacles, fixtures, equipment, or other devices may be relocated. Where relocation is within 10 feet of location shown on the drawings, and when CONTRACTOR is informed of necessary relocation before work is begun on this portion of the job, the relocation shall be at CONTRACTOR'S expense.

1.10 EXISTING UNDERGROUND UTILITIES

- A. The drawings show approximate location of existing underground electrical based on OWNER-provided record drawings. CONTRACTOR shall excavate and verify the location of all underground electrical prior to installing new electrical equipment and prior to making modifications to existing electrical. This shall include, but not be limited to, feeders to structures and equipment, branch circuit wiring, phone and communication cabling, instrument wiring, and control wiring. CONTRACTOR shall temporarily relocate existing underground electrical to keep the existing facility in operation and for any new construction, and all costs for relocating existing electrical shall be included in the Bid.
- B. Record drawings of existing underground electrical utilities are not available for this facility. CONTRACTOR shall excavate and verify the location of all underground electrical prior to installing new electrical equipment. This shall include, but not be limited to, feeders to structures and equipment, branch circuit wiring, phone and communication cabling, instrument wiring, and control wiring. CONTRACTOR shall temporarily relocate existing underground electrical to keep the existing facility in operation and for any new construction, and all costs for relocating existing electrical shall be included in the Bid.

1.11 SUBMITTALS

- A. CONTRACTOR shall submit to ENGINEER for approval prior to beginning his work, shop drawings on the equipment proposed to be furnished and installed. See Division 1-Submittals for requirements.
- B. CONTRACTOR shall, in addition, submit drawings and/or diagrams for review and for job coordination in all cases where deviation from the Contract Drawings are contemplated because of job conditions, interference or substitution of equipment, or when requested by ENGINEER for purposes of clarification of CONTRACTOR's intent. CONTRACTOR shall also submit detailed drawings, rough-in sheets, etc., for all special or custom-built items or

For Review Only

equipment. Drawings and details under this section shall include, but not be limited to, the following, where applicable to this project:

1. Electrical interlock wiring diagrams; see Section 16480–Motor Control.
 2. Major feeder routing in plan and elevation.
- C. These drawings and diagrams shall show all electrical switch and breaker sizes as well as the manufacturer’s name and catalog number of each piece of equipment used.
- D. Equipment and material submittals must show sufficient data to indicate complete compliance with Contract Documents as follows:
1. Proper sizes and capacities.
 2. Construction materials and finishes.
- E. When the manufacturer’s reference numbers are different from those specified, provide correct cross reference number for each item. The shop drawings shall be clearly marked and noted accordingly.
- F. When equipment and items specified include accessories, parts, and additional items under one designation, shop drawings shall be complete and include all components.
- G. See additional requirements of shop drawings under Division 1–General Requirements.

PART 2–PRODUCTS

2.01 STANDARD PRODUCTS

- A. All equipment shall be UL-listed and NEMA-approved.
- B. Unless specified otherwise, major distribution equipment such as panelboards, distribution equipment, motor control panels, drytype transformers, etc., shall each be by the same manufacturer.
- C. All equipment and wiring shall be selected and installed for conditions in which it will perform; e.g., general purpose, weatherproof, rain-tight, explosion-proof, dust-tight, or any other special type.

2.02 SUBSTITUTION OF MATERIALS AND EQUIPMENT

- A. While it is not the intention of OWNER to discriminate against any manufacturer of equipment which may be equivalent to specified equipment, a strict interpretation of such equivalency will be exercised in considering any equipment offered as a substitute for specified equipment. CONTRACTOR shall submit with each request for approval of substitute material or equipment, sufficient data to show conclusively that it is equivalent to that specified in the following respects:
 1. Performance:
 - a. Capacity at conditions and operating speeds scheduled shall be equal to or greater than that of the specified equipment.
 - b. Energy consumption at the point of rating shall not exceed that of the specified equipment.
 - c. Vibration and noise production at the point of rating shall not exceed that of the specified equipment.

For Review Only

2. Materials of Construction.
 3. Gauges, weights and sizes of all portions and component parts.
 4. Design arrangements and workmanship.
 5. Coatings, finishes and durability of wearing parts.
 6. National reputation of the manufacturer as a producer of first quality equipment of the type under consideration.
 7. Availability of prompt, reliable and efficient service facilities franchised by or affiliated with the equipment manufacturer. This shall include the maintenance of local stocks of critical replacement parts equal to those maintained for the specified equipment.
- B. Requests for substitution shall include CONTRACTOR's reason for the request.
- C. If ENGINEER does not consider the items equivalent to those specified, CONTRACTOR shall provide those specified.
- D. See General Conditions for additional requirements.

PART 3-EXECUTION

3.01 UTILITY SERVICES

- A. Utility connection requirements shall be determined. All costs for coordinating utility service shall be included in the price bid as described in Section 16420-Electrical Service System of these Specifications.
- B. All costs for temporary service, temporary routing of piping, or any other requirements of a temporary nature associated with the utility service shall be included.
- C. It is the intent that in the latter stages of construction, the permanent electrical service will be used and the temporary construction service discontinued. The following requirements shall govern the use of the permanent services.
1. Only permanently connected and protected circuits and outlets shall be available.
 2. Temporary wiring shall not be connected to permanent distribution equipment.
 3. Under the above conditions, the use of permanent service equipment shall in no way affect the Contract conditions of the guarantee.
- D. It shall be CONTRACTOR's responsibility to police this situation and protect their equipment.

3.02 CONTINUITY OF SERVICE

- A. CONTRACTOR shall provide and maintain continuous services (power, controls, alarms, etc.) during the entire construction period.
- B. No service shall be interrupted or changed without permission from OWNER. Written permission shall be obtained before any work is started.
- C. When interruption of service is required, all persons concerned shall be notified and a prearranged time agreed upon. Notice shall be a minimum of 72 hours prior to the interruption.

For Review Only

3.03 CLEANING UP AND REMOVAL OF RUBBISH

- A. All control panels, motor starter and disconnect switch enclosures, junction boxes, and pullboxes shall be cleaned of debris and wires neatly arranged with surplus length cut off prior to installation of covers.
- B. Equipment shall be thoroughly cleaned of all stains, paint spots, dirt, and dust. All temporary labels not used for instruction or operation shall be removed.

3.04 CONCRETE WORK

- A. All cast-in-place concrete for new electrical equipment bases shown on the drawings shall be provided by CONTRACTOR except where specifically noted to be provided by others. All new equipment shall be set on 3 1/2-inch, minimum, above finished grade, leveling slabs or as shown on the drawings, including control panels. Pads shall be 3 inches larger than equipment being supported.
- B. Concrete shall be minimum 6-bag, 4,000 psi, air-entrained, cast-in-place concrete. Reinforcing shall be grade 60. Concrete shall comply with Section 03300–Cast in Place Concrete.
- C. Provide all anchor bolts, metal shapes, and templates to be cast in concrete or used to form concrete for support of electrical equipment.

3.05 PAINTING

- A. All painting of electrical equipment shall be done by CONTRACTOR unless equipment is specified to be furnished with factory-applied finish coats.
- B. All electrical equipment shall be provided with factory-applied prime finish, unless otherwise specified.
- C. If the factory finish on any equipment furnished by CONTRACTOR is damaged in shipment or during construction, the equipment shall be refinished by CONTRACTOR to the satisfaction of ENGINEER.
- D. One can of touch-up paint shall be provided for each different color factory finish which is to be the final finished surface of the product.

3.06 CAULKING

- A. Caulk with a caulking sealant where indicated on the electrical drawings or hereinafter specified.
- B. Caulking sealant shall be silicone construction sealant as manufactured by General Electric or two-part polysulfide conforming to the requirements of, and bearing the seal of, the Thiokol Chemical Corporation.
- C. Caulking sealant shall contain no acid or ingredients which will stain stone, corrode metal, or have injurious effect on painting. It shall be colored to match adjacent surroundings.
- D. Caulking shall be performed by craftsman skilled at such work.

For Review Only

3.07 COORDINATION

- A. Provide wiring for all motors and all electrically powered or electrically controlled equipment.
- B. All starters, disconnects, relays, wire, conduit, push-buttons, pilot lights, and other devices for the power and control of motors or electrical equipment shall be provided by CONTRACTOR, except as specifically noted elsewhere in these specifications or on the drawings.
- C. Where starters or other devices are provided by others, they shall be connected and wired by CONTRACTOR.
- D. CONTRACTOR's drawings and specifications shall show number and horsepower rating of all motors furnished together with their actuating devices. Should any change in size, horsepower rating, or means of control be made to any motor or other electrical equipment after the contracts are awarded, any additional costs due to these changes shall be the responsibility of CONTRACTOR.
- E. All motors shall be provided for starting in accordance with local utility requirements and shall be compatible with starters as specified here or under the various trades' sections of these specifications.
- F. CONTRACTOR shall provide all power and control wiring and connect all equipment complete and ready to operate.
- G. CONTRACTOR shall connect and wire all apparatus according to approved wiring diagrams furnished by the various trades.

3.08 EXCAVATION AND BACKFILL

- A. Backfill of exterior trenches shall be compacted granular fill. Compaction shall meet the requirements of Division 20.
- B. Lines passing under foundation walls shall have a minimum of 1 1/2-inch clearance.
- C. Care shall be taken to insure no disturbance of bearing soil under foundations.
- D. CONTRACTOR shall follow underground pipe runs where possible to avoid additional rock excavation. See Division 2 for rock excavation requirements.

3.09 EQUIPMENT ACCESS

- A. CONTRACTOR shall coordinate work of this division with that of other divisions so that all systems, equipment, and other components will be installed at the proper time, will fit the available space, and will allow proper service access to those items requiring maintenance. This means adequate access to all equipment, not just that installed under this division.
- B. Any components for the electrical systems which are installed without regard to the above shall be removed and relocated as required to provide adequate access at CONTRACTOR's expense.

For Review Only

- C. All equipment, junction and pull boxes, and accessories shall be installed to permit access to equipment for maintenance. Any relocation of conduits, equipment, or accessories to provide maintenance access shall be accomplished by CONTRACTOR at no additional cost.
- D. Electrical equipment, devices, instruments, hardware, etc. shall be installed with ample space allowed for removal, repair, calibration, or changes to the equipment. Ready accessibility to equipment and wiring shall be provided without moving other equipment which is to be installed or which is already in place.
- E. Locate electrical equipment to fit the details, panels, or finish of the space. ENGINEER shall reserve the right to make minor position changes before the work has been installed.

3.10 WORKMANSHIP

- A. Install work using procedures defined in NECA Standard of Installation.
- B. Location of process equipment as shown on the drawings is approximate.
- C. Utilization equipment and control devices required under these specifications shall be mounted in a code-approved manner.
- D. Locations of utilization equipment and control devices as shown on drawings are within 10 feet of actual positions. Any mounting of this equipment within this 10-foot distance will be performed at no additional cost to OWNER.
- E. Unless otherwise noted, equipment shall be fastened to foundation, structure, or equipment framework and not placed on the floor.
- F. Where materials, equipment apparatus, or other products are specified by manufacturer brand name and type of catalog number, such designation is to establish standards of desired quality and style and shall be the basis of the bid.
- G. Materials and equipment of the types for which there are National Board of fire Underwriters' Laboratories (UL) listing and label service shall be so labeled and shall be used by CONTRACTOR.

END OF SECTION

SECTION 16110
For Review Only
CONDUIT

PART 1–GENERAL

1.01 SUMMARY

- A. Work Included:
 - 1. Rigid metal conduit and fittings.
 - 2. Polyvinyl chloride conduit and fittings.
- B. Related Sections and Divisions: Applicable provisions of Division 1 shall govern work in this section.

1.02 REFERENCES

- A. ANSI C80.1–Rigid Steel Conduit, Zinc-Coated.
- B. ANSI/NEMA FB 1–Fittings and Supports for Conduit and Cable assemblies.
- C. NEMA RN 1–PVC Externally and Internally-Coated Galvanized Rigid Steel Conduit.

1.03 QUALITY ASSURANCE

- A. Manufacturers of Raceways: Firms regularly engaged in the manufacture of electrical raceways of the types and capacities required whose products have been in satisfactory use in similar service for not less than 5 years.
- B. Installer: A firm with at least 5 years of successful installation experience on projects with electrical wiring installation work similar to that for the project.
- C. Code Compliance: Comply with National Electrical Code (NFPA 70) and any and all local codes as applicable to construction and installation of electrical wiring devices, material, and equipment herein specified.
- D. UL Labels: Provide electrical cable, raceways, wire, connectors, outlets, switches, etc., which have been listed and labeled by Underwriters Laboratories.
- E. Prior to shipment to the site, all conduit shall be new, unused material, and may not have been stored outdoors or exposed to weather.
- F. NECA Standard: Comply with applicable portions of National Electrical Contractor's Association's "Standard of Installation."

1.04 SUBMITTALS

- A. Submit shop drawings and product data in accordance with provisions of Section 01300–Submittals.

For Review Only

1.05 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Provide color-coded thread protectors on the exposed threads of threaded rigid metal conduit.
- B. Handle conduit carefully to prevent end-damage and to avoid scoring the finish.
- C. Store conduit inside and protect from weather. When necessary to store outdoors, elevate well above grade and enclose with durable waterproof wrapping.

PART 2—PRODUCTS

2.01 RIGID METAL CONDUIT AND FITTINGS

- A. Rigid Steel Conduit: ANSI C80.1. Heavy wall seamless tubing with hot-dipped galvanized coating.
- B. Fittings and Conduit Bodies: ANSI/NEMA FB 1; threaded type, material to match conduit.

2.02 POLYVINYL CHLORIDE CONDUIT (PVC) AND FITTINGS

- A. Conduit: Heavy wall rigid, Schedule 40, Schedule 80 where noted, UL-listed for underground, encased, and aboveground applications. PVC conduit installed in exterior locations shall be UV resistant.
- B. Fittings and Conduit Bodies: ANSI/NEMA FB 1.

2.03 CONDUIT SUPPORTS AND SPECIAL FITTINGS

- A. Expansion Fittings: Crouse Hinds or Robroy, type XJG, or equal, for rigid, or IMC conduit. Crouse-Hinds, type XD, or equal for PVC conduit.
- B. Expansion-deflection Fittings: OZ type "DX", Crouse-Hinds, type XD, or Appleton.
- C. Mechanical Seals: 316 stainless steel, Link Seal, or equal. Link Seals shall be provided with 316 stainless steel bolts, nuts, and fasteners.
- D. Conduit Clamps, Straps, and Supports: Fiberglass, PVC or 316 stainless steel with no crevices.
- E. Water Tight Hubs: Die-cast, insulated, and gasketed, rated for wet or dry locations, indoors or outdoors. Water tight hubs shall be Appleton HUB, Crouse Hinds Meyers Hubs, or equal.

PART 3—EXECUTION

3.01 CONDUIT SIZING, ARRANGEMENT, AND SUPPORT

- A. Size conduits for branch circuit conductors, control wires, and instrumentation cables so as to have not less than 25% spare capacity after installation; 3/4-inch minimum size.

For Review Only

- B. Maintain at least 1-inch separation between conduit sizes to 1 1/2 inches, 2 inches between conduits 1 1/2 inches or larger. Maintain 1-foot separation between signal conduits (below 100 volts) and power conduits (100 volts and above).

3.02 CONDUIT INSTALLATION

- A. Provide for the proper application, installation, and location of inserts and supports and anchor bolts for a satisfactory raceway system. Where any component of the raceway system is damaged, replace or provide new raceway system.
- B. Run conduits concealed to avoid adverse conditions such as heat and moisture, to permit drainage, and to avoid all materials and equipment of other trades.
- C. Ream conduit smooth at ends, cap upon installation, rigidly attach to structural parts of the building, and securely fasten to all outlet boxes, panel cabinets, junction boxes, pull boxes, splicing chambers, safety switches, and all other components of the raceway system.
- D. Independently support or attach the raceway system to structural parts of construction in accordance with good industry practice.
- E. Conduits passing through masonry, concrete, or similar construction shall be cast-in-place using PVC coated rigid conduit extending completely through the construction.
- F. Where wall penetrations through existing walls are below grade, cored openings shall be sealed with waterproof mechanical seals. Cores shall be pitched slightly, such that conduit slopes away from building or structure. Sleeve diameter shall be provided and mechanical seals installed as recommended by the manufacturer.
- G. Conduit shall not be run in slabs-on-grade or structural topping slabs.
- H. Conduits installed for future equipment or electrical work shall be cut-off and capped flush with finished grade or slab. Conduit ends shall have threaded fittings to accommodate future conduit installation.
- I. Provide all empty raceways 2 1/2-inch and over with #10 galvanized fishwire, and nylon cord for conduits smaller than 2 1/2-inch. Empty raceways and fishwire/nylon cord shall be identified with permanent label, and label shall include conduit termination point. All empty conduits shall be threaded, capped and flush with finished grade or slab. Exposed conduits shall be threaded and capped.
- J. Provided conduit raceway for exposed cables that are not sunlight resistant. This shall include, but not be limited to, instrument wiring, motor terminators, pump cables, float cables, etc.
- K. Provide conduit expansion fittings as specified herein, in all conduit runs that cross a structural expansion joint, and for conduits protruding from earth where the conduit is terminated within 5 feet of finished grade.
- L. Provide conduit expansion –deflection fittings as specified herein, in all conduit runs where movement perpendicular to axis of conduit may be encountered.

For Review Only

- M. All conduits that protrude from poured concrete shall be PVC coated rigid conduit. Conduit shall extend a minimum of four feet beyond the poured concrete (both sides).
- N. Where fittings are brought into an enclosure with a knock-out, a gasket assembly consisting of an "O" ring and retainer shall be installed on the outside. Fittings shall be insulated throat type.
- O. PVC conduit shall be securely fastened to building structure at intervals not exceeding 3 feet, or closer.
- P. All conduit installed below grade shall be buried a minimum of 2 feet 0 inches.
- Q. PVC conduit installed in earth shall be bedded in compacted sand with a minimum of 6-inch cover on all sides.
- R. Conduit bends for PVC conduit shall be made using a hot box, heat blanket, or glycol bender. Open flame or point heat sources of any type are not allowed.

3.03 CONDUIT INSTALLATION SCHEDULE

- A. The following schedule lists specific conduit types allowed in designated areas. Those areas not listed under a specific conduit type shall not have that type of conduit installed.
 - 1. Rigid steel:
 - a. Structural slabs.
 - b. All exposed interior locations.
 - c. All concealed interior locations.
 - 2. PVC:
 - a. Earth, except within 6 feet of a structure footing, wall, manhole, and under pavement or roadways. (Schedule 80 only)
 - b. Service entrance ground conductors.

END OF SECTION

SECTION 16120

For Review Only

WIRE

PART 1—GENERAL

1.01 SUMMARY

- A. Work Included:
 - 1. Wire.
 - 2. Terminal blocks and accessories.
 - 3. Wiring connections and terminations.
- B. Related Sections and Divisions: Applicable provisions of Division 1 shall govern work in this section.

1.02 QUALITY ASSURANCE

- A. Manufacturers of Wire: Firms regularly engaged in the manufacture of electrical wire products of the types and ratings needed whose products have been in satisfactory use in similar service for not less than 5 years.
- B. Installer: A firm with at least 5 years of successful installation experience on projects with electrical wiring installation work similar to that in this project.
- C. Code Compliance: Comply with National Electrical Code (NFPA 70) and any and all local codes as applicable to construction and installation of electrical wiring devices, material, and equipment herein specified.
- D. UL Labels: Provide electrical raceways, wire, connectors, outlets, and switches that have been listed and labeled by Underwriters Laboratories.
- E. NECA Standard: Comply with applicable portions of National Electrical Contractor's Association's "Standard of Installation."

1.03 SUBMITTALS

- A. Submit shop drawings and product data under the provisions of Section 01300—Submittals.
- B. Submit shop drawings for wiring system including layout of distribution devices, branch circuit conduit and cables, circuiting arrangement, and outlet devices.
- C. Submit manufacturer's instructions.

1.04 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Provide factory-wrapped, waterproof, flexible barrier material for covering wire on wood reels, where applicable; and weather-resistant fiberboard containers for factory-packaging of wire, connectors, outlets, boxes, lamps, fuses, etc., to protect against physical damage in transit. Do not install damaged wire or other material; remove from project site.

For Review Only

- B. Store wire and other material in factory installed coverings in a clear, dry, indoor space which provides protection against the weather.

PART 2-PRODUCTS

2.01 WIRE

- A. All wire for permanent installation shall be new stranded copper, delivered to project in unopened cartons or reels, except where specifically noted and be UL listed for the use intended. No wire smaller than 12 AWG shall be used unless specifically noted. The use of multi-conductor cable is NOT ALLOWED.
- B. Motor circuit branch wiring and associated control wiring:
 - 1. Insulation type shall be THHN.
 - 2. Minimum size for motor control wiring shall be 14 AWG.
 - 3. Control wiring for supervisory equipment shall be shielded, sized per equipment manufacturer's recommendations, or as shown on drawings.
- C. All wiring within control panels and supervisory control centers shall be insulation type MTW, minimum size 16 AWG.
- D. Wiring in dry locations shall be THHN. Wiring in damp and wet locations shall be type XHHW-2. Damp and wet locations shall include but not be limited to exterior locations, unconditioned spaces, buried conduits, wet wells, and any washdown areas.
- E. All available colors shall be used; however, green shall be used only for equipment grounds. Where color-coded wire in larger sizes is not available, one wrap of 1-inch-wide, colored, self-adhesive tape at each terminal end shall be used for identification. Initial phase color shall be used throughout the run, even for switch legs. Colors must meet code requirements for each class voltage. Do not duplicate colors, including neutral, on different voltages.
- F. Color Coding:

	120/208/240V
A Phase	Black
B Phase	Red
C Phase	Blue
Neutral	White
Travelers	Yellow
Equipment Ground	Green

- G. Circuits 150 feet or over shall be sized for a maximum 2% voltage drop.

2.02 WIRING CONNECTIONS AND TERMINATIONS

- A. Stranded conductors may only be terminated with UL or ETL Listed type terminations or methods: e.g. stranded conductors may not be wrapped around a terminal screw but must be terminated with a crimp type device.

For Review Only

- B. Provide insulated, **silicone-filled** spring wire connectors with plastic caps for 8 AWG conductors and smaller. Connectors shall be King Silicone-Filled Safety Connectors, or equal. Spring wire connectors shall only be allowed in junction, outlet, or switch boxes.
- C. Provide in-line splices for all conductor connections, 6 AWG and larger. Splice crimp component shall be Burndy copper compression splice long barrel, beveled entry, type YS, or equal. Splice shall be made with crimp tool by manufacturer that allows expanded conductor ranges. Splice insulation component shall be Raychem heavy-wall, low voltage tubing, type WCSM, or equal. No splices will be allowed unless approved by ENGINEER.

2.03 TERMINAL BLOCKS AND ACCESSORIES

- A. Terminal Blocks: ANSI/NEMA ICS 4: UL listed.
- B. Power Terminals: Unit construction-type, closed-back-type, with tubular pressure screw connectors, rated 600 volts.
- C. Signal and Control Terminals: Modular construction-type, channel mounted; tubular pressure screw connectors, rated 300 volts.
- D. Manufacturer and Model Number: Phoenix Contact UK 5 N, or equal.

PART 3—EXECUTION

3.01 INSPECTION

- A. Examine the areas and conditions under which the work is to be installed and notify CONTRACTOR of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected.

3.02 GENERAL WIRING METHODS

- A. Install electrical wire and connectors in accordance with the manufacturer's written instructions; applicable requirements of the NEC, the National Electrical Contractors Association's "Standard of Installation"; and in accordance with recognized industry practices to ensure that products serve the intended functions.
- B. Place an equal number of conductors for each phase of a circuit in same raceway.
- C. Splice only in junction or outlet boxes. Splicing is not allowed in disconnects, manholes, motor control centers, control panels, etc. Avoid splices between terminals of interconnecting power and control wiring.
- D. Spring wire connectors shall only be used in junction, outlet, or switch boxes. Equipment wireways (e.g. motor control panels, panelboards, disconnects, etc.) and control panels shall not have any spring wire connectors installed; all terminations shall be on terminal strips.
- E. Neatly train, lace, and tie wrap all wiring inside boxes, equipment, control panels, and enclosures.

For Review Only

- F. Make conductor lengths for parallel circuits equal.
- G. The same color shall be used for each numbered wire throughout its entire length.
- H. Terminate all wiring on terminal blocks in control panels, starter cubicles, and similar equipment. This shall include all spare or unused wires.
- I. Provide preprinted adhesive or heat shrink-type wire numbering labels at all terminations and splices. Wire numbering preprinted on the conductor, flag-type labels, and individual wraparound numbers (e.g. Brady labels) are not acceptable.
- J. Use appropriate wiring methods and materials for the equipment or environment.
- K. Do not use a pulling means which can damage the raceway.
- L. Conductors #6 AWG and larger shall be pulled in to conduits utilizing a tugger with built-in tension meter. CONTRACTOR shall provide a report to ENGINEER for each pull indicating maximum tension reached during the pull along with manufacturer's maximum pulling tension. Motorized machines of any type are NOT ALLOWED for any wire pulling.
- M. Signal wiring (below 100 volts) and intrinsically safe wiring must be in a conduit separate from power and/or control wiring (over 100 volts). Signal wire shall include, but not be limited to, loop powered devices, and communication wiring (i.e. RS-232, etc.). Intrinsically safe wiring shall be separated and identified in accordance with Article 504 of the NEC.
- N. Control wiring (e.g., internal thermal overloads, lockout stops, etc.) to motors utilizing VFDs shall be in a conduit separate from motor power wiring.
- O. Provide junction or pull boxes to facilitate the "pulling in" of wires or to make necessary connections. All raceways and apparatus shall be thoroughly blown out and cleaned of foreign matter prior to pulling in wires.
- P. Thoroughly clean wires before installing lugs and connectors.
- Q. Make splices, taps, and terminations to carry full capacity of conductors without perceptible temperature rise.
- R. Terminate spare conductors within equipment, and control panels on terminal strips and label as "SPARE." Spare wiring in pull or junction boxes may be terminated with electrical tape and labeled as "SPARE." All spare conductor labels shall indicate where the conductors terminate. Refer to Section 16195–Electrical Identification, for additional requirements.

3.03 WIRING INSTALLATION IN RACEWAYS

- A. Pull all conductors into a raceway at the same time. Use UL-listed wire-pulling lubricant for pulling 4 AWG and larger wires. Yellow 77 pulling lubricant is not allowed.
- B. Install wire in raceway after all mechanical work likely to injure conductors has been completed.
- C. Completely and thoroughly swab raceway system before installing conductors.

For Review Only

- D. Conductors shall be installed in conduit system in such a manner that insulation is not damaged, conductors are not overstressed in pulling, and walls are not damaged. No splices are permitted except in junction boxes or outlet boxes.
- E. CONTRACTOR shall observe code limitation on the number and size of wires in an outlet box. CONTRACTOR shall either lay out work so that the wires do not exceed the particular box limitation, or provide larger boxes approved for additional capacity.
- F. Individual phases for all power wiring shall be identified with colored tape at all lugs/terminations. The same phase relation shall be maintained throughout.
- G. Circuiting is indicated diagrammatically on the drawings.

3.04 FIELD QUALITY CONTROL

- A. Inspect wire for physical damage and proper connection.
- B. Torque test conductor connections and terminations to manufacturer's recommended values.
- C. Prior to energizing, check conduit, raceways, outlet boxes, and wire for continuity of circuitry and for short circuits. Correct malfunction when detected.
- D. Subsequent to wire hook-ups, energize circuitry and demonstrate functioning in accordance with these specifications.
- E. Perform continuity test on all power and equipment branch circuit conductors. Verify proper phasing connections.
- F. Perform field inspection and testing according to provisions of this section.

3.05 ACCEPTANCE TESTS

- A. CONTRACTOR shall furnish all materials, labor, and equipment necessary for the acceptance tests specified herein. Acceptance tests shall be performed in the presence of OWNER or OWNER's representative and must be passed before final acceptance of the work.
- B. CONTRACTOR shall be responsible for powered tests of each field installed device unless specifically noted otherwise. CONTRACTOR shall be responsible for device operation as powered from its power source.
- C. Operation Test—By operational testing, OWNER will give final acceptance of the wiring system when all of the wiring is considered a complete system. All equipment shall function and operate in the proper manner as indicated in the details of the specifications and on the drawings. All motors shall be properly connected to protective devices, and motor rotation shall be in the correct direction.
- D. At the request of OWNER's representative, demonstrate by test the compliance of the installation with these specifications and drawings, the National Electrical Code, and the accepted standards of good workmanship. These tests shall include operation of

equipment, continuity of the conduit system, grounding resistance and insulation resistance.

For Review Only

- E. A written record of performance tests on electrical and control and instrumentation systems and equipment shall be supplied to OWNER. Such tests shall show compliance with governing codes.
- F. The transformer, feeder, and all subfeeds shall be completely phased out as to sequence and rotation. Phase sequence shall be A-B-C as follows:
 - 1. Front-to-rear, top-to-bottom, or left-to-right when facing equipment.
 - 2. Phasing shall be accomplished by using distinctive colors for the various phases. The same color or variation of it shall be used for a particular phase throughout the building and project.

3.06 WIRE INSTALLATION SCHEDULE

- A. Install all wiring in raceways except as otherwise noted. This includes all low voltage wiring such as control, instrumentation, and phone.

END OF SECTION

SECTION 16195 For Review Only

ELECTRICAL IDENTIFICATION

PART 1–GENERAL

1.01 SUMMARY

- A. Work Included:
 - 1. Nameplates.
 - 2. Labeling tags.
 - 3. Wire markers.
- B. Related Sections and Divisions: Applicable provisions of Division 1 shall govern work in this section.

1.02 SUBMITTALS

- A. Submit shop drawings and product data in accordance with provisions of Section 01300–Submittals.
- B. Provide schedule for nameplates and labeling tags for shop drawings. Reference drawings for type used.

PART 2–PRODUCTS

2.01 NAMEPLATES

- A. Type “A”:
 - 1. Use:
 - a. Motor starters.
 - b. Each separately mounted circuit breaker or disconnect switch.
 - c. Each device in motor control panels.
 - d. TVSS units.
 - e. Cabinets, enclosures, pull, and junction boxes.
 - f. Field devices (flowmeter transmitters, level transducers, etc.).
 - 2. Size: 2-inch by 3-inch.
 - 3. Material: 3-layer laminated Micarta.
 - 4. Background Color: Black.
 - 5. Character Color: White.
 - 6. Character Size: 1/4-inch.
 - 7. Engraving: See schedule, one-line, or drawings for labels or as requested by ENGINEER. Label shall include equipment number and description (i.e. P-01 Wastewater Pump 1).
 - 8. Mounting Location: Front exterior.

For Review Only

- B. Type "B":
1. Use: Standby power systems as in "A" above.
 2. Size: 2-inch by 3 5/8-inch.
 3. Material: 3-layer laminated Micarta.
 4. Background Color: Red.
 5. Character Color: White.
 6. Character Size: 1/4-inch.
 7. Engraving: See schedule and one-line for labels or as requested by ENGINEER.
 8. Mounting Location: As requested by ENGINEER.
- C. Type "C":
1. Use:
 - a. Motor Control Panels.
 - b. Supervisory Control Centers.
 - c. Generators.
 - d. Transfer Switches.
 2. Size: 4-inch by 4-inch.
 3. Material: 3-layer laminated Micarta.
 4. Background Color: Black.
 5. Character Color: White.
 6. Character Size: 2 1/4-inch.
 7. Engraving: Equipment label, Emergency to be white with red letters. Label shall include equipment number and description (i.e. LCP-10-01, Lift Station Control Panel).
 8. Mounting Location: Equipment: Top wireway.
- D. Type "E":
1. Use: Identify Supervisory Control Center communication and I/O modules.
 2. Size: As necessary.
 3. Material: 3-layer laminated Micarta.
 4. Background Color: Black.
 5. Character Color: White.
 6. Character Size: 1/8-inch.
 7. Engraving: Operating function.
 8. Mounting Location: As requested by ENGINEER.
- E. Type "G":
1. Use: Operator instructions.
 2. Size: As necessary.
 3. Material: 3-layer laminated Micarta.
 4. Background Color: Yellow.
 5. Character Color: Black.
 6. Character Size: 3/16-inch.
 7. Engraving and Mounting Location: As requested by ENGINEER.

2.02 LABELING TAGS

- A. Use: Filed-mounted devices (valves, limit switches, etc.).
1. Size: 1-inch by 3-inch.
 2. Material: 1/32-inch-thick stainless steel.
 3. Character Size: 1/4-inch.
 4. Engraving: As requested by ENGINEER.

For Review Only

2.03 WIRE MARKERS

- A. Wire markers shall be permanently attached sleeve or heat shrink-type labels. Wire numbering preprinted on the conductor, flag-type labels, and individual wrap around numbers (such as Brady preprinted markers) are not acceptable. All wire markers shall be the same throughout the project.
- B. Wire markers shall be specifically printed for this project using permanently attached computerized adhesive tags, such as Brady IDXPRT labeling printer with self laminating vinyl, permaleeve heat-shrink polyolefin, or equal. Hand-written markers are not acceptable.

PART 3-EXECUTION

3.01 INSTALLATION

- A. Degrease and clean surfaces to receive nameplates.
- B. Install nameplates parallel to equipment lines.
- C. Affix nameplates with stainless steel screws in outdoor locations and stickyback adhesive in indoor locations.
- D. Affix labeling tags with permanent bonding cement or locking wire ties. Provide 3/8-inch hole to accommodate wire tie.
- E. Prepare and install neatly typed directions in all panels including existing panels where work is done under this Contract.

3.02 WIRE IDENTIFICATION

- A. Provide wire markers on each conductor, including neutral and spare conductors, in gutters, pull boxes, outlet and junction boxes, and at load connection. Identify with branch circuit or feeder number for power and lighting circuits, and with control wire number as indicated on schematic and interconnection diagrams for control wiring. Spare conductors shall have control wire number of shall indicate termination point of wire.
- B. Conductors in pull boxes, motor control panels, supervisory control panels, control panels, cabinets, and enclosures shall be grouped as to circuits and arranged in a neat manner. All conductors of a feeder or branch circuit shall be grouped, bound together with nylon ties, and identified. Phase identification shall be consistent throughout the system.

END OF SECTION

SECTION 16420 For Review Only

ELECTRICAL SERVICE SYSTEM

PART 1—GENERAL

1.01 SUMMARY

- A. Work Included:
 - 1. Utility company.
 - 2. Secondary service characteristics.
 - 3. Definitions.
 - 4. Sequencing, scheduling.
 - 5. Overhead Electrical Service.
- B. Related Sections and Divisions: Applicable provisions of Division 1 shall govern work in this section.

1.02 UTILITY COMPANY

- A. The Utility Company is Kentucky Utilities.

1.03 SECONDARY SERVICE CHARACTERISTICS

- A. The secondary service will be 240/120 volt, 4 wire, 3 phase.

1.04 DEFINITIONS

- A. Service—As defined in the NEC, Article 100.
- B. Secondary Voltage—600 volts and below.

1.05 SEQUENCING, SCHEDULING

- A. Provide electrical service system except the Utility Company will provide:
 - 1. Protective device at terminal pole.
 - 2. Protective device at transformer.
 - 3. Cable from transformer to service building.

1.06 OVERHEAD ELECTRICAL SERVICE

- A. Provide complete overhead electrical service except for items furnished and installed by the Utility Company.

PART 2—PRODUCTS

NOT APPLICABLE

For Review Only

PART 3-EXECUTION

NOT APPLICABLE

END OF SECTION

SECTION 16450
For Review Only
SECONDARY GROUNDING

PART 1—GENERAL

1.01 SUMMARY

- A. Work Included:
 - 1. Power system grounding.
 - 2. Electrical equipment and raceway grounding and bonding.
- B. Related Sections and Divisions: Applicable provisions of Division 1 shall govern work in this section.

1.02 SUBMITTALS

- A. Indicate location of system grounding electrode connections and routing of grounding electrode conductor.
- B. Submit shop drawings and product data in accordance with provisions of Section 01300—Submittals.

PART 2—PRODUCTS

2.01 MATERIALS

- A. Ground Rods: Copper bonded, 5/8-inch-diameter, minimum length 10 feet.
- B. Ground Connections Below Grade: Exothermic-type, Cadweld, or equal.
- C. Ground Fittings: O-Z/Gedney, Type ABG, CG, TG, KG, GBL, or equal.

PART 3—EXECUTION

3.01 INSTALLATION

- A. Provide a separate insulated equipment grounding conductor and neutral conductor (where applicable) for each feeder and branch circuit. Terminate each end on a grounding lug, bus, or bushing.
- B. Bond together system neutrals, service equipment enclosures, exposed noncurrent carrying metal parts of electrical equipment, metal raceway systems, grounding conductor in raceways and cables, and receptacle ground connectors.
- C. Ground system, transformer neutrals and equipment as required by code and local ordinances.
- D. All feeder neutrals shall be connected to neutral at only one point in the control panel.

For Review Only

- E. All bare copper conductors installed outdoors shall be buried a minimum of 2 feet below grade.
- F. Water system grounds and a minimum of three ground rods at 15-foot separations near service entrance shall be provided and ground wires must attach to point ahead of meter or service shutoff valve. These shall be connected to ground bus by conductors sized to code requirements. The above are minimum requirements.
- G. All service entrance ground conductors shall be installed in PVC conduit. All conduit bends shall be made using sweep elbows. Conduit bodies and 90° bends are not allowed.
- H. Include ground for grounded receptacles, motors, and other equipment items.
- I. Flexible connections do not qualify for ground. All flexible connections must have separate green ground wire from motor base or equipment frame to conduit system.
- J. Separately derived systems as defined by the National Electric Code shall be grounded as such. This shall include, but not be limited to, 4-wire transformers and 4-wire standby generators.

3.02 FIELD QUALITY CONTROL

- A. Inspect grounding and bonding system conductors and connections for tightness and proper installation.
- B. Provide ground system resistance test report for each ground grid. Test report shall document ground system resistance following the three-point "fall of potential" test. The test results shall include a graph of the results, plus a diagram of the testing layout. A single point of measurement is not acceptable, and the two-point method of ground system testing shall only be used where there is no or insufficient "open area" to use the three-point "Fall of Potential" method. Resistance at any point in the grounding system shall not exceed 5 ohms. All ground system tests shall be witnessed by ENGINEER.
- C. The test meter shall be Associated Research Vibroground test set with null balance, James A. Biddle Megger Earth-Tester-Null Balance, or equal. All ground system tests shall be performed in accordance with the procedures outlined in the instruction manuals of the ground system test report.
- D. Individual ground rods when tested separately shall be isolated from all metallic connections, such as from the ground rod to other grounded structures and electrical system neutrals.
- E. Provide test report using the attached form, 16450. Each ground grid, including service entrance transformers, and standby generators shall have a form submitted.

END OF SECTION

FORM 16450

For Review Only

GROUND ROD RESISTANCE TO EARTH TEST RECORD

1. DATE _____
2. PROJECT NAME _____
3. LOCATION OF TEST _____
4. DRAWING NO. _____
5. GROUND ROD TYPE _____
DIAMETER _____
LENGTH _____
6. TEST METHOD _____
INSTRUMENT TYPE _____
SERIAL NO. _____
7. REQUIRED MAXIMUM RESISTANCE TO EARTH _____
8. MEASURED RESISTANCE TO EARTH
ROD 1 _____
ROD 2 _____
ROD 3 _____

TEST PERFORMED BY: _____
Signature

TEST WITNESSED BY: _____
Signature

SECTION 16480
For Review Only
MOTOR CONTROL

PART 1–GENERAL

1.01 SUMMARY

- A. Work Included:
 - 1. Motor control devices, accessories, and general requirements.
 - 2. Magnetic motor starters.
- B. Related Sections and Divisions: Applicable provisions of Division 1 shall govern work in this section.

1.02 REFERENCES

- A. ANSI/NEMA ICS 6–Enclosures for industrial controls and systems.
- B. NEMA AB 1–Molded case circuit breakers.
- C. NEMA ICS 2–Industrial control devices, controllers, and assemblies.
- D. NEMA KS 1–Enclosed switches.
- E. NEMA ICS-18-Motor Control Centers.
- F. NEMA PB 1–Panelboards.
- G. NEMA PB 1.1–Instruction for safe installation, operation, and maintenance of panelboards rated 600 volts or less.

1.03 SUBMITTALS

- A. Submit shop drawings and product data in accordance with provisions of Section 01300–Submittals.
- B. Provide product data on motor starters and combination motor starters, relays, pilot devices, and switching and overcurrent protective devices.

1.04 OPERATION AND MAINTENANCE DATA

- A. Submit operation and maintenance data under provisions of Section 01300–Submittals.
- B. Include spare parts data listing; source and current prices of replacement parts and supplies; and recommended maintenance procedures and intervals.

For Review Only

1.05 DELIVERY, STORAGE, AND HOLDING

- A. Store in a clean dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.
- B. Handle in accordance with manufacturer's written instructions. Lift only with lugs provided for the purpose. Handle carefully to avoid damage to motor control panel components, enclosure, and finish.

1.06 SPARE PARTS

- A. The following spare parts shall be furnished with each control panel:
 - 1. One complete set of replacement fuses, control and current-limiting where used.
 - 2. Twenty replacement lamps for push-to-test indicating lights. Provide lamp replacement tool.
 - 3. One replacement relay for each type of auxiliary relay provided.
 - 4. Replacement contacts, along with all related springs, bolts, and other materials necessary to completely rebuild one line contactor of each type furnished if more than one type is needed.
 - 5. One automatic alternator.
- B. All spare parts shall be suitably boxed or wrapped to prevent deterioration and shall be completely identified on the outside.

PART 2—PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS—MOTOR STARTERS

- A. Motor control devices, motor starters, variable frequency drives, and motor control centers shall be as manufactured by Allen Bradley, or equal, as approved by ENGINEER and in accordance with substitutions under provisions of the General Conditions. All equipment specified in this section and provided by CONTRACTOR shall be by the same manufacturer.
- B. The drawings and specifications were prepared based on Allen Bradley. CONTRACTOR shall include in the Bid and shall be responsible for the cost of any changes to accommodate other equipment including but not limited to structural, mechanical, and electrical work. CONTRACTOR shall also pay additional costs necessary for revisions of drawings and/or specifications by ENGINEER.

2.02 MAGNETIC MOTOR STARTERS

- A. Magnetic Motor Starters: NEMA ICS 2; AC general-purpose Class A magnetic controller for induction motors rated in horsepower. Each magnetic starter shall be equipped with a solid state overload relay, Allen Bradley E-1 Plus, Bulletin 592-EE, or equal. Starters for submersible pumps, mixers and motors installed outdoors shall include ground fault protection.

For Review Only

- B. Full Voltage Starting: Nonreversing type
- C. Coil Operating Voltage: 120 volts, 60 Hz.
- D. Size: NEMA ICS 2; size based on motor hp.
- E. Overload relays shall have the following features:
 - 1. Self-powered, solid state.
 - 2. Up to 5:1 adjustments.
 - 3. Visible trip indicators.
 - 4. Phase loss protection.
 - 5. Low energy consumption.
- F. Magnetic motor starters shall be combined with molded case circuit breakers.
- G. Through-the-door overload reset push-buttons shall be provided for all magnetic starters.

2.03 VARIABLE FREQUENCY DRIVES

- A. A variable frequency drive (VFD) system consists of enclosed inverter, motor starter, bypass system, motor, and any additional system control as specified.
- B. System Operating Conditions:
 - 1. 480 VAC \pm 10%.
 - 2. 3 phase, 3 wire, any phase sequence.
 - 3. 60 Hz \pm 2%.
 - 4. Storage temperature -40°C to +70°C.
 - 5. Operating temperature 0 to 40°C.
 - 6. Altitude: 3,300 feet above sea level maximum.
 - 7. Humidity: 95% noncondensing maximum.
- C. Variable Frequency Unit:
 - 1. Conform to NEMA and NEC standards.
 - 2. C.S.A. and ETL approved and/or UL approved.
 - 3. Input:
 - a. Withstand without component failure, line voltage transients up to 3,000 volts per ANSIC 37.904-1974.
 - b. Design to include DC bus chokes (2) to be used in conjunction with one or more capacitors. The DC bus chokes are to be incorporated in the design to minimize line side harmonics. Magnetic only designs need to include line filters to limit harmonics to a value no greater than in a system using dual DC bus chokes.
 - c. Include MOV line side protection.
 - d. Inverter input to have a .95 PF or better throughout the speed range.
 - e. Units shall be capable of operating attached to the same power bus without affecting each others operations. If operational problems occur, an isolation transformer shall be added to each drive at no additional Contract cost.
 - f. Three percent line reactors.
 - 4. Inverter Output:
 - a. Match motor specified.
 - b. 3 phase, 3 wire.
 - c. Pulse width modulated wave form.
 - d. Maximum output 460 volts.
 - e. Frequency 2 to 66 Hz.

For Review Only

- f. Frequency accuracy $\pm 1\%$ of setting at any point in the specified speed range, in a 24-hour period.
- g. Full load output current shall be rated in excess of the AC motor selected.
- h. Motor performance:
 - (1) 3% regulation in the manual speed control mode.
 - (2) Normal duty overload rating: 110% continuous current for 1 minute; 150% for 3 seconds.
 - (3) Heavy-duty overload rating: 150% continuous current for 1 minute; 200% for 3 seconds.
 - (4) 110% starting torque minimum.
- 5. AC drive features:
 - a. 4-20 mA circuitry mounted on separate printed circuit board to include offset, slope, minimum clamp, separate acceleration and deceleration adjustments from 0 to 3600 seconds. A light emitting diode is to be provided to show signal presence and an internal manual speed potentiometer is to be supplied for simulating the 4-20 mA input for start-up and maintenance. The circuit is to be designed to accept either a positive or negative signal, grounded or ungrounded.
 - b. Current limit circuitry: 0.1 amps to 150% of drive-rated amps.
 - c. Efficiency of the inverter to be:
 - (1) 100% rated speed and load: 97% or better.
 - (2) 70% rated speed and 50% load: 93% or better.
 - (3) 50% rated speed and 25% load: 87% or better.
 - (4) 30% rated speed and 9% load: 70% or better.
 - d. Additional features for constant torque units shall include:
 - (1) IR compensation to provide automatic voltage boost or reduction to optimize both starting torque and system input KW.
 - (2) Slip compensation to provide 0.5% regulation with a 100% load change.
 - (3) Inner current loop regulator.
- 6. Enclosures:
 - a. The VFD system shall be furnished with motor control panel as specified herein.
 - b. Items to be mounted in/on the motor control panels.
 - (1) Inverter.
 - (2) Incoming door interlocked, thermal-magnetic, molded case circuit breaker.
 - (3) Bypass circuitry when specified with incoming circuit breaker and NEMA rated mechanically interlocked contactors with separate overload.
 - (4) Interface to the drive shall be via a removable Human Interface Module (HIM) with integral display. This unit shall be a 7 line by 21-character backlit LCD display with graphics capability. HIM shall be used to display drive operating conditions, fault/alarm indications, and programming information with full text support in multiple languages. The LCD HIM shall be rated IP20/Type 1 and may also be used as a handheld terminal by connecting via a separate cable. The HIM keypads shall include programming keys, drive operating keys (Start, Stop, Direction, Jog, and Speed Control), numeric keys for direct entry and an ALT (alternate function) key to allow drive programming or operating functions to be accessed directly without knowledge of programming structure. The HIM unit shall be mounted on the front of the enclosure door so the operator does not have to open the enclosure to access the HIM.
- 7. Interlocks:
 - a. Fault contact to terminals.
 - b. VFD run contact to terminals.
 - c. Bypass run contact to terminals.

For Review Only

8. VFD protection:
 - a. Adjustable current limit of 50 to 150% minimum.
 - b. Instantaneous overcurrent trip.
 - c. Electronic ground fault and short-circuit protection to shut down the drive without fuse or component failure. Electronic ground and short-circuit protection to be functional with an input line of 480 VAC plus and minus 10%. The drive manufacturer is to be prepared to demonstrate ground fault and short-circuit protection without the use of an isolation transformer at drive start-up.
 - d. Input thermal-magnetic ambient compensated circuit breaker with a through-the-door interlocked operator.
 - e. Shutdown on loss of any input phase for longer than 3 cycles.
 - f. Output phase sequence to be independent of input phase sequence.
 - g. High or low sustained voltage.
 - h. 120 VAC grounded control circuits.
 - i. Electrically and/or optically isolated low voltage logic.
 - j. Corrosion protection:
 - (1) Gold-plated plugs (male and female section) on all printed circuit boards.
 - (2) Protective board coating for adverse wastewater treatment plant environments.
 - k. MOV converter protection.
 - l. DC bus chokes to minimize line side current harmonics.
 - m. Additional features for constant torque units:
 - (1) I²T protection to provide 150% current for one minute.
 - (2) Regenerative override protection.
9. VFD adjustments:
 - a. Maximum speed: 50 to 100%.
 - b. Minimum speed: 0 to 70%.
 - c. Current limit: 50 to 110%, 150% on constant torque units.
 - d. Linear acceleration 5 to 600 seconds.
 - e. Linear deceleration 5 to 600 seconds.
 - f. Output volts/Hz trim.
 - g. Voltage boosts.
 - h. Additional features for constant torque units:
 - (1) Slip compensation.
 - (2) IR compensation.
 - i. All drives shall attempt to restart three times prior to indicating failure.
10. Inverter digital or LED diagnostic features:
 - a. Current limit signal.
 - b. Regenerative override signal.
 - c. External fault (ex. motor overload).
 - d. Low line voltage.
 - e. High line voltage.
 - f. Current overload.
 - g. High DC bus voltage.
 - h. Current trip.
 - i. Short-circuit.
11. Inverter construction:
 - a. Modular construction-ease of maintenance.
12. Mount modules on enclosure subpanel.
 - a. Easily accessible from front.
 - b. Interconnect with plugs.

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- c. Construct boards of fire retardant materials in accordance with NEMA grade FR4 specifications.

D. Inverter Quality Control:

- 1. Test all power devices at rated temperature and current for dv/dt, tq, TRR, and leakage.
- 2. Test integrated circuits for programmed parameters at rated temperature.
- 3. Treat printed circuit boards for corrosion resistance (conformed coating).
- 4. Provide gold-plated connections at all points where plugs are used.
- 5. Thermal cycle all printed circuit boards for ten cycles between 0° to 65°C prior to installation in inverter.
- 6. All units to be tested at a rated load and temperature after assembly.

- E. The variable speed drives shall be Allen Bradley, or equal, Powerflex 70.

2.04 MOTOR CONTROL PANELS

- A. Arrangement and physical location of all equipment within control station panel shall be subject to shop drawing approval.
- B. Starters and disconnect devices for motors shall be provided in the motor control panels, except where shown to be remote mounted at the motor location. Starters and disconnect devices shall be NEMA rated sized according to application as specified.
- C. Elapsed time meters (ETMs): Redington/Engler 710 Series, 3 inches round, 99,999.9 hours, nonreset-type, and mounted on the inner door of the motor control panels.
- D. Auxiliary Contacts: NEMA ICS 2; two field convertible contacts, minimum, in addition to seal-in contact, or as necessary.
- E. Pushbuttons and Selector Switches: NEMA ICS 2; heavy-duty, oil-tight, 30 mm.
- F. Indicating Lights: NEMA ICS 2; heavy-duty, oil-tight, 30 mm, push-to-test type.
- G. Timing Relays: UL Listed with On and Timing Out LEDs.
- H. Contactors: NEMA ICS 2. All contactors for starters specified herein, including VFD and bypass starters, shall be NEMA rated. IEC contactors are not allowed.
- I. Control Power Transformers: 240/120 volt fused primary and secondary.
- J. Relays for motor control circuits, hard-wired control logic, and for loads less than 10 amps shall be general purpose, industrial, square base relays. Relays shall meet the following requirements.
 - 1. General purpose relays.
 - a. Configuration: DPDT or 3PDT as required by System Supplier.
 - b. Mounting: DIN rail with screw terminal base socket.
 - c. Voltage: 120VAC.
 - d. Contact rating: 15A, minimum; ¾ HP.
 - e. Operating life: 10 million cycles.
 - f. Status: On-Off flag-type or LED indicator.
 - g. UL listed.
 - h. Manufacturer: Allen Bradley, 700-HB, or equal.

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- K. Motor control panel design shall be in accordance with latest applicable NEMA standards, shall have been tested to prove adequate mechanical and electrical capabilities, and all major components shall have been individually tested. Control panel shall bear a serialized UL label indicating that it is UL-approved as an assembled unit. Panels which have individual components which are UL-labeled but do not have UL approval as an assembled unit are not acceptable.
- L. Enclosures shall be front access only, minimum No. 12 gauge steel, continuous hinged doors, rotating lockable handle 3-point latch on each compartment door (not screws or bolts) with top and bottom bolts actuated by one rotating handle on large doors. Quick opening hasps may be substituted for rotating lockable handle latch where approved by ENGINEER. All indicating lights, selector switches, operator interfaces, etc., shall be installed on an inner front door. Panels shall include door stop kit, data pockets for panel wiring diagrams and minimum 18-inch fluorescent light and switch. Panels shall include main breaker with padlock hasp to prevent opening the panel with switch in "On" position. A defeater shall be provided to bypass this interlock, with handle lockable in "On" position. Painting (as applicable) shall include phosphate treatment, zinc chromate iron oxide primer, baked rust inhibiting enamel, white interior, and OWNER-selected exterior color. All doors and panels shall be gasketed, and panels installed outdoors or nonconditioned spaces shall be insulated. All louvers shall be filtered with forced air cooling as necessary by the supplier for conditions where installed. Enclosures shall be as manufactured by Hoffman, Lehman, or Saginaw. Enclosure rating shall be as follows unless noted otherwise on the drawings or in the associated specification section.
1. Indoor and/or dry locations: NEMA 12.
 2. Corrosive and/or damp locations including chemical rooms, below-grade nonconditioned spaces, and outdoor locations: NEMA 4X, stainless steel.
 3. Hazardous locations: NEMA 7, cast iron.
- M. The equipment mounted within the enclosures shall be mounted on the enclosure back panel, neatly organized, and shall be in accordance with the manufacturer's recommendations.
1. All wiring within control panels shall be insulation-type MTW, minimum size 16 AWG. Wiring within the enclosure shall be routed through plastic wiring troughs with removable covers. Maximum fill for wiring troughs shall be 60%. Terminal strips located adjacent to wiring troughs shall have a minimum of 1-1/2 inches between terminal strip and trough. All wiring in control panels not in wiring troughs shall be bound with continuous-type spiral windings.
 2. All I/O devices shall be wired to rail mounted terminal blocks. Plastic wiring duct shall be Electrovert "Electro-duct," Panduit, or equal. Terminal blocks shall be Electrovert 9700 Series, Square D, Class 9080 Type G, or equal.
 3. Field wiring in dry locations shall be insulation-type THHN, minimum size 14 AWG. Field wiring in damp or wet locations shall be insulation type XHHW-2, minimum size 14 AWG. All field wiring shall terminate at the rail mounted terminal blocks. Splices are not allowed within enclosures or wireways. Field wiring terminals shall be clearly identified as to which I/O terminals they are wired. Wire markers shall be permanently attached, wraparound adhesive, or heat-shrink type markers. Wire numbering preprinted on the conductor and individual wraparound numbers are not acceptable.
 4. Jumpers between adjacent terminal blocks shall be copper jumper bars supplied by the terminal block manufacturer.
 5. All panels with DIN rail mounted equipment shall include a minimum of 25% spare DIN rail space.
 6. In addition to spare I/O specified herein, provide a minimum of 25% spare hot and neutral terminals, wired to terminal strips. Spare terminals shall be provided for all voltage sources within the panel (e.g. 120V, 24V).

For Review Only

- N. Fuse holders shall be provided with integral LEDs to indicate when the fuse is blown.
- O. All starters shall be equipped with auxiliary devices to meet the requirements of the plans and specifications. Each starter operating at other than 120 volt single phase shall be equipped with a control transformer providing 120 volt secondary for control power. **The use of one common control power transformer for all starters will not be allowed.** Transformer shall have fused primary and secondary connections and shall be sized per manufacturer's recommendations. Coils and pilot lights in all starters shall be 120 volts.
- P. Motor control panels shall be factory-assembled, wired, and tested. All internal wiring shall be color coded, numbered Class II, Type C, and each wire shall be terminated on terminal strips, including internal spares, field wiring, and spare field wires. Terminal blocks shall be located at the bottom or side of the enclosure, depending where the I/O conduits penetrate the enclosure. Provide a minimum of 25% spare terminals for all terminal blocks furnished. Schematic and wiring layout drawings following JIC Standards which show all connections to external devices, a complete bill of materials, and a detailed description of operation shall be submitted.
- Q. Power supplies shall be protected against short circuits and contain their own overcurrent and overvoltage protection. 12 and 24 VDC power supplies shall be provided and installed in the enclosures for powering all analog input signals where required.
- R. All door-mounted devices shall be furnished flush-mounted, and an exterior engraved phenolic nameplate worded by the manufacturer and reviewed by OWNER (upon receipt of shop drawings) shall be provided for each compartment, device, light, etc. All components within the enclosures shall be identified with interior mounted engraved labels. Labels shall be installed on the enclosure back-panel and not on the device or wireway. Devices shall be grouped for each device or unit being controlled.
- S. Each panel shall have a specification grade, GFI , duplex, 20 ampere, 120 volt receptacle, fed from a dedicated 20 amp single pole circuit breaker.
- T. If enclosure and panel space is needed for future installation of devices, PLC, radio, and lights, the enclosure and panel shall be constructed for such installation. Supports shall be provided for future equipment, and panel openings shall be made and covered with neat cover plates matching the panel.

2.05 ARC FLASH HAZARD WARNING LABELS FOR NEW EQUIPMENT

- A. Equipment specified herein shall be provided with arc flash hazard warning labels based on an arc flash hazard analysis performed by the equipment manufacturer. Labels shall include, but not be limited to, the following items.
 - 1. Arc-flash boundary.
 - 2. Flash hazard category (0-4).
 - 3. Minimum arc rating (cal/cm²).
 - 4. Required personal protective equipment.
- B. Warning labels shall be self-adhesive vinyl, 4 inches by 6 inches, and be as manufactured by Conney Safety products, or equal.

PART 3—EXECUTION

For Review Only

3.01 INSTALLATION

- A. Provide motor control equipment in accordance with manufacturer's instructions and drawings.
- B. Overloads shall be selected on the basis of nameplate horsepower and service factor. Selection of overloads based on horsepower shown on the drawings is not acceptable. If power factor correction capacitors are provided, overload protection shall be compensated for the lower motor running current due to improved power factor.
- C. All motor control wiring shall be installed in accordance with control wiring diagrams furnished.
- D. Wireways in motor control panels shall be used only for routing of conductors. Splices are not allowed within wireways.
- E. Motor Data: Provide neatly typed label inside each motor starter enclosure identifying motor served, nameplate horsepower, full load amperes, code letter, service factor, and voltage/phase rating.
- F. All motors will be provided by other divisions, ready for connections. This CONTRACTOR shall be responsible for electrical connections for power and control circuit wiring, proper phase relationships, and correct motor rotation.
- G. Provide motor circuit wiring for each motor from the source of supply to the terminal box on the motor including all intermediate connections at devices such as motor starters, disconnect switches, terminal strips, etc.
- H. All control panels and equipment enclosures shall be cleaned of debris and wires neatly arranged with surplus length cut off. Spare wires shall be labeled as "spare" and where the wires terminate.
- I. All wiring within motor control panels shall be landed on terminals and not left unterminated with the panel or within wireways. This shall include all internal motor control wiring and external field wiring, including spare wires.
- J. Control wiring and field wiring (120V and below) shall be separated from power wiring (277V and above). Where possible, route control and field wiring in separate raceways or wireways. Provide a minimum of 2 inches separation between control wiring, field wiring, and power wiring.
- K. Where louvers are provided in enclosures or control panels , louvers shall be vacuumed free of all dust and dirt. Where air filters are provided in enclosures or control panels, all filters shall be replaced with new at the time of final completion.
- L. Equipment shall be thoroughly cleaned of all stains, paint spots, dirt, and dust. All temporary labels not used for instruction or operation shall be removed.
- M. All electrical equipment shall be provided with factory-applied prime finish, unless otherwise specified. If the factory finish on any equipment furnished by CONTRACTOR is damaged in shipment during construction, the equipment shall be refinished by

For Review Only

CONTRACTOR to the satisfaction of ENGINEER. One can of touch-up paint shall be provided for each different color factory finish which is to be the final finished surface of the product.

3.02 FIELD START-UP AND COMMISSIONING

- A. Provide the services of a qualified factory-trained manufacturer's representative to assist CONTRACTOR in installation and start-up of the equipment specified in this section. The manufacturer's representative shall provide technical direction and assistance to CONTRACTOR in general operation of the equipment, connections and adjustments, and testing of the assembly and components contained therein.
- B. The manufacturer's representative shall provide inspection of the final installation. The manufacturer's representative shall perform site start-up and functional checkout of the panel. Upon completion of the manufacturer's start-up and checkout, the manufacturer shall generate a site start-up and functional checkout report, documenting all systems checked as well as any incomplete work remaining and operational deficiencies.
- C. CONTRACTOR shall provide three copies of the manufacturer's site start-up and functional checkout report to ENGINEER for review. Once ENGINEER has reviewed the report and all equipment is operating in accordance with the specifications, ENGINEER will make one site visit to check operation of the system. If the system is not ready or does not operate as specified, OWNER shall deduct payment to CONTRACTOR and make payment to ENGINEER for additional travel, expenses, and site visits until the equipment operates as specified. CONTRACTOR shall be responsible for all water, pumping, and electrical costs required to check operation of the system.

3.03 WARRANTY

- A. The manufacturer shall warrant that all equipment shall be free from defects in material and workmanship under normal and proper use and service for a period of one year after substantial completion.

END OF SECTION

For Review Only

DIVISION 20

STANDARD SPECIFICATIONS FOR UTILITY AND STREET CONSTRUCTION IN KENTUCKY

TABLE OF CONTENTS

	Pages Through
SECTION 1—MATERIALS AND EQUIPMENT	1
1.1 GENERAL	1
1.1.1 REFERENCED SPECIFICATIONS	1
1.1.2 MATERIAL STANDARDS.....	1
1.2 PIPE	5
1.2.1 REINFORCED CONCRETE PIPE	5
1.2.2 CLAY PIPE.....	6
1.2.3 COMPOSITE PIPE (PVC AND ABS).....	6
1.2.4 SOLID WALL PVC.....	7
1.2.5 OPEN PROFILE WALL PVC (18 INCH AND LARGER PIPE ONLY).....	7
1.2.6 GRAVITY SANITARY SEWER SERVICE BRANCHES AND LATERALS	8
1.2.7 STEEL OR ALUMINUM CORRUGATED PIPE.....	8
1.2.8 HIGH DENSITY POLYETHYLENE (HDPE) CORRUGATED PIPE.....	9
1.2.9 IRON PIPE AND FITTINGS.....	9
1.2.10 PVC PIPE (AWWA).....	11
1.2.11 PVC PIPE (SDR-PR).....	11
1.2.12 PVC PIPE (SCHEDULE PIPE)—4 INCH OR LESS	11
1.2.13 HIGH DENSITY POLYETHYLENE PRESSURE (HDPE) PIPE AND FITTINGS.....	11
1.2.14 PVC PRESSURE PIPE fittings (4 INCH AND LARGER)	12
1.2.15 GRINDER PUMP PRESSURE SEWER PIPE AND FITTINGS (LESS THAN 4 INCH)	12
1.2.16 PIPE RESTRAINT	12
1.2.17 COPPER WATER TUBING	12
1.2.18 SURFACE WATER CROSSINGS	13
1.2.19 MISCELLANEOUS PIPE	13
1.3 VALVES	13
1.3.1 GATE VALVES.....	13
1.3.2 BUTTERFLY VALVES.....	14
1.3.3 PLUG VALVES.....	14
1.3.4 CHECK VALVES	15
1.3.5 GRINDER PUMP PRESSURE SEWER SHUTOFF VALVES.....	16
1.3.6 CORPORATION STOPS, CURB STOPS, AND TAPPING SADDLES.....	16
1.3.7 FIRE HYDRANTS	16
1.3.8 VALVE BOXES	17
1.3.9 CURB BOXES.....	17
1.3.10 MISCELLANEOUS VALVES	18
1.4 PRECAST REINFORCED CONCRETE MANHOLES	18
1.5 STORM SEWER INLETS.....	20
1.6 MASONRY	20
1.7 MANHOLE AND INLET CASTINGS	20
1.8 FRAME/CHIMNEY SEAL	20
1.9 MORTAR.....	21
1.10 AGGREGATE SLURRY (FLOWABLE) BACKFILL	21
1.11 EROSION CONTROL	21

For Review Only

TABLE OF CONTENTS

	Pages Through
1.12	BEDDING DIKE..... 21
1.13	SPECIAL MATERIALS AND EQUIPMENT..... 21
SECTION 2	ALIGNMENT AND GRADE..... 22
2.1	GENERAL..... 22
2.2	DEVIATIONS OCCASIONED BY UNDERGROUND FACILITIES..... 22
2.3	CAUTION IN EXCAVATION..... 22
2.4	SUBSURFACE EXPLORATION..... 22
SECTION 3	EXCAVATION AND PREPARATION OF TRENCH..... 22
3.1	GENERAL EXCAVATION..... 22
3.2	EXCAVATION TO GRADE..... 23
3.3	DEWATERING..... 23
3.4	WIDTH OF TRENCH..... 24
3.5	ROCK EXCAVATION, UTILITIES..... 25
3.6	BLASTING..... 26
3.7	SPECIAL BEDDING..... 26
3.8	CONCRETE CRADLE..... 26
3.9	BRACED AND SHEETED TRENCHES..... 26
3.10	TUNNELING, BORING, JACKING, OR BORING AND JACKING..... 26
SECTION 4	PIPE AND MANHOLE INSTALLATION..... 27
4.1	GENERAL..... 27
4.2	MATERIAL INSPECTION..... 27
4.3	BEDDING AND COVER..... 27
4.4	PIPE LAYING..... 29
4.5	SEWER SERVICE BRANCH AND LATERAL INSTALLATION..... 30
4.6	WATER SERVICE LATERAL INSTALLATION..... 31
4.7	PORTABLE TRENCH BOX..... 32
4.8	MANHOLES..... 32
4.9	STORM SEWER INLETS..... 32
4.10	MASONRY..... 32
4.11	ABANDONING UTILITIES..... 32
SECTION 5	BACKFILLING..... 33
5.1	BACKFILL MATERIAL..... 33
5.2	GRANULAR BACKFILL..... 33
5.3	PLACEMENT..... 33
5.4	BACKFILL CONSOLIDATION..... 34
5.5	MAINTENANCE OF SURFACE..... 34
SECTION 6	ROADWAY AND DRAINAGE EXCAVATION, GRADING AND BASE COURSE..... 34
6.1	GENERAL..... 34
6.2	CLEARING AND GRUBBING..... 35
6.3	COMMON EXCAVATION..... 35
6.4	ROCK EXCAVATION, STREETS..... 36
6.5	BORROW EXCAVATION..... 36
6.6	EXCAVATION BELOW SUBGRADE..... 36
6.7	GEOTEXTILES..... 36
6.8	PREPARATION OF FOUNDATION..... 36
6.9	CRUSHED AGGREGATE BASE COURSE..... 37
6.10	SALVAGED ASPHALT PAVEMENT BASE..... 37
SECTION 7	CONCRETE CURB AND GUTTER, SIDEWALK, AND PAVEMENT..... 37
7.1	GENERAL..... 37
7.2	CONCRETE..... 37

TABLE OF CONTENTS For Review Only

	Pages Through
7.3 CURB AND GUTTER	39
7.4 CONCRETE SIDEWALK AND DRIVEWAYS	39
SECTION 8-ASPHALTIC PAVING	40
8.1 GENERAL	40
8.2 ADJUSTING CASTINGS	40
8.3 ASPHALTIC CONCRETE PAVING	41
8.4 TACK COAT	41
8.5 PAVEMENT STRIPING	41
SECTION 9-RESTORATION AND SITE WORK	42
9.1 SCOPE	42
9.2 SEEDING AND SODDING	42
9.2.1 SEED RESTORATION	42
9.2.2 SOD RESTORATION	42
9.3 MISCELLANEOUS RESTORATION ITEMS	43
9.4 RETAINING WALLS	44
9.4.1 BOULDER WALLS	44
9.4.2 CUT BLOCK MODULAR RETAINING WALL	44
9.4.3 STRUCTURAL GEOGRID	46
9.5 PLANTINGS	46
SECTION 10-MISCELLANEOUS REQUIREMENTS	48
10.1 GRADE STAKES AND PROPERTY STAKES	48
10.2 TESTING PIPELINES	48
10.2.1 GENERAL	48
10.2.2 SANITARY SEWER AIR AND LEAKAGE TESTING	49
10.2.3 MANHOLE TESTING	49
10.2.4 TELEVISED INSPECTION	49
10.2.5 DEFLECTION TESTING	50
10.2.6 WATER MAIN DISINFECTION	50
10.2.7 WATER MAIN AND FORCE MAIN TESTING	50
10.3 TRAFFIC CONTROL	51
10.4 EROSION CONTROL	51
10.5 MISCELLANEOUS WORK	52
SECTION 11-MEASUREMENT AND PAYMENT	52
11.1 GENERAL	52
11.2 UTILITY CONSTRUCTION	52
11.3 SERVICES, LATERALS, AND RISERS	52
11.4 INLET LEADS	53
11.5 MANHOLES	53
11.6 DROP ENTRANCES	53
11.7 STORM SEWER INLETS	53
11.8 ROCK EXCAVATION, UTILITIES	53
11.9 SPECIAL BEDDING AND CONCRETE CRADLE	54
11.10 GRANULAR BACKFILL	54
11.11 TRENCH SHEETING	54
11.12 DEWATERING	54
11.13 TUNNELING, BORING, JACKING, OR BORING AND JACKING	54
11.14 EROSION CONTROL	55
11.15 BEDDING DIKE	55
11.16 AGGREGATE SLURRY (FLOWABLE) BACKFILL	55
11.17 CLEARING AND GRUBBING	55

TABLE OF CONTENTS

For Review Only

Pages
Through

11.18	COMMON EXCAVATION.....	55
11.19	ROCK EXCAVATION, STREETS.....	55
11.20	BORROW EXCAVATION.....	56
11.21	EXCAVATION BELOW SUBGRADE.....	56
11.22	GEOTEXTILES.....	56
11.23	BASE COURSE.....	56
11.24	SALVAGED ASPHALT PAVEMENT.....	56
11.25	CONCRETE.....	56
11.26	CURB AND GUTTER.....	57
11.27	CONCRETE SIDEWALK AND DRIVEWAYS.....	57
11.28	ASPHALTIC CONCRETE PAVING.....	57
11.29	PAVEMENT STRIPING.....	57
11.30	SEEDING AND SODDING.....	58
11.31	MISCELLANEOUS RESTORATION.....	58
11.32	BOULDER WALLS.....	58
11.33	CUT BLOCK MODULAR RETAINING WALLS.....	58
11.34	PLANTINGS.....	58
11.35	DUST CONTROL.....	58
11.36	SUPPLEMENTAL UNIT PRICES.....	58
11.37	SPECIAL ITEMS OF WORK, MATERIAL, AND EQUIPMENT.....	59
11.38	MISCELLANEOUS WORK.....	59
SECTION 12	SPECIAL PROVISIONS.....	60
12.1	1.2 PIPE.....	60
12.2	1.2.11 PVC PIPE (SDR-PR).....	60
12.3	1.2.13 HIGH DENSITY POLYETHYLENE PRESSURE (HDPE) PIPE AND FITTINGS.....	60
12.4	1.3 VALVES.....	60
12.5	1.3.6 CORPORATION STOPS, CURB STOPS, AND TAPPING SADDLES.....	60
12.6	1.3.7 FIRE HYDRANTS.....	60
12.7	1.13 SPECIAL MATERIALS AND EQUIPMENT.....	61
12.8	2.1 SERVICE LINE LOCATIONS.....	62
12.9	3.10 TUNNELING, BORING, JACKING, OR BORING AND JACKING.....	62
12.10	6.1 STREET CONSTRUCTION-GENERAL.....	62
12.11	9.1 RESTORATION AND SITE WORK-SCOPE.....	62

For Review Only

SECTION 1–MATERIALS AND EQUIPMENT

1.1 GENERAL

Materials provided shall be suitable for the conditions in which they are being installed and used. CONTRACTOR shall review installation requirements of the Contract with material suppliers and incorporate any additional installation requirements necessary to meet the required use within the price bid for the Work.

All material shall conform to the type, size, and shape shown on the Drawings and as specified.

All material in contact with potable water shall meet NSF Standards 60 and 61.

All pipe and materials used in performance of the Work shall be clearly marked as to strength, class, or grade. Pipe and materials not so marked shall be subject to rejection.

When requested by ENGINEER, material suppliers shall furnish certificates of compliance indicating that all tests required by the various Standards have been conducted and that the test results comply with the Standards.

1.1.1 REFERENCED SPECIFICATIONS

Unless the text indicates otherwise (e.g., see Materials Standards), Standard Specifications shall refer to Division 20 Standard Specifications for Utility and Street Construction in Kentucky.

KYDOH Specifications in the Standard Specifications shall refer to the *State of Kentucky Transportation Cabinet, Department of Highways, Standard Specifications for Road and Bridge Construction, Latest Edition*.

Best Management Practices in the Standard Specifications shall refer to *Kentucky's Best Management Practices for Construction Activities*.

1.1.2 MATERIAL STANDARDS

This listing of Material Standards is provided for convenience only and may not be all inclusive.

AASHTO	M36	Standard Specification for Corrugated Steel Pipe, Metallic-Coated, for Sewers and Drains.
	M148	Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
	M167	Standard Specifications for Corrugated Steel Structural Plate, Zinc-Coated, for Field-Bolted Pipe, Pipe-Arches, and Arches.
	M252	Standard Specifications for Corrugated Polyethylene Drainage Pipe.
	M294	Standard Specifications for Corrugated Polyethylene Pipe, 300- to 1200-mm Diameter.
ACI	211.1	Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete.
	305.1	Specification for Hot Weather Concreting.
	306.1	Standard Specification for Cold Weather Concreting.

For Review Only

ANSI	A21.10	Ductile-Iron and Gray-Iron Fittings for Water.
	A21.11	Standard for Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
	A21.5	Standard for Polyethylene Encasement for Ductile-Iron Pipe Systems.
	A21.51	Ductile-Iron Pipe, Centrifugally Cast, for Water.
	B16.1	Cast Iron Pipe Flanges and Flanged Fittings Classes 25, 125, and 250.
	Z60.1	American Standard for Nursery Stock
ASTM	A48	Specification for Gray Iron Castings.
	A126	Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings.
	A240	Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
	A479	Standard Specification for Stainless Steel Bars and Shapes for Use in Boilers and Other Pressure Vessels.
	A615	Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
	B62	Standard Specification for Composition Bronze or Ounce Metal Castings.
	B88	Standard Specification for Seamless Copper Water Tube.
	C14	Specification for Concrete Sewer, Storm Drain, and Culvert Pipe.
	C32	Specification for Sewer and Manhole Brick (Made From Clay or Shale).
	C33	Standard Specification for Concrete Aggregates.
	C76	Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe.
	C90	Standard Specification for Loadbearing Concrete Masonry Units.
	C139	Specification for Concrete Masonry Units for Construction of Catch Basins and Manholes.
	C140	Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units.
	C270	Specification for Mortar for Unit Masonry.
	C301	Test Method for Vitrified Clay Pipe.
	C425	Standard Specification for Compression Joints for Vitrified Clay Pipe and Fittings.
	C443	Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets.
	C470	Specification for Molds for Forming Concrete Test Cylinder Vertically.
	C478	Standard Specification for Precast Reinforced Concrete Manhole Sections.
	C497	Standard Test Methods for Concrete Pipe, Manhole Sections, or Tile.
	C507	Standard Specification for Reinforced Concrete Elliptical Culvert, Storm Drain, and Sewer Pipe.
	C655	Standard Specification for Reinforced Concrete D-Load Culvert, Storm Drain, and Sewer Pipe.
	C700	Standard Specification for Vitrified Clay Pipe, Extra Strength, Standard Strength, and Perforated.
	C828	Standard Test Method for Low-Pressure Air Test of Vitrified Clay Pipe Lines.

For Review Only

- C913 Standard Specification for Precast Concrete Water and Wastewater Structures.
- C923 Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes, and Laterals.
- C924 Standard Practice for Testing Concrete Pipe Sewer Lines by Low-Pressure Air Test Method.
- C1214 Standard Test Method for Concrete Pipe Sewerlines by Negative Air Pressure (Vacuum) Test Method.
- C1244 Test Method for Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test Prior to Backfill.
- C1433 Standard Specifications for Precast Reinforced Concrete Box Sections for Culverts, Storm Drains and Sewers.
- D1557 Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)).
- D1784 Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.
- D1785 Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.
- D2152 Standard Test Method for Adequacy of Fusion of Extruded Poly (Vinyl Chloride) (PVC) Pipe and Molded Fittings by Acetone Immersion.
- D2240 Standard Test Method for Rubber Property—Durometer Hardness.
- D2241 Standard Specification for Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series).
- D2321 Practice for Underground Installation of Flexible Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications.
- D2339 Standard Test Method for Strength Properties of Adhesives in Two-Ply Wood Construction in Shear by Tension Loading.
- D2412 Standard Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading.
- D2464 Standard Specification for Threaded Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.
- D2466 Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.
- D2467 Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.
- D2564 Standard Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems.
- D2672 Standard Specification for Joints for IBS PVC Pipe Using Solvent Cement.
- D2680 Specification for Acrylonitrile–Butadiene–Styrene (ABS) and Poly (Vinyl Chloride) (PVC) Composite Sewer Piping.
- D2751 Specification for Acrylonitrile–Butadiene–Styrene (ABS) Sewer Pipe and Fittings.
- D2855 Standard Practice for Making Solvent-Cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings.
- D3034 Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.

For Review Only

D3139	Standard Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals.
D3212	Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals.
D3350	Standard Specification for Polyethylene Plastics Pipe and Fittings Materials
D3965	Standard Specifications for Rigid Acrylonitrile–Butadiene–Styrene (ABS) Compounds for Pipes and Fittings.
D4101	Specification for Propylene Plastic Injection and Extrusion Materials.
D4475	Standard Test Method for Apparent Horizontal Shear Strength of Pultruded Reinforced Plastic Rods By The Short-Beam Method.
F477	Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.
F593	Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.
F594	Standard Specification for Stainless Steel Nuts.
F679	Standard Specification for Poly (Vinyl Chloride) (PVC) Large-Diameter Plastic Gravity Sewer Pipe and Fittings.
F794	Standard Specification for Poly (Vinyl Chloride) (PVC) Profile Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter.
F1417	Standard Test Method for Installation Acceptance of Plastic Gravity Sewer Lines Using Low-Pressure Air.
AWWA	
C104	Standard for Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water.
C105	Standard for Polyethylene Encasement for Ductile-Iron Pipe Systems.
C110	Standard for Ductile-Iron and Gray-Iron Fittings, 3 Inches Through 48 Inches For Water.
C111	Standard for Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
C115	Standard for Flanged Ductile-Iron Pipe With Ductile-Iron or Gray-Iron Threaded Flanges.
C150	Standard for the Thickness Design of Ductile-Iron Pipe.
C151	Standard for Ductile-Iron Pipe, Centrifugally Cast for Water or Other Liquids.
C153	Standard for Ductile-Iron Compact Fittings, 3 Inches (76 mm) Through 64 Inches (1,600 mm), for Water Service.
C300	Standard for Reinforced Concrete Pressure Pipe, Steel-Cylinder Type.
C301	Standard for Prestressed Reinforced Concrete Pressure Pipe, Steel-Cylinder Type.
C302	Standard for Reinforced Concrete Pressure Pipe, Noncylinder Type.
C500	Standard for Metal-Seated Gate Valves for Water Supply Service.
C502	Standard for Dry-Barrel Fire Hydrants.
C504	Standard for Rubber-Seated Butterfly Valves.
C507	Standard for Ball Valves 6 Inches Through 48 Inches (150 mm Through 1,200 mm).
C508	Standard for Swing-Check Valves for Waterworks Service, 2-In. Through 24-In. (50-mm Through 600-mm) NPS

For Review Only

C509	Standard for Resilient-Sealed Gate Valves for Water Supply Service.
C600	Standard for Installation of Ductile-Iron Water Mains and Their Appurtenances.
C605	Standard for Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water.
C651	Standard for Disinfecting Water Mains.
C800	Standard for Underground Service Line Valves and Fittings.
C900	Standard for Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 Inches Through 12 Inches (100 mm through 300 mm), for Water Distribution.
C901	Polyethylene (PE) Pressure Pipe and Tubing, 1/2 in. (13 mm) Through 3 in. (76 mm), for Water Service.
C905	Standard for Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 14 Inches through 48 Inches (350 mm through 1,200 mm) for Water Transmission and Distribution.
C906	Standard for Polyethylene (PE) Pressure Pipe and Fittings, 4 In. (100 mm) Through 63 In. (1575 mm) for Water Distribution and Transmission.
C907	Standard for Polyvinyl Chloride (PVC) Pressure Fittings for Water—4 In. Through 8 In. (100 mm Through 200 mm).
M55	PE Pipe-Design and Installation.

1.2 PIPE

The type of pipe to be used in the Project shall be as specified in the STANDARD APPLICATIONS table in the **SPECIAL PROVISIONS** or as shown on the Drawings.

Rigid pipes are defined as pipe manufactured of such materials as concrete or clay.

Thermoplastic pipe shall be defined as pipe manufactured of such materials as PVC or other plastics.

1.2.1 REINFORCED CONCRETE PIPE

Reinforced concrete pipe shall meet ASTM C76 for circular pipe, ASTM C507 for elliptical pipe, ASTM C655 for D-load pipe, or ASTM C1433 for box culvert pipe.

All reinforced concrete pipe used in the Work shall be of adequate strength to support the construction and trench loads applied.

Not more than one lift hole per length of pipe shall be used in storm sewer. Lift holes will not be permitted in sanitary sewers.

All reinforced concrete pipe and fittings shall be provided with joints and gaskets which meet ASTM C443. Joints for storm and sanitary sewer shall be sealed with rubber gaskets having a continuous O-ring cross-section. Joints for elliptical pipe shall be sealed with an application of a trowelable bitumastic joint sealant on the inside of the joint. All pipe shall be specifically built to fit the gasket used.

Reinforced concrete pipe shall be of the class as shown on the Drawings or in the **SPECIAL PROVISIONS** and shall have a minimum "B" wall construction.

For Review Only

Sanitary sewer pipe shall be provided with either a smooth exterior wall (i.e., no bell), or with an R-4 big bell joint.

All reinforced concrete pipe used for sanitary sewer shall be vacuum tested from end to end at the factory in accordance with ASTM C1214. Test result, date, pipe class, date of manufacture, and individualized pipe I.D. shall be clearly marked on each pipe. Written vacuum test results for each pipe I.D. shall be kept and submitted to ENGINEER. ENGINEER shall be provided an opportunity to observe all tests.

Acceptance of reinforced concrete pipe shall be on the basis of plant load-bearing tests, material tests, and inspection of manufactured pipe for visual defects and imperfections.

Reinforced concrete bends, tees, and reducers shall be manufactured to provide for the required transitions as shown on the Drawings. Sufficient additional reinforcement shall be added at the spring lines and top and bottom of the pipe to prevent shearing after installation. Repairs to complete fabricated pipe fittings shall be such that the completed unit shall have the same strength as that of the remainder of the pipe barrel and the concrete used to complete the section shall not spall or separate.

1.2.2 CLAY PIPE

Vitrified clay pipe and fittings shall conform to ASTM C700. Pipe and fittings shall be extra strength. Joints shall be compression type joints conforming to ASTM C425.

1.2.3 COMPOSITE PIPE (PVC AND ABS)

Composite pipe shall meet the requirements of ASTM D2680. Resin used in the manufacture of PVC composite sewer pipe and fittings shall have cell classification 12454-B or 12454-C as defined in ASTM D1784. Resin used in the manufacturer of ABS composite pipe and fittings shall have cell classification of 1-0-2-2-3 of ASTM D3965.

Acceptance of piping shall be subject to tests conducted by an approved testing agency.

Attachment of couplings and saddle fittings and field joining of pipe sections and fittings shall be accomplished by solvent welding or rubber gaskets in accordance with the recommendations of the pipe manufacturer. All exposed filler material shall be field-coated with ABS or PVC Solvent Cement. Approved adapters shall be provided for transitions to other types of pipe.

Pipe shall be subject to rejection for failure to conform to material requirements of ASTM D2680 or for any of the following reasons:

- a. Distortion or puncture of the inner plastic shell. Distortion or punctures of the outer shell shall not be reasons for rejection if the inner shell is unaffected and such exterior distortion or puncture is suitably repaired with a solvent-welded patch to the satisfaction of ENGINEER.
- b. Voids in the concrete filler at pipe ends, exceeding 1 inch in depth as measured from the pipe end and exceeding 10% of the pipe circumference. However, this pipe may be used if the faulty pipe end is sawed off and coated to the satisfaction of ENGINEER.
- c. Through cracks in coupling.

For Review Only

1.2.4 SOLID WALL PVC

Polyvinyl Chloride (PVC) pipe shall meet the requirements of ASTM D3034 for pipe sizes 4 inches through 15 inches and ASTM F679 for pipe sizes 18 inches through 36 inches. The wall thickness for ASTM F679 pipe shall conform to requirements for a T-1 wall. All PVC sewer pipe shall have maximum standard dimension ratio (SDR) of 35.

PVC material shall have cell classification 12454-B or 12454-C as defined in ASTM D1784 with minimum modulus of elasticity of 400,000 psi in tension. Pipe stiffness shall be minimum 46 psi when tested in accordance with ASTM D2412.

Pipe and fittings shall be the product of one manufacturer and the manufacturer shall have experience records substantiating acceptable performance of the pipe to be furnished.

Fittings shall be injection molded.

Acceptance of piping shall be subject to tests conducted by an approved testing agency in accordance with ASTM D3034 and/or ASTM F679.

Fittings such as saddles, elbows, tees, wyes, and others shall be of material and construction corresponding to and have a joint design compatible with the adjacent pipe. Approved adapters shall be provided for transitions to other types of pipe.

Joints shall be of the elastomeric type for pipes 4 inches or larger and elastomeric or solvent cement for pipes less than 4 inches.

Elastomeric joints shall be a bell and spigot joint conforming to ASTM D3212 sealed by a rubber gasket conforming to ASTM F477 so that the assembly will remain watertight under all conditions of service, including the movements resulting from the expansion, contraction, settlement, and deformation of the pipe. Bells shall be formed integrally with the pipe and shall contain a factory-installed positively restrained gasket.

Solvent cement joints shall be assembled using solvent cement obtained from the pipe manufacturer, which conforms to the requirements of ASTM D2564.

The assembled joint shall pass the performance tests as required in ASTM D3212.

1.2.5 OPEN PROFILE WALL PVC (18 INCH AND LARGER PIPE ONLY)

Open profile PVC pipe and fittings shall meet the requirements of ASTM F794. Fittings shall also conform to ASTM D3034 SDR 35. Pipe shall have smooth interior with a ribbed exterior. Exterior ribs shall be perpendicular to the axis of the pipe to allow placement of gaskets without additional cutting or matching. Pipe shall have solid wall cross-section—no voids between inner and outer surfaces of pipe wall.

PVC materials shall have cell classification 12454-B or 12454-C as defined in ASTM D1784 with minimum modulus of elasticity of 400,000 psi in tension. Pipe stiffness shall be minimum 46 psi when tested in accordance with ASTM D2412. Impact strength shall equal or exceed values given in ASTM D3034 or F679.

Pipe and fittings shall be the product of one manufacturer and the manufacturer shall have an experience record substantiating acceptable performance of the pipe to be furnished. Fittings shall be injection molded.

For Review Only

All joints shall be of the flexible elastomeric type with bells and spigots conforming to ASTM D3212. Gaskets shall conform to ASTM F477. All bells shall be formed integrally with the pipe. Elastomeric gasket shall be positively restrained in ribs on spigot of pipe.

Acceptance of piping shall be subject to tests conducted by an approved testing agency in accordance with ASTM F794.

Fittings such as saddles, elbows, tees, wyes, and others shall be of material and construction corresponding to, and have a joint design compatible with the adjacent pipe. Approved adapters shall be provided for transitions to other types of pipe. Fittings shall be molded.

Joints shall be sealed with elastomeric gaskets meeting the requirements of ASTM F477. Solvent cement shall not be used to join pipe lengths or fittings to pipe lengths. The assembled joint shall pass the performance tests as required in ASTM D3212.

The pipe wall will be homogeneous and contain no seams. Minimum pipe stiffness per ASTM D2412 shall be 60 psi for 18 inch and 46 psi for 21 inch and larger pipe sizes. Pipe shall withstand impact of 210-foot-pounds for 8 inch and 220-foot-pounds on larger sizes. Standard lengths shall be 13-foot or 20-foot lengths. Pipe shall withstand flattening up to 60% without cracking, splitting, or breaking and pass acetone immersion in accordance with ASTM D2152.

1.2.6 GRAVITY SANITARY SEWER SERVICE BRANCHES AND LATERALS

Branches (tees and wyes) shall be of the same material as the main except for reinforced concrete pipe used for sanitary sewer. For such reinforced concrete pipe, special branches shall be furnished and installed to accept the lateral. Such special branches are subject to review by ENGINEER.

If a different thermoplastic material is specified for laterals than for the main line, appropriate solvent welds, fittings, and other appurtenances shall be provided to effect a water tight seal.

Fittings for laterals shall be of the same material as the lateral pipe unless special fittings are needed for transition between material types or sizes or standard fittings are not manufactured.

Where the wye or tee branches and laterals are of dissimilar materials, CONTRACTOR shall provide a transition coupling, Fernco, or equal, designed to join the two pipe materials matching flow line elevations. All bands and other metal components on couplings shall be stainless steel.

All fittings used, including type of jointing, are subject to review by ENGINEER. See **SPECIAL PROVISIONS** for any additional requirements.

1.2.7 STEEL OR ALUMINUM CORRUGATED PIPE

Corrugated pipe composed of corrosion-protected steel or of aluminum shall meet the requirements of AASHTO M36 and of structural steel plate shall meet the requirements of M167. Pipe provided shall be new and free of defects and scale. Pipe and fittings that are dented, deformed, or have damaged coatings shall be removed from the site at CONTRACTOR's expense.

The average inside diameter of circular pipe shall not vary more than 1/2 inch or 1%, whichever is greater, from the nominal diameter.

The span and rise dimensions shall not vary more than 1 inch or 2% of the equivalent circular diameter, whichever is greater.

For Review Only

Coupling bands shall conform to AASHTO M36 and shall be made of the same base metal as the pipe. The bands shall not be less than 7 inches wide for diameters of 8 inches to 30 inches, inclusive; not less than 12 inches wide for pipe with diameters 36 inches to 60 inches, inclusive; and not less than 24 inches wide for pipe with diameters greater than 60 inches. Such bands shall be so constructed as to lap on an equal portion of each of the pipe sections to be connected and preferably shall be connected at the ends by galvanized angles having minimum dimensions of 2 by 2 by 3/16 inches.

All connections shall be shop fabricated where possible.

All cuts in corrugated pipe and pipe arch shall be saw cut. Connections cut in the field shall be saw cut with a saddle connection of 16-gauge material bolted on the corrugated pipe with 1/2-inch-diameter galvanized bolts.

1.2.8 HIGH DENSITY POLYETHYLENE (HDPE) CORRUGATED PIPE

Corrugated pipe composed of high density polyethylene shall meet the requirements of AASHTO M252 and M294. Pipe and fittings shall be made from virgin polyethylene compounds conforming to ASTM D3350.

Pipe shall have interior smooth inner wall of full circular cross section with an integrally formed outer corrugated wall AASHTO Type S designation.

Fittings may be molded or fabricated and shall not impair the integrity or function of the pipe. Only fittings supplied or recommended by pipe manufacturer shall be used. Where elastomeric gaskets are required they shall conform to ASTM F477.

1.2.9 IRON PIPE AND FITTINGS

General: Iron pipe shall be ductile iron conforming to AWWA C151. Fittings shall be ductile or cast iron conforming to the standards herein. Iron pipe and fittings shall be American-made: American, Clow, Griffin, Tyler, U.S. Pipe, or equal.

Ductile iron pipe shall consist of pipe centrifugally cast in metal or sand-lined molds. Pipe wall shall be homogeneous from inside to outside and shall be completely free of laminations, blisters, or other imperfections. Defects may be removed at the factory only.

Each pipe and fitting shall have the weight, class or nominal thickness, country where cast, casting period, manufacturer's mark, the year in which the pipe was produced, and the letters DI or DUCTILE cast or stamped thereon. Improper or incomplete marking will be cause for rejection of the pipe or fitting.

CONTRACTOR shall furnish certification data representing each class of pipe or fitting furnished. The certification report shall clearly state that all pipe and fittings furnished meet the appropriate AWWA specification.

Exterior Pipe: Ductile iron pipe shall be provided with mechanical joints or push-on joints where buried. Provide flanged joints inside manholes, wet wells or other such structures, and elsewhere exterior as shown on the Drawings or as specified.

Unless otherwise shown on the Drawings or specified in the **SPECIAL PROVISIONS**, buried pipe shall be minimum Pressure Class 350 with a water hammer allowance of 100 psi. Additional pipe wall thickness shall be furnished as required by AWWA C150 for the depth of cover as shown on the Drawings when using Laying Condition 4 of AWWA C600 or the Class C Bedding Detail as shown on Drawing 01-975-43A.

For Review Only

Flange jointed pipe to be used elsewhere as shown on the Drawings or as specified, shall be minimum Special Thickness Class 53 conforming to AWWA C115 with a minimum rated working pressure of 250 psi and with a water hammer allowance of 100 psi. All flanged pipe shall be made up in strict accordance with AWWA C115 specifications. No field make-up flanges will be allowed unless strictly conforming to AWWA C115 with facing done after turning pipe through flange.

Linings and Coatings: Buried pipe and pipe in manholes, wet wells, and other structures shall be cement-mortar lined and asphaltic coated inside and asphaltic coated outside. Inside lining and coating shall comply with AWWA C104. Outside coating shall comply with AWWA C151. Lining and coatings shall be suitable for use with potable water systems. The asphaltic coating shall be applied over the cement lining on the inside of the pipe and directly on the outside of the pipe. The coatings shall be smooth and impervious to water without any tendency to scale off.

Exterior aboveground pipe and pipe in manholes, wet wells, and other structures shall comply with the above unless specified otherwise in the **SPECIAL PROVISIONS**.

Polyethylene Encasement: Where required on the Drawings or specified in the **SPECIAL PROVISIONS**, CONTRACTOR shall provide polyethylene encasement conforming to AWWA C105. Film shall be Class C–Carbon Black, with a minimum thickness of 0.008 inches (8 mils). Tape for securing the film shall be a thermoplastic material with a pressure sensitive adhesive face capable of bonding to metal, asphaltic coating, and polyethylene. Tape shall have a minimum thickness of 8 mils and a minimum width of 1 inch.

The polyethylene film envelope shall be as free as is commercially possible of gels, streaks, pinholes, particles of foreign matter, and undispersed raw materials. There shall be no other visible defect such as holes, tears, blisters, or thinning out at folds.

Tapping: In cases where corporation stops are to be tapped into mains, pipe wall thickness shall be furnished as specified in AWWA C151 to provide four threads or pipe saddles shall be furnished as approved by manufacturer.

Cutting-in and Repair Tees and Sleeves and Tapping Tees: Cutting-in and repair tees and sleeves and tapping tees shall be of ductile or cast iron with the same rated working pressure of the pipe in which they are installed but no less than 150 psi.

Exterior Joints, Fittings, and Gaskets: Joints, fittings, and gaskets shall have the same rated working pressure of the pipe in which they are installed but no less than a minimum rated working pressure of 150 psi. Fittings shall be cement-mortar lined and asphaltic coated inside and shall be shop primed or asphaltic coated outside as specified above for the piping in which they are being installed.

Joints, fittings, and gaskets for buried piping shall be mechanical joint or push-on joint conforming to AWWA C110 and AWWA C111, as well as AWWA C153 (compact), with vulcanized styrene butadiene rubber gaskets conforming to AWWA C111.

Bolts on mechanical joints shall be high-strength low-alloy steel (Corten, or equal) conforming to AWWA C111; a certificate to that effect shall be provided.

Flange joints, fittings, and gaskets to be used elsewhere as shown on the Drawings or as specified shall conform to AWWA C110, AWWA C111, and to ANSI B16.1. Gaskets for flanged piping shall be full face, minimum 1/8-inch-thick, synthetic rubber gaskets with factory-made holes for flange bolts. Thicker gaskets shall be provided as needed to accommodate allowed tolerances in flange manufacturing.

For Review Only

Gaskets shall be furnished in sufficient number for all joints. Sufficient joint lubricant shall be furnished by the manufacturer with the gaskets.

1.2.10 PVC PIPE (AWWA)

AWWA PVC pressure rated pipe shall conform to the requirements of AWWA C900 for pipe from 4 inch through 12 inch and AWWA C905 for pipe from 14 inch through 36 inch. Pipe shall be furnished with integral elastomeric bell and spigot joints.

PVC pipe diameter shall conform to the O.D. of ductile iron pipe (DIOD). The type of PVC material, nominal pipe size, standard dimension ratio, and pressure rating shall be not less than pressure class 235 and not greater than dimension ratio 18.

Markings on the pipe shall include the following: Nominal pipe size, type of plastic pipe material, DR number, AWWA Designation with which the pipe complies, manufacturer's name, and the seal or mark of the laboratory making the evaluation of the suitability of the pipe for the transport of potable water.

1.2.11 PVC PIPE (SDR-PR)

Standard dimension ratio PVC pressure rated pipe shall conform to the requirements of ASTM D2241 (SDR-PR) for pipe from 4 inch through 12 inch. Pipe shall be furnished with integral elastomeric bell and spigot joints. Spigot end shall conform to ASTM D2241. Bell end shall conform to ASTM D3139. Gaskets shall meet ASTM F477.

PVC pipe diameter shall conform to galvanized iron or steel pipe sizes (IPS). The type of PVC material, nominal pipe size, standard dimension ratio, and pressure rating shall be not less than pressure class 200 and not greater than standard dimension ratio (SDR) 21.

Markings on the pipe shall include the following: Nominal pipe size, type of plastic pipe material, SDR number, pressure class rating, manufacturer's name, and the seal or mark of the laboratory making the evaluation of the suitability of the pipe for the transport of potable water.

1.2.12 PVC PIPE (SCHEDULE PIPE)–4 INCH OR LESS

PVC Schedule pipe 4 inch or less shall conform to the requirements of ASTM D1785 for Schedules 40, 80, or 120. Pipe shall be solvent weld type conforming to ASTM D2855 with bell conforming to ASTM D2672. Pressure rating for pipe supplied shall be minimum 150 psi. PVC pipe diameter shall conform to galvanized iron or steel pipe sizes (IPS).

1.2.13 HIGH DENSITY POLYETHYLENE PRESSURE (HDPE) PIPE AND FITTINGS

HDPE pressure rated pipe shall conform to the requirements of AWWA C906 for pipe from 4 inch through 63 inch. HDPE pipe shall be manufactured from material conforming to PE Code PE3608.

HDPE pipe diameter shall conform to the O.D. of ductile iron pipe (DIOD). The type of HDPE material, nominal pipe size, standard dimension ratio, and pressure rating shall be not less than pressure class 200 and not greater than a dimension ratio (DR) 9.

Markings on the pipe shall include the following: Nominal pipe size, type of plastic pipe material, DR number, pressure class rating, manufacturer's name, and the seal or mark of the laboratory making the evaluation of the suitability of the pipe for the transport of potable water.

For Review Only

Fittings for HDPE pipe shall conform to AWWA C906 and shall have the same pressure rating as the pipe in which they are installed.

1.2.14 PVC PRESSURE PIPE fittings (4 INCH AND LARGER)

Unless otherwise specified in the **SPECIAL PROVISIONS** or shown on the Drawings, fittings for PVC pressure pipe shall be iron pipe fittings as specified herein.

1.2.15 GRINDER PUMP PRESSURE SEWER PIPE AND FITTINGS (LESS THAN 4 INCH)

Grinder pump pressure sewer pipe and laterals, shall be constructed of PVC conforming to ASTM D1785 for Schedules 40, 80, or 120 or to ASTM D2241, Class 250, SDR 17 with solvent weld joints.

All fittings shall be solvent weld, 1120 PVC, Schedule 40 conforming to ASTM D2466 or Schedule 80 in accordance with ASTM D2467. Threaded fittings shall be Schedule 80 minimum conforming to ASTM D2464.

All fittings and joints shall have a working pressure rating at least equal to the pipe to which they are attached. Fittings shall be compatible with the above-specified SDR-PR or Schedule Pipe. All PVC fittings outside of manholes shall have socket or bell ends. Transitions to curb stops shall be socket type on the PVC side and threaded on the curb stop side. Fittings inside manholes shall be as shown on the Drawings. All PVC pipe and fittings shall be approved by the National Sanitation Foundation and shall bear their mark of approval.

1.2.16 PIPE RESTRAINT

Pipe restraint fittings shall be provided as follows:

- a. For mechanical joint iron pipe—Megalug Series 1100 or 1100SD, by EBAA Iron Sales, Inc., or equal.
- b. For push-on joint iron pipe— Megalug Series 1100HD or 1700, by EBAA Iron Sales, Inc., Flex-Ring, or Lok-Ring by American Cast Iron Pipe Company, TR Flex by U.S. Pipe Company, or equal.
- c. For PVC push-on pipe (not solvent welded)—Megalug Series 1500 or 2800, or equal restraint system.

Gaskets that include metal locking segments vulcanized into the gasket to grip the pipe to provide joint restraint are not acceptable.

1.2.17 COPPER WATER TUBING

Copper tubing installed within trenches shall be Type K soft annealed seamless copper tubing and shall conform to the specifications of ASTM B88. All other copper shall be Type K hard copper conforming to ASTM B88.

The name or trademark of the manufacturer and a mark indicating the type shall be permanently and plainly marked on tubing.

For Review Only

Fittings for copper tubing shall be cast brass having an alloy of 85% copper, 5% tin, 5% zinc and 5% lead. They shall have uniformity in wall thickness and strength and shall be free from any defect that may affect their serviceability.

Fittings shall be of the flared or compression-type. Unions shall be extra heavy 3-part unions only.

Each fitting shall be permanently and plainly marked with the name or trademark of the manufacturer.

1.2.18 SURFACE WATER CROSSINGS

Unless indicated otherwise on the Drawings or in the **SPECIAL PROVISIONS**, pipe for water crossings shall be ductile iron, Flex-Ring, or Lok-Ring by American Cast Iron Pipe Company, TR Flex by U.S. Pipe Company, or equal. Type of joint is subject to the review of ENGINEER and approval of OWNER. Mechanical joints with retainer glands will not be allowed.

1.2.19 MISCELLANEOUS PIPE

Piping needed for repair or reconstruction of existing utilities and appurtenances shall be of the same type and strength as the existing. The type of jointing used in repair and reconstruction shall be reviewed by ENGINEER. Special fittings shall be furnished and installed as necessary for repair, reconstruction, or connection of existing facilities.

All special fittings on or for connection to utilities shall be specifically built for the type of gasket used. Special fittings shall have joints of the same type as the utility to which the connection is being made.

When sanitary sewer construction is within 50 feet of a potable well, 200 feet of a municipal well, or as requested by ENGINEER, a water main equivalent pipe shall be used. To transition from water main equivalent pipe to pipe normally supplied, a transition pipe with suitable joints to mate the two different pipes shall be supplied. No field-constructed transitions will be allowed unless reviewed by ENGINEER and approved by OWNER. Construction shall not proceed until proper transition pipe is supplied.

1.3 VALVES

The type of valves to be used in the Project shall be as specified in the STANDARD APPLICATIONS table in the **SPECIAL PROVISIONS** or as shown on the Drawings.

1.3.1 GATE VALVES

Solid wedge and double disk gate valves and resilient wedge gate valves shall conform to AWWA C500 and C509, respectively. Double disk valves shall not be used for wastewater applications. Valves shall close clockwise.

Valve stem seals shall be O-rings. The compound shall be of Buna N or NBR rubber and have a durometer hardness of 70° when tested in accordance with ASTM D2240.

Markings shall be cast on the bonnet or body of each valve and shall show the manufacturer's name or mark, the year and location valve casting was made, the size of the valve, and the designation of working water pressure.

Valves on water distribution systems and force main shall be suitable for direct burial, be provided with nonrising stems, and be equipped with a standard 2-inch-square operating nut with cast-on directional arrow.

For Review Only

Valves in structures as shown on the Drawings or as specified in the **SPECIAL PROVISIONS** shall be provided with nonrising stems and handwheels.

1.3.2 BUTTERFLY VALVES

Butterfly valves shall conform to AWWA C504.

Valves shall be Class 150B with ductile iron valve body.

Shaft seals shall be the self-adjusting split-V type or standard O-ring seals.

Valves shall be suitable for direct burial-type installation on water distribution mains. Valves shall close in a clockwise direction.

All valves 30 inches and larger shall be furnished with a seat, adjustable, removable, and replaceable from the interior of the pipeline. The seat shall be removable and replaceable without removing the body from the pipeline.

Valves shall be furnished with a standard AWWA 2-inch-square nut for manual wrench operation which shall be positively secured to the operator input shaft (in conformance with AWWA C500).

A self-draining, self-aligning base 4 3/4-inch- to 5-inch-diameter concentric with the input shaft shall be provided to accept a circular valve box base.

The operator shall be self-locking with a permanent factory set stop at each end of its travel. The disc shall not creep or flutter under service conditions. The valve shall seat closed at an angle of 90° from full open.

The operator shall be designed for the output torque according to AWWA C504. Maximum input torque required to develop the rated output torque shall not exceed 150-foot pounds for any size valve.

The operator case shall be completely watertight, sealed by means of approved gaskets, gasket compounds, O-rings, or threaded plugs. Operators shall be filled with a suitable oil lubricant or thoroughly coated with an approved grease at the factory. If the operator lubricant is oil, suitable fill and drain plugs shall be provided.

On valves 3 through 16 inches, the standard AWWA coatings in accordance with C504 shall be applied. On valves 20 through 60 inches, the standard AWWA coatings in accordance with C504 are acceptable for all but the final exterior coat, which shall be applied after complete assembly. The final exterior coat shall be applied to all exposed ferrous elements, except for stainless steel. Final exterior coating shall be not less than 10 mils thick and shall be Koppers 50 or 505.

1.3.3 PLUG VALVES

Plug valves shall be DeZurik Series PEC, ValMatic, or equal.

Valves shall be of the nonlubricated eccentric type with resilient faced plugs and end connections as shown on the Drawings or as needed to mate with main. Plugs and upper and lower shafts shall be cast in one piece. The plug profile shall be of a cylindrical eccentric shape so that the vertical face of the plug is straight and the horizontal face is eccentrically curved in relation to the plug shafts. Segmented ball valves with spherical plugs shall not be acceptable. Port areas shall be at least 80% of full pipe area. Valve bodies shall be of ASTM A126, Class B cast iron. Resilient plug facings shall be of chloroprene, suitable for use with wastewater.

For Review Only

Valves shall be furnished with corrosion-resistant seats and replaceable oil-impregnated permanently lubricated stainless steel sleeve-type bearings, which comply with the latest edition of AWWA Standards C507 and C504. Valves shall be furnished with a 1/8-inch machined smooth welded overlay seat of not less than 90% nickel. Seat area shall be raised surface completely covered with weld to ensure that the plug face contacts only nickel. Screwed-in seats are not acceptable. Valve shaft seals shall be of the type utilizing a stuffing box and pulldown packing gland. Shaft seals shall be designed for replacement with the line pressurized at design pressure with the plug in both the open and closed position. Standard Alemite No. 1610-BL grease fittings shall be installed in the upper and lower journals of the plug valves.

The design of the valve and stuffing box assembly shall be such that the packing can be adjusted or completely replaced without disturbing any part of the valve or operator assembly except the packing gland follower. Stuffing boxes shall have a depth sufficient to accept at least four rings of v-type packing. Valve seating adjustment shall be accomplished without removing the valve from the pipe line and with pressure in the line.

Valve pressure ratings shall be 175 psi for valves through 12 inch and 150 psi for valves in sizes 14 inch through 24 inch. Valves shall provide drip-tight shutoff up to the full pressure rating in both seating and unseating head conditions. Valves and all accessories shall be suitable for buried and submerged water service.

All underground valves shall be equipped with cast iron telescopic adjustable valve boxes and covers. Provide 4- and 6-inch valves with valve key and stainless steel extended stems.

Plug valves 8 inches and larger shall be mounted in the horizontal, and when open, valve plugs shall be at top of valve out of flow stream. Plug valves installed in the horizontal shall have worm gear actuators. Provide same full pressure rating for gearbox as for valve. All gearing shall be enclosed in a cast iron housing of same quality as plug valve and be suitable for running in a lubricant with seals provided on all shafts to prevent entry of dirt and water into the actuator. The actuator shaft and the quadrant shall be supported on permanently lubricated bronze bearings. Actuators shall indicate valve position. Buried and submerged actuators shall be suitable for direct burial or submergence and shall be mounted on a gasketed and totally enclosed actuator mounting bracket and shall have a totally enclosed and gasketed cover. Actuator shall be filled with grease. Provide OWNER with number of revolutions to open and close valves.

Extension stems shall be provided. Extension stems for submerged gear-operated valves shall be fabricated from stainless steel rod. Stems shall be provided with 2-inch operating nut.

Buried or submerged valves shall be fusion-bonded epoxy-coated.

Valves shall be equipped with open/close rotation indicator at top of extended stem. All valves shall open when the operating shaft is rotated counterclockwise.

Provide warranty on valves and valve components, 30 months from date of shipment or 24 months from date of installation, whichever is earlier.

See **SPECIAL PROVISIONS** for any additional valve requirements.

1.3.4 CHECK VALVES

Swing Check Valves: Swing check valves in lines carrying liquid shall be M&H Style 259, Pratt, DeZurik, American, Dresser, (lever and weight) for sizes 2 inch to 30 inch, or equal, conforming to AWWA C508, minimum 150 psi, iron body with disk to be bronze trimmed and neoprene rubber faced. Additional weights shall be used if necessary to stop slamming.

For Review Only

Air Cushion Swing Check Valves: Air cushion swing check valves in lines carrying liquid shall be GA Industries 250D, or equal. The swing check valves shall be constructed with a heavy cast iron or cast steel body, a bronze or stainless steel seat ring, an extra heavy noncorrosive shaft for attachment of lever and necessary weights to close valve, and a complete noncorrosive air cushion chamber. The valve shall be tight seating and shockless in operation. The seal ring shall be renewable and shall be securely held in place by a threaded joint. The air cushion chamber shall be attached to the side of the valve body externally and so constructed with a piston operating in a chamber that will effectively permit the valve to be operated without any hammering action. Shock absorption shall be by air, and the chamber shall be so arranged that the closing speed can be adjusted to meet the service requirements. The valve disk shall be of cast iron or cast steel and shall be suspended from a noncorrosive shaft that shall pass through a stuffing box to be connected to the chamber on the outside of the valve.

1.3.5 GRINDER PUMP PRESSURE SEWER SHUTOFF VALVES

All shutoff valves in valve and air release manholes for low pressure grinder pump sewers shall be PVC ball valves, ASAH1, True Union, 150 psi, Plastic Systems, Cartridge Type 342, or equal.

Ball valves shall be 1120 PVC body, union nuts, stem, handle, and end connectors. Balls shall be made of either CPVC or PVC. Valves shall be equipped with replaceable Teflon seats and EPDM O-ring seals. Ball valves shall be compatible with pipe and fittings as specified herein.

1.3.6 CORPORATION STOPS, CURB STOPS, AND TAPPING SADDLES

Corporation stops and curb stops from 1/2 inch to 2 inch shall be brass and shall be manufactured in accordance with AWWA C800 and ASTM B62. Unless otherwise specified in the **SPECIAL PROVISIONS**, manufacturer shall be Mueller, Ford, or equal.

With PVC main, tapping saddles shall be provided for all corporation stops. Unless otherwise specified in the **SPECIAL PROVISIONS**, tapping saddles shall be Mueller, Ford, or equal, brass, 150 psi working pressure with stainless steel bands, nuts, and bolts

1.3.7 FIRE HYDRANTS

Fire hydrants provided under these Specifications shall conform to AWWA C502 for Dry-Barrel Fire Hydrants. Hydrants shall have the following features:

Bury Length	Approximately 3 feet to traffic flange.
Nozzle Size	One 4 1/2-inch- and two 2 1/2-inch-diameter openings.
Nozzle Threads	National standard fire hose coupling screw threads.
Drain Port:	Drain port at base of hydrant barrel. Plug drain port when hydrant installed in area where ground water level may rise above drain port.
Size of Main Valve Opening	5 1/4-inch-diameter minimum. The hydrant lead connection shall be minimum 6 inches diameter mechanical joint.
Torque Requirements	Hydrant shall comply with AWWA C502 even if greater than 5-foot bury.
Lubrication	Nontoxic and providing proper lubrication for a temperature range of -30° to +120° Fahrenheit.

For Review Only

Hydrants shall have permanent markings identifying the manufacturer by name, initials, insignia, or abbreviations in common usage, and designating the size of the main valve opening and the year of manufacture. Markings shall be so placed as to be readily discernible and legible after hydrants have been installed.

CONTRACTOR shall furnish certification to ENGINEER that the hydrant and all material used in its construction conform to the applicable requirements of AWWA C502 and the supplementary requirements thereto.

All joints on the fire hydrant leads shall be made using MEGALUG® or Uni-flange pipe restraint specified herein, or other approved restrained joint. Approximately one-half cubic yard of clear stone shall be placed from the bottom of the trench around the hydrant elbow and up the hydrant barrel. Clear stone shall be wrapped completely in filter fabric to prevent the in-migration of fine materials.

Hydrants shall be provided with reaction backing.

CONTRACTOR shall furnish all necessary fittings in the fire hydrant lead to install the fire hydrant in a plumb condition at locations shown on the Drawings and at the specified depth of bury. The pumper nozzle of all fire hydrants shall be installed with the nozzle pointing toward the street. ENGINEER reserves the right to alter the location of fire hydrants from that shown on the Drawings.

1.3.8 VALVE BOXES

A valve box shall be provided for fire hydrant auxiliary valves and for valves in the main. The valve box shall be centered and plumb over the wrench nut of the valve with the box cover flush with the finished ground elevation. Solid 4-inch concrete blocks shall be placed under the base of valve boxes so that the bottom of the base is about 2 inches away from contact with the valve bonnet. The valve box shall not transmit shock or stress to the valve.

Valve boxes shall be made of cast iron conforming to ASTM A48, Class 20. The castings shall be free from blowholes, porosity, hard spots, shrinkage defects or cracks, or other injurious defects and shall have a normal smooth casting finish. The castings shall be thoroughly coated with a 1-mil minimum thickness bituminous coating. Valve boxes shall be 5-1/4 inches in diameter. Valve boxes shall have a maximum length of 5 feet when extended without extension sections. Extensions shall be provided for deeper mains.

Valve boxes shall consist of a base section, tubular mid and top sections, both with cast threads by which one can be telescoped on the other, extension sections if required, and a circular drop cover.

1.3.9 CURB BOXES

Curb boxes shall be of the *Arch or Minneapolis Pattern*, Ford, Mueller, or equal made with cast iron conforming to ASTM A48, Class 20. The castings shall be free from blowholes, porosity, hard spots, shrinkage defects or cracks, or other injurious defects and shall have a normal smooth casting finish. The pentagon head bolt shall be brass.

The castings shall be thoroughly coated with a 1-mil thickness bituminous coating.

A 2 1/2-inch-diameter box shall be provided for 3/4-inch and 1-inch service stops.

A 3-inch-diameter box with the enlarged base shall be provided for 1-1/4, 1-1/2, and 2-inch service stops.

For Review Only

All curb boxes shall have a maximum length of 5 feet when extended without the use of extension section. Extensions shall be provided for deeper mains.

1.3.10 MISCELLANEOUS VALVES

Shutoff valves in pipe taps and potable and nonpotable water lines smaller than 1 inch shall be Milwaukee 1131T (threaded), Milwaukee 1169 (solder joint), Nibco T-134 (threaded), Nibco S-134 (solder joint), or equal bronze 300 psi gate valves. Provide unions for ease of valve removal

Shutoff valves in pipe taps and potable and nonpotable lines, pump vent, and drain lines 1 inch through 2-1/2 inch shall be gate valves, 150 psi, bronze or iron body bronze mounted, solid wedge disk, threaded, rising stem Nibco T-131, Milwaukee 1150, or equal. Provide unions for ease of valve removal.

1.4 PRECAST REINFORCED CONCRETE MANHOLES

Unless otherwise required in the **SPECIAL PROVISIONS**, all manhole sections including risers, flat slab tops, conical tops, base sections, steps, and adjusting rings shall be precast reinforced concrete. Reinforced concrete manhole sections shall conform to ASTM C478. Manhole construction shall conform to Drawing 01-975-43A.

Lengths of manhole riser (barrel) shall be furnished in such combinations as to conveniently make up the depth of the manhole. A maximum of two handling holes per length of riser will be permitted.

Standard sewer and water manholes shall be constructed with eccentric cone top section and water main valve manholes shall be constructed with a concentric cone top section for 48-inch-diameter barrel sections. For other diameters the top section shall be a cone section, if available, or flat slab. Concrete adjusting rings shall be furnished to set the manhole casting to established grade. Valves and cleanout piping connections shall be centered below the casting.

Drop entrances to sanitary sewer manholes shall be installed where indicated on the Drawings and as shown on Drawing 01-975-43A. Drop entrances shall be of the same diameter as the sewer main from sizes 8 inch through 18 inch. For larger diameters, the drop shall be 18 inches unless otherwise specified in the **SPECIAL PROVISIONS** or shown on the Drawings. Drop entrances for storm sewer manholes are not required.

The interior bottom of sanitary sewer and storm sewer manholes shall be constructed of concrete benches which shall be precast or poured-in-place in the field. Benches shall extend to the top of each pipe to a maximum height of 42 inches. Flow lines shall be made smooth with uniform curves to promote flow through the manhole.

All joints between manhole pipe sections and top shall be tongue and groove conforming to ASTM C443. Manhole joints shall be sealed with circular O-ring conforming to ASTM C443 or bituminous jointing material equal to EZ-Stick, Kent Seal, Ram-Nek, or Mas-Stik butyl rubber gasket, or butyl rubber rope.

Manhole connections for sanitary sewer mains shall be made using flexible, watertight connections, PSX Press Seal, Kor-N-Seal, or equal, for sewers up through 18-inch-diameter. All other sanitary sewer manhole connections shall be made with A-Lok, PSX Press Seal, Kor-N-Seal, or equal. Manhole connections for all other piping shall be made with A-Lok, PSX Press Seal, Kor-N-Seal, or concrete grout.

Manhole bottoms for sanitary sewer shall be monolithically precast with the bottom section for manholes up through 6-foot-diameter. Bottoms for larger diameter manholes shall be precast but need

For Review Only

not be monolithically cast with the bottom section. All other manhole bottoms shall be either poured-in-place or precast concrete.

Manhole bottoms for air release manholes, force main cleanout manholes and water system valve manholes shall have an 18-inch-diameter sump hole. Sump hole shall have a solid concrete bottom where groundwater is above the bottom of the manhole.

Manholes shall be furnished of minimum diameters as shown on Drawing 01-975-43A. Manholes shall be furnished large enough to provide a minimum distance, between adjacent pipe, measured tangentially along the inside face of the manhole, equal to one-half the outside diameter of the intersecting sewer pipe. In any event, manholes shall be furnished in the diameter necessary to accommodate intersecting sewer pipe and the pipe to manhole connection as proposed for use.

Steps shall be installed in all sewer manholes by the manufacturer as shown on Drawing 01-975-43A and shall be cast iron conforming to ASTM A48, Class 30B or steel reinforced plastic conforming to ASTM A615, Grade 60 and ASTM D4101, Type II, Grade 49108 as shown on the Drawings. Manhole steps shall be spaced at 16 inch on center with an allowable tolerance of 1 inch plus or minus. Steps shall be embedded into the riser or conical top section wall a minimum of 3 inches.

Precast reinforced concrete manhole risers and tops shall be tested in accordance with ASTM C497. Precast reinforced concrete manhole risers and tops meeting the strength requirements will be considered acceptable and shall be stamped with an appropriate monogram. When requested, copies of test reports shall be submitted to ENGINEER before the manhole sections are installed in the Project. Final acceptance will be made after field inspection upon delivery to the job site.

Precast reinforced concrete manhole sections shall be subject to rejection for failure to conform to any of the Specification requirements. In addition, individual sections of manhole risers and tops may be rejected because of any of the following reasons:

- a. Fracture or cracks passing through the wall, except for a single end crack that does not exceed the depth of the joint.
- b. Defects that indicate imperfect proportioning, mixing, and molding.
- c. Surface defects indicating honey-combed or open texture.
- d. Damaged ends, where such damage would prevent making a satisfactory joint.
- e. Manhole steps out of line, or not properly spaced.
- f. Noticeable infiltration into manhole.
- g. Variation in diameter of the manhole section of more than 1 percent from the nominal diameter.
- h. Any continuous crack having a surface width of 0.01 inch or more and extending for a length of 12 inches or more regardless of position in the section wall.

Each precast reinforced concrete manhole riser and top section shall be clearly marked with the name or trademark of the manufacturer and the date of manufacture. This marking shall be indented into the manhole section or shall be painted thereon with waterproof paint.

For Review Only

Precast concrete adjusting rings for standard manholes shall have an inside diameter of 26 inches, be not less than 2 inches nor more than 6 inches high, and shall have a wall thickness of 6 inches unless otherwise specified. The rings shall contain a minimum of one No. 2 reinforcing rod centered within the ring.

1.5 STORM SEWER INLETS

All inlets shall meet the requirements of ASTM C913. Construction shall conform to Drawing 01-975-41A. Inlets, in general, shall be rectangular in shape and shall be constructed of precast or poured-in-place concrete.

1.6 MASONRY

Concrete block shall meet the requirements of ASTM C139.

The face size of stretcher units shall be 7-5/8 inches by 15-5/8 inches. Variations in the face size shall be within the limits permitted by the above standards. Special shapes and sizes shall be furnished and installed as necessary.

Sewer brick shall conform to ASTM C32. All sewer brick shall be grade SS and manhole brick shall be grade MS. Sewer brick shall be installed as shown on the Drawings furnished by ENGINEER and as required in the construction of sewer appurtenances.

1.7 MANHOLE AND INLET CASTINGS

All manhole and inlet castings shall be gray iron and meet the requirements of ASTM A48. Unless otherwise shown on the Drawings or specified in the **SPECIAL PROVISIONS**, standard manhole castings shall be Neenah R1550 with machined frame, Type B solid lid, concealed pick holes and self sealing gaskets, East Jordan Iron Works, or equal. Floodproof castings shall be Neenah R1916 C with machined frame, type B solid lid, concealed pick holes and self-sealing gaskets, East Jordan Iron Works, or equal.

Inlet castings for locations with curb and gutter shall be Neenah R3067 with type L grates on slopes and type R grates at low points, East Jordan Iron Works, or equal. For driveway areas, inlet castings shall be Neenah R3290 with Type A grates, East Jordan Iron Works, or equal.

1.8 FRAME/CHIMNEY SEAL

Where required by the **SPECIAL PROVISIONS** or shown on the Drawings, CONTRACTOR shall provide internal manhole frame chimney seal. The seal shall be made of a rubber type product, with a minimum thickness of 3/16 inches, a minimum unstretched width of 8 inches and be extruded or molded from a high grade rubber compound conforming to the applicable requirements of ASTM C923. The bands used for compressing the sleeve against the manhole shall be fabricated from stainless steel conforming to ASTM A240, Type 304, for sheet and ASTM A479, Type 304, for rods. Any screws, bolts, or nuts used on these bands shall be stainless steel conforming to ASTM F593 and F594, Type 304. The internal seal or its appurtenances shall not extend far enough into the manhole opening to restrict entry into or exit from the manhole.

Manhole frame-chimney seals shall be designed to prevent the leakage of water into the manhole at the area of the joint between the manhole frame and chimney continuously throughout a 20-year design life. The seal shall remain flexible, allowing repeated vertical movements of the frame because of frost lift, ground movement, or other causes of up to 2 inches and/or repeated horizontal movements of the frame because of thermal movement of the pavement or other causes of up to 1/2 inch, both rates of

For Review Only

movement occurring at rates not less than 0.10 inch per minute. If the seal is an internal seal, it and its appurtenances shall not extend far enough into the manhole opening to restrict entry or exit from the manhole.

The seal shall be made of only materials that have been successfully used in sanitary sewer construction for at least ten years and have proven to be resistant to sanitary sewerage; corrosion or rotting under wet or dry conditions; the gaseous environment in sanitary sewers and at road surfaces including common levels of ozone, carbon monoxide and other trace gases at the sites of installations; the biological environment in soils and sanitary sewers; chemical attacks by road salts, road oil and common street spillages or solvents used in street construction or maintenance; the temperature ranges, variations and gradients in and between manhole frames and chimneys in the climate of the location of construction; variations in moisture conditions and humidity; fatigue failure caused by a minimum of 30 freeze-thaw cycles per year; or vibrations because of traffic loadings; fatigue failure because of repeated variations of tensile, compressive and shear stresses and repeated elongation and compression; and any combination of the foregoing. The materials used shall be compatible with each other and the manhole materials.

1.9 MORTAR

All mortar used shall meet the requirements of ASTM C270. Mortar shall be one part Portland cement and 2-1/4 parts washed mortar sand.

1.10 AGGREGATE SLURRY (FLOWABLE) BACKFILL

Aggregate slurry (flowable) backfill shall consist of fine and coarse aggregate conforming to ASTM C33. Coarse aggregate shall be size number 67 and fine aggregate shall be size number 4. The material shall be mixed with water to provide an approximate 3-inch slump. The mix shall be deposited in the trench from ready mix concrete transit mix trucks and shall be consolidated using concrete vibrators or vibratory plate compactors.

1.11 EROSION CONTROL

Erosion and pollution control components such as silt fences, rock bags, straw bales, trash receptors, etc. shall meet the requirements of Best Management Practices and the Stormwater Pollution Prevention Plan established for this Project.

1.12 BEDDING DIKE

Where shown on the Drawings or requested by ENGINEER in the field, CONTRACTOR shall install clay bedding dikes to prevent groundwater from flowing continuously through the bedding material installed for the sanitary sewer. Bedding dikes shall be 4 feet long and shall extend from the bottom of the trench excavation to within 2 feet of the ground surface and 1 foot beyond the normal trench width on both sides of the trench.

1.13 SPECIAL MATERIALS AND EQUIPMENT

See **SPECIAL PROVISIONS** for items of material and equipment specific to the Project.

For Review Only

SECTION 2—ALIGNMENT AND GRADE

2.1 GENERAL

Utility lines shall be laid and installed to the lines and grades specified with valves, fittings, manholes, and other appurtenances at the specified locations; spigots centered in bells; and all manholes and riser pipes plumb.

Water main and force main shall maintain a minimum of 36 inches of cover. Gravity sewer mains and laterals shall maintain a minimum 36 inches of cover but shall be deep enough to provide service to buildings.

Water main, force main, and other pressure mains shall be installed to within plus or minus 0.1 feet of designed grades. Sanitary and storm sewer and laterals shall be installed to within plus or minus 0.03 feet of designed grades.

Unless otherwise noted in the **SPECIAL PROVISIONS** or on the Drawings, service lines shown on the Drawings are approximate. ENGINEER will assist CONTRACTOR in staking the actual locations in the field.

Staking shall be completed in conformance with Division 1 of the Specifications.

2.2 DEVIATIONS OCCASIONED BY UNDERGROUND FACILITIES

Wherever significant obstructions not shown on the Drawings are encountered during the progress of the Work, CONTRACTOR shall proceed in accordance with the General Conditions to notify owners and protect the facilities. Existing items unnecessarily damaged during the performance of the Work shall be repaired and replaced at the expense of CONTRACTOR.

2.3 CAUTION IN EXCAVATION

CONTRACTOR shall proceed with caution in the excavation and preparation of the trench so that the exact location of underground structures may be determined and shall be held responsible for the repair of such structures when broken or otherwise damaged because of carelessness on its part.

2.4 SUBSURFACE EXPLORATION

Whenever, in the opinion of ENGINEER, it is necessary to explore and excavate to determine the location of existing underground facilities, CONTRACTOR shall make explorations and excavations for such purposes. If CONTRACTOR is asked to perform additional Work in making the explorations and excavations, extra compensation will be allowed as specified in the General Conditions.

SECTION 3—EXCAVATION AND PREPARATION OF TRENCH

3.1 GENERAL EXCAVATION

The trench shall be dug so that the utilities can be laid to the alignment and depth specified. Unless otherwise allowed by ENGINEER, trenches shall not be excavated more than 100 feet in advance of pipe laying. Earth excavation shall include all excavation except rock as hereinafter defined. Included in earth excavation shall be removal of street paving of all types, existing structures, existing improvements and trees smaller than 4 inches in diameter measured 4 feet above the ground, all as necessary to complete the pipe installation.

For Review Only

3.2 EXCAVATION TO GRADE

The trench shall be finished to the depth necessary to provide a uniform and continuous bearing and support for the pipe on the bedding material provided at every point between bell holes. Any part of the bottom of trench excavated below the specified grade shall be corrected with bedding material, thoroughly compacted in place. The bedding shall be shaped and finished with hand tools to fit the bottom quadrant to the pipe.

If, in the opinion of ENGINEER, unstable soil conditions are encountered at subgrade, CONTRACTOR shall replace the unstable soil with special bedding. CONTRACTOR shall be allowed extra compensation for the special bedding, unless the unstable soil conditions are caused by CONTRACTOR's failure to adequately dewater the trench, in which case CONTRACTOR shall bear the entire cost.

All excavated material shall be piled in a manner that will not endanger the Work. Stockpiles not for immediate backfilling shall have silt fences placed around their perimeter for erosion control. The Work shall be conducted in such a manner that pedestrian and motor traffic is not unnecessarily disrupted. Fire hydrants, valve boxes and manholes shall be left unobstructed. Gutters shall be kept clear or other satisfactory provisions made for street drainage, and natural water courses shall not be obstructed.

Excavated material designated by ENGINEER as being undesirable for backfilling shall be immediately removed as excavation progresses. Points of disposal are subject to approval of OWNER. All undesirable and surplus material disposed of must be leveled off and graded to rough elevations as determined by OWNER.

CONTRACTOR shall remove bituminous pavement and road surface as a part of the trench excavation. The width of pavement removed shall be the minimum possible, and acceptable, for convenient and safe installation of utilities and appurtenances.

All bituminous pavement shall be cut on neat, straight lines and shall not be damaged beyond the limits of the trench.

Where it is necessary to trench through concrete pavement, a strip shall be sawed and removed in such a manner as not to disturb the remainder of the pavement. Paving and undermining of existing concrete pavement shall be prevented by CONTRACTOR. If CONTRACTOR unnecessarily removes or damages pavement or surfaces beyond limits acceptable to ENGINEER, such pavement and surfaces shall be replaced or repaired at the expense of CONTRACTOR.

3.3 DEWATERING

CONTRACTOR shall, at its own expense, keep the excavation clear of water while structures and appurtenances are being built, utilities are being installed, and fill and backfill is being compacted. CONTRACTOR shall at all times have on hand sufficient pumping equipment and machinery in good working condition for all ordinary emergencies, including power outages, and shall have available at all times competent workers for the operation of the pumping equipment. The dewatering systems shall not be shut down between shifts, on holidays or weekends, or during Work stoppages.

All dewatering shall be done in accordance with applicable federal, state, and local code requirements.

Under no conditions shall the Work be laid in or under water. No water shall flow over the Work until the joints are complete or the concrete has set. Wherever necessary, CONTRACTOR shall excavate in advance of the completed Work, lead the water into sumps or pump wells, and provide erosion control measures to prevent water or sediment damage.

For Review Only

The expense for making all extra excavations necessary to prevent water from interfering with the proper construction of the Work and for forming of all dams, digging sumps or pump wells, bailing and pumping, and erosion control shall be borne by CONTRACTOR. Any permits necessary for the dewatering operations shall be obtained and paid for by CONTRACTOR. No extra payment will be made for dewatering of the trench whether accomplished by the use of sumps and pumps, well point systems, or deep wells.

CONTRACTOR's dewatering system shall ensure that soils within the trench will not be destabilized by hydrostatic uplift pressures from adjacent groundwater. If conditions warrant, CONTRACTOR shall furnish and install well point systems or deep wells. Spacing and depth of well points or wells shall be adequate to lower the piezometric level to at least 2 feet below the bottom of the excavation. Additional lowering shall be provided as necessary to create a stable subgrade. The control of groundwater shall be such that softening or heaving of the bottom of excavations or formation of quick conditions or boils shall be prevented. Dewatering systems shall be designed and operated to prevent the migration or removal of soils. In areas where rock is encountered, the water level shall be kept at or below top of rock but at least 6 inches below bottom of concrete. Additional rock shall be removed as needed to provide clearances.

CONTRACTOR shall take all necessary precautions during the dewatering operation to protect adjacent structures against subsidence, flooding, or other damage. The dewatering system shall be installed and operated so that the groundwater level outside the excavation is not reduced to the extent that would damage or endanger adjacent structures or property. Any such facilities and structures damaged shall be repaired or replaced to the satisfaction of their owner.

Prior to dewatering, CONTRACTOR shall take into account the effect of its proposed dewatering operation on existing private water supply systems and shall make arrangements with property owners for protecting their supplies or providing alternative supply. If CONTRACTOR's dewatering operation adversely affects private water supply systems, CONTRACTOR shall provide property owners with alternative potable and nonpotable supplies until dewatering operations are ceased and groundwater levels return to normal. If the water in private water supply wells is contaminated through no fault of CONTRACTOR after restoration of original groundwater levels, OWNER will provide measures to restore water potability. CONTRACTOR is responsible for restoration of the water supply, not its potability after restoration.

In areas where continuous operation of dewatering pumps is necessary, CONTRACTOR shall avoid noise disturbance to nearby residences and businesses to the greatest extent possible by using electric driven pumps, intake and exhaust silencers, or housing to minimize noise.

The release of groundwater to its static level shall be performed in such a manner as to maintain the undisturbed state of the natural foundation soils, prevent disturbance of compacted fill or backfill, and prevent floatation or movement of all structures and pipelines.

3.4 WIDTH OF TRENCH

CONTRACTOR shall be responsible for determining and providing the minimum width necessary to provide a safe trench in accordance with current OSHA standards and all other applicable standards. The top width of trench excavation shall be kept as narrow as is reasonably possible and acceptable to minimize pavement damage. Pay items related to maximum trench widths shall not limit CONTRACTOR's responsibility to provide safe trench conditions.

Width of Trench—Rigid Pipe: The width of trench below the outside top of the pipe shall be as shown in the following table for the sizes listed. A minimum clearance of 8 inches between the outside of the pipe barrel and the trench wall at the pipe spring line shall be maintained to allow for bedding and haunching. If sheeting is used and is going to remain in place, the trench width shall be measured as

For Review Only

the clear distance between inside faces of the sheeting. Otherwise, the trench width shall be based on the width between stable trench walls after sheeting is removed.

MAXIMUM WIDTH OF TRENCH BELOW TOP OF PIPE

Nominal Pipe Diameter (Inches)	Trench Width (Inches)
4	30
6	30
8	36
10	36
12	36
15	36
18 and larger	SEE SPECIAL PROVISIONS

Where the width of trench below the outside top of the pipe barrel cannot be otherwise maintained within the limits shown above, CONTRACTOR, at its own expense, shall furnish an adequate pipe installation for the actual trench width which will meet design conditions. This may be accomplished by furnishing higher class bedding, a stronger pipe, concrete cradle, cap or envelope or by driving sheeting prior to excavation to subgrade. Removal of sheeting below the top of the pipe, if allowed by ENGINEER, shall be gradual during backfilling.

If the maximum trench width is exceeded for any reason other than by request of ENGINEER, the concrete cradle, cap, sheeting, bedding or the stronger pipe shall be placed by CONTRACTOR at its own expense. Where the maximum trench width is exceeded at the written request of ENGINEER, the concrete cradle, cap, sheeting, bedding or stronger pipe will be paid for on the basis of the price bid.

Width of Trench—Thermoplastic and Ductile Iron Pipe: The trench width for flexible pipe shall be minimum three times the pipe outside diameter or the maximum trench width specified for rigid pipe, whichever is greater. A minimum clearance of 8 inches between the outside of the pipe barrel and the trench wall at the pipe spring line shall be maintained to allow for bedding and haunching.

3.5 ROCK EXCAVATION, UTILITIES

Rock excavation for utilities shall include all hard, solid rock ledges, bedded deposits and unstratified masses and all conglomerate deposits or any other material so firmly cemented that in the opinion of ENGINEER it is not practical to excavate and remove same with a 225-net flywheel horsepower trench backhoe or equal, except after continuous drilling and blasting. Soft or disintegrated rock which can be removed with a pick, loose, shaken or previously broken rock, or rock which may fall into the excavation from outside the limits of excavation will not be classified as rock excavation. Rock excavation shall also include all rock boulders necessary to be removed having a volume of 2 cubic yards or more.

When rock is encountered, it shall be stripped of earth and ENGINEER or OWNER's representative notified and given proper time to evaluate same before removal. Any rock removed which has not been measured by ENGINEER or OWNER's representative will not be classified as rock excavation.

The depth of trench in rock shall be 6 inches below the lowest outside bottom of the pipe.

All rock excavated from the trench shall be classified as undesirable backfill material and shall be disposed of as specified in the Excavation to Grade section. All trenches in rock shall be backfilled with bedding, cover, and backfill material furnished by CONTRACTOR.

For Review Only

3.6 BLASTING

Blasting for rock excavation will be permitted only after securing the written approval of OWNER and only after proper precautions are taken for the protection of persons or property. The hours of blasting will be fixed by OWNER. Any damage caused by blasting shall be repaired by CONTRACTOR at its expense. CONTRACTOR's method and procedure of blasting shall conform to state laws and municipal ordinances.

CONTRACTOR shall provide a copy of Blaster License as required by the licensing agencies to OWNER prior to commencement of blasting.

3.7 SPECIAL BEDDING

Where the bottom of the trench at subgrade is found to be unstable or unsuitable material, which in the opinion of ENGINEER should be removed, CONTRACTOR shall excavate and remove such unstable or unsuitable material to the normal trench width and to a depth of 2 feet. The excavated area shall be lined with filter fabric, Mirafi 140 N, Supac, or equal, and backfilled with bedding material in layers. At subgrade the filter fabric shall be wrapped over the special bedding with an 18-inch overlap. Normal bedding shall then be placed over the special bedding to support the piping. See Dewatering section for additional conditions.

3.8 CONCRETE CRADLE

If, in the opinion of ENGINEER, soil conditions require it, concrete cradle or encasement shall be placed around the pipe as shown on Drawing 01-975-43A. Excavation shall be carried below the normal grade line to a depth requested by ENGINEER and concrete cradle or encasement placed. Before the concrete is placed, the pipe shall be laid to line and grade, blocked and braced, and the joint made. The cradle shall then be placed, taking care not to disturb the pipe. Concrete shall have a minimum 28-day compressive strength of 4,000 psi. Concrete cradle shall not be used for thermoplastic piping. See Trench Width section for additional conditions.

3.9 BRACED AND SHEETED TRENCHES

Open-cut trenches shall be sheeted and braced as required by any governing federal regulations including OSHA, state laws, and municipal ordinances; and as may be necessary to protect life, property, improvements or the Work. Underground or aboveground improvements to be left in place shall be protected and, if damaged, shall be repaired or replaced at the expense of CONTRACTOR.

Sheeting and bracing which is to be left in place must be removed for a distance of 4 feet below the present or proposed final grade of the street, road, or land, whichever is lower. Trench bracing, except that which shall be left in place, may be removed after backfilling has been completed or has been brought up to such an elevation as to permit its safe removal.

3.10 TUNNELING, BORING, JACKING, OR BORING AND JACKING

Where shown on the Drawings or specified in the **SPECIAL PROVISIONS**, the sewer, water main or force main (carrier pipe) shall be placed inside a casing pipe that is installed by tunneling, boring, jacking, or boring and jacking or other approved methods not using open-cut construction techniques. Installation shall be accomplished in accordance with State Laws, municipal ordinances, and any permit requirements. Casing pipe used shall be of adequate diameter and thickness to support all loads imposed and to permit installation of the carrier pipe to plan line and grade. Type and minimum size of

For Review Only

casing pipe shall be as called for on the Drawings or as specified. Steel casing pipe joints shall be continuous circumferential welds of strength equal to pipe walls.

Casing pipe shall be installed using equipment and material that cases the hole as earth is removed to eliminate cavities at the lead end of the casing pipe. Grouting between casing pipe and soil opening shall be performed when needed to secure casing pipe, to prevent soil collapse, and to fill voids between the casing pipe and native soil.

Installation of casing and carrier pipe shall proceed in such a manner as to minimize disruption of traffic and to avoid damage to adjacent streets. No equipment shall work off the pavement or shoulder of the street being crossed during the course of construction. Signs, barricades, flagmen and lighting shall be provided to strictly comply with the Traffic Control section of the Standard Specifications as may be modified by any permit requirements. Stricter requirements shall govern in case of differences.

The carrier pipe shall be placed inside the casing pipe using hardwood blocks or stainless steel casing spacers, which are shaped to fit both the casing pipe and carrier pipe. At least three blocks or spacers shall be provided for each length of carrier pipe. They shall be banded or fixed to the barrel of the carrier pipe so they are parallel to the longitudinal centerline. The annular space between the casing pipe and carrier pipe shall be filled with sand or concrete grout. Sand fill shall be thoroughly tamped and rammed in place.

All carrier pipe within the limits of jacking pits shall be installed at CONTRACTOR's expense to resist all loads imposed including, if necessary, the use of special pipe.

Other tunneling methods shall be as specified in the **SPECIAL PROVISIONS**.

SECTION 4—PIPE AND MANHOLE INSTALLATION

4.1 GENERAL

Prior to commencing pipe laying, CONTRACTOR shall notify ENGINEER of the intended date for starting Work. ENGINEER may request at CONTRACTOR's expense the removal and relaying of pipe which was installed prior to notification of ENGINEER.

Proper implements, tools, and facilities shall be provided and used by CONTRACTOR for the safe and convenient prosecution of the Work. All pipe, fittings, and appurtenances shall be carefully lowered into the trench, piece by piece, with a crane, rope or other suitable tools or equipment, in such manner as to prevent damage to materials. Under no circumstance shall pipe be dropped or rolled into the trench.

Materials shall be as shown on the Drawings or as specified herein.

4.2 MATERIAL INSPECTION

CONTRACTOR shall inspect the pipe, fittings, and appurtenances for defects when delivered to the job site and prior to lowering into the trench. Defective material shall be removed from the job site. All material shall be clean and free of deleterious substances prior to use in the Work.

4.3 BEDDING AND COVER

Immediately prior to placing the pipe, the trench bottom shall be shaped by hand to fit the entire bottom quadrant of the pipe. If pipe is of the bell and spigot type, bell holes shall be provided to prevent the bell from supporting the backfill load. Bell holes shall be large enough to permit proper making of the joint but not larger than necessary to make the joint. All adjustments to line and grade must be done by

For Review Only

scraping away or filling in bedding material under the body of the pipe. Any fill used must be bedding material. If necessary to obtain uniform contact of the pipe with the subgrade, a template shall be used to shape the bedding material. All pipe shall be bedded in bedding material at least 4 inches thick. CONTRACTOR shall perform all necessary excavation and shall furnish all necessary material to provide this bedding.

Bedding material shall be hard and durable and shall be made by crushing sound limestone or dolomite ledge rock, or crushed gravel aggregate. Bedding material shall conform to the requirements of ASTM C33.

PERCENTAGE BY WEIGHT PASSING INDICATED SIEVE

Size	2-1/2 Inch	2 Inch	1-1/2 Inch	1 Inch	3/4 Inch	1/2 Inch	3/8 Inch	No. 4	No. 8	No. 16	No. 30	No. 100	No. 200
57			100	95-100		25-60		0-10	0-5				
8						100	85-100	10-30	0-10	0-5			
9						100	75-100	0-25	0-5				
10							100	85-100				10-30	

All rigid sanitary sewer pipe and related appurtenances shall be bedded and covered in accordance with the Class B bedding detail as shown on Drawing 01-975-43A. Bedding material shall conform to Size No. 8 or No. 9. With pipes greater than 15 inch, Size No. 57 may be used.

Concrete and other rigid pipe used in non-sanitary sewer applications (sanitary sewer applications, if allowed by the **SPECIAL PROVISIONS**) may be bedded using the Class C bedding detail as shown on Drawing 01-975-43A. Bedding material shall conform to the above for rigid sanitary sewer pipe.

Ductile and cast iron pipe shall be bedded in accordance with Class C bedding detail as shown on Drawing 01-975-43A or the Type 3 laying condition of AWWA C600. Bedding material shall conform to Size No. 8, or No. 9. Where ductile iron pipe is polyethylene encased, bedding material shall conform to Size No. 10 or cover material as specified below.

Thermoplastic sanitary sewer pipe and related appurtenances shall be bedded and covered in accordance with the Thermoplastic Pipe Bedding Detail on Drawing 01-975-43A. Bedding material shall conform to Size No. 8 or No. 9. With pipes greater than 15 inch, Size No. 57 may be used.

All other sanitary sewer pipe and related appurtenances shall be bedded and covered in accordance with the Class B bedding detail as shown on Drawing 01-975-43A. Bedding material shall conform to Size No. 8 or No. 9. With pipes greater than 15 inch, Size No. 57 may be used.

PVC and HDPE water main or force main shall be bedded and covered in accordance with the Thermoplastic Pipe Bedding Detail on Drawing 01-975-43A. Bedding material shall conform to Size No. 8 or No. 9. With pipes greater than 15 inch, Size No. 57 may be used.

Bedding material for copper water services shall conform to Size No. 9 or No. 10.

No material native to the trench shall be used for bedding material.

CONTRACTOR shall provide ENGINEER with a sieve analysis of the bedding material for review prior to starting construction.

Material which is to be placed from the bedding material to 1 foot above the top of the pipe shall be termed cover material. All trenches shall be backfilled by hand to 1 foot above the top of the pipe with cover material. Cover material shall be deposited in the trench for its full width on each side of the pipe,

For Review Only

fittings and appurtenances simultaneously in 6-inch layers and shall be compacted using hand tamping bars and/or mechanical tampers. CONTRACTOR shall use special care in placing cover material to avoid injury to or movement of the pipe. Cover material shall consist of durable granular particles ranging in size from fine to a maximum size of 3/4 inch. Unwashed bank run sand and crushed bank run gravel will be considered generally acceptable cover material. Cover material shall generally conform to the following gradation specifications:

COVER MATERIAL GRADATION

Sieve Size	Percentage by Weight Passing
1 inch	100
3/4 inch	85 to 100
3/8 inch	50 to 80
No. 4	35 to 65
No. 30	--
No. 40	15 to 30
No. 200	5 to 15

Native trench materials may be used for cover material if they substantially conform to the above gradation specifications and a suitable credit is extended to OWNER.

All bedding materials may be substituted for cover material when requested by CONTRACTOR except where polyethylene encasement is used. In such case, only those bedding materials specifically noted for polyethylene encasement may be used.

4.4 PIPE LAYING

All pipe shall be laid accurately to the line and grade as designated. Preparatory to making pipe joints, all surfaces of the portions of the pipe to be joined or of the factory-made jointing material shall be clean and dry. Lubricants, primers, adhesives, and other joint material shall be used and installed as recommended by the pipe or joint manufacturer's specifications. The jointing materials or factory fabricated joints shall then be placed, fitted, joined, and adjusted in such a workmanlike manner as to obtain the degree of watertightness specified. Pertinent specifications from the joint and pipe manufacturer which outline procedures to be followed in making the joint shall be furnished to ENGINEER.

Wyes, tees, and special fittings shall be installed as called for on the Drawings or as requested by ENGINEER. Wyes, tees, and special fittings shall, in general, be jointed with the same type of joint as used in the pipe.

In joining two dissimilar types of pipe, manufactured adapters and fittings shall be used. Adapters and fittings shall be configured to maintain invert elevations at same level.

Joint deflections shall not exceed the limits established by the pipe manufacturer for the pipe and joint being used.

At times when pipe laying is not in progress, the open ends of pipe shall be closed with plugs to prevent the entry of foreign material. All foreign material shall be removed from the pipe prior to acceptance.

After placing a length of pipe in the trench, the spigot end shall be centered in the bell and the pipe forced home and brought to correct line and grade. The pipe shall be secured in place with specified backfill material tamped around it except at the bells. Trenches shall be kept water-free during bedding, laying, and jointing and for as long a period as necessary to permit proper execution of the Work.

For Review Only

Pipe shall be brought home by using a cross member and levers or jacks. It will not be permissible to push pipe home with motor-powered excavation equipment.

Force main and water main shall be installed in accordance with AWWA C600 for iron pipe, AWWA C605 for PVC pipe, and AWWA M55 for HDPE pipe. All plugs, caps, tees, hydrants, and bends for water mains and force mains shall be provided with positive reaction backing or restrained joints.

Reaction backing shall be poured-in-place concrete. Backing shall be placed between solid ground and the fitting to be anchored; the area of bearing on the pipe and on the ground in each instance shall be sized so that the soil bearing pressure does not exceed 1,200 psf, using a working pressure in the main of 150 psi plus 100 psi water hammer allowance. Unless otherwise shown or specified, the backing shall, be so placed that the pipe and fitting joints will be accessible for repair.

CONTRACTOR may use restrained joints in lieu of reaction backing. The minimum length of pipe to be restrained shall be as shown in the following table:

REQUIRED LENGTH OF RESTRAINED PIPE BEYOND FITTING IN FEET

Fitting	Minimum Length—Ft
90° Bend (4 inch)	36
90° Bend (6 inch to 8 inch)	54
90° Bend (10 inch to 12 inch)	72
90° Bend (14 inch)	84
45° Bend (≤ 6 inch)	18
45° Bend (8 inch to 14 inch)	36
22-1/2° Bend ≤ 14 inch	18
11-1/4° Bend ≤ 14 inch	9
Fire Hydrant Leads	All Joints
End of Line Tees (4 inch)*	18 (Along Branch)
End of Line Tees (6 inch to 8 inch)*	36 (Along Branch)
End of Line Tees (10 inch to 12 inch)	54 (Along Branch)
End of Line Tees (14 inch)*	66 (Along Branch)

*Restrained run length on tees assumed 18 feet on each side of fitting

This table assumes 150 psi test pressure plus a 100 psi water hammer allowance, ductile iron pipe, and a 3-foot bury. Lengths shall be adjusted for other conditions and fittings. For other fittings and for more specific requirements, see the Drawings or **SPECIAL PROVISIONS**.

4.5 SEWER SERVICE BRANCH AND LATERAL INSTALLATION

General: CONTRACTOR shall furnish and install sanitary sewer and storm sewer branches, laterals, and leads as shown on the Drawings or requested by ENGINEER. Under normal circumstances, service laterals will be installed within the right-of-way or easement to serve all existing buildings and all platted lots. In certain cases, only wye or tee branches will be installed to vacant lots. Service laterals shall consist of a branch fitting at the main and extension of the specified lateral pipe to the end of lateral as called for and requested. All necessary fittings shall be furnished and installed to complete the installation as shown on Drawing 01-975-75A. All necessary fittings shall be furnished and installed to complete installation of for storm sewer leads as shown on Drawing 01-975-42A.

Wye or tee branches: Wherever shown on the Drawings or requested by ENGINEER, wye or tee branches shall be provided for use in making sanitary sewer service and storm sewer inlet connections.

For Review Only

Unless specified otherwise in the **SPECIAL PROVISIONS** or as shown on the Drawings, wye or tee branches for sanitary sewer service lateral connections to single-family residences shall be 4-inch-diameter. All other sanitary sewer service lateral connections shall be 6 inch. Wye or tee branches for storm sewer inlet connections shall be of the size called for on the Drawings, 12 inch minimum.

Sanitary sewer service branches shall be turned so that the branch is at an angle of 30° or 45° with the horizontal.

Sanitary Sewer Service Laterals: Under normal conditions and unless otherwise specified in the **SPECIAL PROVISIONS**, shown on the Drawings, or requested by ENGINEER, all service laterals shall be Standard Laterals, Type 1, as shown on Drawing 01-975-75A. Service laterals of Types 2 through 6 may be requested by ENGINEER to meet field conditions.

It is the general intent to install Modified Laterals, Type 2, 4, or 5 for service to homes that presently have shallow or no basements or where the depth to groundwater at the end of lateral is shallow. Type 3 and 6 risers are only to be provided where shown on the Drawings or specified in the **SPECIAL PROVISIONS**.

Installation and Testing Requirements: Except for those branches that are to be used on storm sewers or for extending sanitary sewer service laterals, wye and tee branches shall be closed with airtight stoppers blocked to withstand air test pressures.

The ends of all laterals shall be plugged and blocked to resist air test pressures. All plugs shall be manufactured to fit the pipe used and shall be watertight. The ends of all laterals shall be marked as shown on Drawing 01-975-75A using flagging tape and 2 by 4 markers.

A complete and accurate tabulation of length, depth, and location of all branches, risers, and laterals shall be kept by CONTRACTOR on cards available from ENGINEER. Measurements shall be made from the nearest downstream manhole. Lateral installation to meet these Specifications and field conditions are the responsibility of CONTRACTOR. Problems occurring because of failure to provide proper installation or proper records shall be corrected by CONTRACTOR at its expense.

No installed lateral shall be backfilled until ENGINEER has been notified that the lateral is complete and reasonable time is allowed for observation of the Work.

4.6 WATER SERVICE LATERAL INSTALLATION

Water service laterals requiring reconstruction and new service laterals shall be installed in accordance with AWWA C600. CONTRACTOR shall perform all excavation, backfill, and other Work necessary for a complete installation. The service tubing shall be continuous and shall be placed at a minimum depth of 30 inches. Each service shall include a corporation stop at the main, copper service tubing, curb stop, curb box, couplings, and all other appurtenances necessary for a complete installation. Where existing services in the street are being reconstructed, the new service shall be connected to the existing service at the property line unless otherwise shown or specified. Taps in the main shall be at an angle of 45° above the horizontal.

OWNER reserves the right to make taps and connections to the new mains prior to backfilling by CONTRACTOR. CONTRACTOR shall delay backfilling until OWNER has completed its Work.

All curb boxes on new services shall be marked by placing a 4-foot-long 2 by 4 adjacent to it. The 2 by 4 shall project 1 foot above existing ground and shall be painted blue. All services shall be extended to the street property line, unless otherwise shown or specified.

For Review Only

4.7 PORTABLE TRENCH BOX

Whenever a portable trench box or shield is used, special precautions shall be taken so as not to pull already jointed pipe apart or leave voids around the pipe wall. Whenever possible, the bottom edge of the box shall be kept at a level approximately even with the top of pipe. Cover material shall be placed to at least the top of pipe before moving the box ahead.

4.8 MANHOLES

Manholes shall be installed in accordance with Drawing 01-975-41A for storm sewer, Drawing 01-975-42A for water main, and Drawing 01-975-43A for sanitary sewer. Manholes shall be plumb with any steps aligned and openings located over steps. For sanitary sewers, openings shall be located over the bench and not the sewer flow line itself.

All manholes shall be made watertight and shall show no visible signs of leakage at the time of final review and within the guarantee period. Any leakage shall be sealed from the exterior of the manhole by methods allowed by ENGINEER.

4.9 STORM SEWER INLETS

Storm sewer inlets shall be installed in accordance with Drawing 01-975-41A. Inlets shall be set to the line and grade as furnished by ENGINEER. The outside end of the lift hole shall be covered with filter fabric to prevent the entrance of fines into the inlet.

Inlets shall be connected to the storm sewer main either at manholes, at wye branches in the main, or to other inlets, all as shown on the Drawings. Minimum size of inlet lead pipe shall be 12 inches.

Storm inlets shall be backfilled to undisturbed soil and at least 2 feet along connecting piping with bedding material.

4.10 MASONRY

No masonry shall be laid when the temperature of the outside air is below 40°F unless all masonry materials are heated and protected against freezing.

Only enough mortar shall be mixed that can be conveniently used before it reaches initial set. Retempering of mortar will not be permitted.

4.11 ABANDONING UTILITIES

Utilities to be abandoned shall, unless otherwise noted on the Drawings or in the **SPECIAL PROVISIONS**, be abandoned in place. Open ends of pipes shall be plugged with 12 inches of concrete. Manhole barrels, valve boxes and other such structures shall be removed to a point 3 feet below existing or final ground surface, whichever is lower, and shall then be filled with backfill material compacted to that of the trench backfill. An approximate 9-inch-diameter opening shall be made in the bottom of the structure to allow for groundwater movement.

For Review Only

SECTION 5-BACKFILLING

5.1 BACKFILL MATERIAL

Backfill shall be that material placed between the top of cover material to the subgrade for placement of restoration materials. Backfill for storm inlets shall be bedding material.

When the type of backfill material is not otherwise specified, CONTRACTOR may backfill with the excavated material, provided that such material consists of loam clay, sand, gravel, or other materials which, in the opinion of ENGINEER, are suitable for backfilling.

All backfill material shall exceed 35°F and be free from frost, cinders, ashes, refuse, vegetable or organic matter, boulders, rocks, or stone, frozen lumps, or other material which in the opinion of ENGINEER is unsuitable. From 1 foot above the top of the pipe to the trench subgrade, well-graded material containing stones up to 8 inches in their greatest dimension may be used, unless otherwise specified in the **SPECIAL PROVISIONS**. Care should be taken in backfilling so as not to damage the installed pipe.

In refilling the trench, if there is not sufficient material excavated therefrom suitable for refilling, CONTRACTOR shall, without extra compensation, furnish the deficiency. Where indicated on the Drawings, fill shall be provided over projecting conduits. Such fill shall be free of large boulders, and the top 6 inches shall be of suitable material to fit the adjoining ground.

5.2 GRANULAR BACKFILL

When called for on the Drawings, in the **SPECIAL PROVISIONS**, or requested by ENGINEER, backfill material shall be granular and shall consist of durable particles ranging in size from fine to coarse in a substantially uniform combination. Sufficient fine material shall be present to fill all the voids in the coarse material. No stones over 3 inches or clay lumps shall be present. Unless otherwise allowed by ENGINEER, granular backfill shall generally conform to the following gradation specification:

GRANULAR BACKFILL

Sieve Size	Percentage by Weight Passing
3 inch	100
2 inch	95 to 100
No. 4	35 to 60
No. 200	5 to 10

5.3 PLACEMENT

All trenches shall be backfilled using specified material so that excessive lengths of trench are not left open. In general the backfilling operation shall proceed so that no more than 100 feet of trench is open behind the pipe laying operation.

Backfill shall be left below the original surface to allow for placement of restoration materials including pavement, base course, concrete, topsoil, sod, plus any pavement replacement specified in accordance with the Asphaltic Paving section herein. When settlement occurs, CONTRACTOR shall restore the surface improvements at its expense, to maintain the finished surface.

For Review Only

5.4 BACKFILL CONSOLIDATION

Unless specifically deleted in the **SPECIAL PROVISIONS**, all trenches shall be consolidated as specified in this section for the entire depth and width of the trench.

Consolidation shall be achieved by use of smooth surface vibratory compactors or backhoe-operated hydraulic compactors for granular materials and rotating sheepsfoot type mechanisms for loam/clay soils. The lift height shall not exceed 8 inches for walk-behind hand-operated vibratory compactors and sheepsfoot. Lift height shall not exceed 24 inches for self-propelled vibratory drum or backhoe-operated hydraulic compactors. Smaller lift heights shall be provided as necessary to achieve the degree of compaction specified.

Unless specified otherwise in the **SPECIAL PROVISIONS**, backfill material beneath paved areas or future paved areas and within 5 feet of paved areas or future paved areas shall be consolidated as follows: within 3 feet of the surface 95% of maximum dry density, below 3 feet from the surface to 1 foot above the pipe 90% of maximum dry density, as determined by the modified Proctor Test (ASTM D1557).

Unless otherwise specified in the **SPECIAL PROVISIONS**, backfill material placed in all other areas shall be compacted to the point where no additional consolidation can be observed from the compaction and backfill equipment being used.

Backfill material not meeting the compaction specification shall be recompacted by CONTRACTOR at no cost to OWNER. Cost for additional testing on recompacted material shall be at CONTRACTOR's expense.

5.5 MAINTENANCE OF SURFACE

CONTRACTOR shall maintain all backfilling, resurfacing, repaving, and other surface improvements constructed under this Contract as a warranty item. CONTRACTOR shall, upon proper notice from OWNER, make all repairs in surfaces of trenches and excavations. All expenses incurred by OWNER and/or CONTRACTOR in making repairs and all expenses in maintaining trench and excavation surfaces shall be at the expense of CONTRACTOR regardless of the material used in backfilling trench excavations. OWNER reserves the right to make all emergency repairs necessary to make safe all streets and walks at the expense of CONTRACTOR regardless of the material used in backfilling trench excavations. A maintenance guarantee fund, if specified in the **SPECIAL PROVISIONS**, will be withheld from the final amount due CONTRACTOR for a period of six months after acceptance of the Work to assure such maintenance.

CONTRACTOR shall be responsible for controlling dust dispersion during utility and street construction. Remedial actions required as a result of inadequate dust control shall be CONTRACTOR's responsibility. To control dust, CONTRACTOR shall apply calcium chloride or ammonium lignin sulfonate in 12 to 14 percent solution. Prior to application of dust palliative, the street shall be graded smooth.

SECTION 6—ROADWAY AND DRAINAGE EXCAVATION, GRADING AND BASE COURSE

6.1 GENERAL

The Work under this section includes all clearing, grubbing, excavation, grading, base course, and other miscellaneous items of Work required for restoration of utility construction Work and for street construction as shown on the Drawings and included in the Specifications.

For Review Only

Unless otherwise specified, all street construction work shall conform to the KYDOH Specifications as amended herein. Street construction shall mean street, roadway, parking lot, driveway, and similar type construction.

See **SPECIAL PROVISIONS** for availability of water for use in street construction.

6.2 CLEARING AND GRUBBING

In general, allowable tree removals shall be those trees which are necessary to remove for utility and street construction within the right-of-way or easement areas. Actual allowable tree removals will be determined in the field by ENGINEER. All trees and brush outside the right-of-way or easement areas shall be protected by CONTRACTOR, unless otherwise allowed by ENGINEER.

For utility construction, trees and brush to be removed outside the immediate trench area shall be cut flush with the ground surface or pushed over for all brush and for all trees 12-inch caliber or less measured 4 feet above ground. Trees in excess of 12-inch caliber shall be cut to within 6 inches of the ground surface. A basal application of Rodeo, or equal, shall be applied to all remaining stumps to prevent the development of suckers. Trees that are pushed over shall have their stumps removed and disposed of off-site.

Trees and brush, including stumps, within the trench area and within areas of street, sidewalk, bike path, and driveway construction shall be removed from the site and disposed of.

6.3 COMMON EXCAVATION

All street excavation shall be performed as called for in Section 204 of the KYDOH Specifications and as herein modified.

The following items of Work shall be included in common excavation:

- a. The excavation to subgrade elevations as detailed in the Drawings including road bed areas, terraces, sidewalks, bike paths, driveways, and other miscellaneous surface improvements.
- b. Removal (and stockpiling, if the use of salvaged topsoil is required) of topsoil from all cut areas and fill areas within a 1:1 slope of finished street, sidewalks, bike paths, driveways, and other miscellaneous surface improvements.
- c. The preparation, grading, compaction, and proof-rolling of subgrade areas for roadbed, sidewalks, bike paths, driveways, and other miscellaneous surface improvements to the elevations detailed on the Drawings.
- d. Excavation and grading required to realign and/or create ditch lines and drainage ways to route drainage to or from storm facilities as shown on the Drawings, or as necessary to maintain positive drainage.
- e. Removal of temporary backfill placed in new utility trenches above the subgrade.
- f. The removal and disposal of all undesirable and surplus materials.

Common excavation may be completed as part of utility construction prior to initiating general street excavation activities.

For Review Only

All subgrade areas in streets and parking lots, including utility trench restoration areas, shall be proof-rolled with a heavily loaded tri-axle dump truck or other similar equipment requested by ENGINEER prior to the placement of any fill materials or base course. ENGINEER must be present during proof-rolling to review the Work necessary for the stabilization of any unstable areas identified.

Saw cuts shall be made in existing pavement, driveways, curb and gutter, and sidewalks to allow restoration to neat straight lines. Saw cuts damaged during construction shall be recut prior to beginning restoration.

6.4 ROCK EXCAVATION, STREETS

Rock excavation for streets shall include removal of rock to subgrade elevations. Rock for excavation purposes shall be as defined in the Rock Excavation, Utilities section. Such rock shall be classified as undesirable backfill and disposed of in accordance with the Excavation to Grade section.

6.5 BORROW EXCAVATION

CONTRACTOR shall salvage suitable materials from utility and street construction activities to provide fill for street construction. Where sufficient quantities of materials suitable for street construction are not available from areas of the site, CONTRACTOR shall perform borrow excavation to make up the deficit in accordance with Section 205 of the KYDOH Specifications.

6.6 EXCAVATION BELOW SUBGRADE

ENGINEER may request the excavation of unsuitable materials in areas of unstable subgrade. The excavation of such materials, except in areas where CONTRACTOR has completed utility construction or placed street fill, shall be measured by ENGINEER for payment.

The excavation and replacement of unstable utility trench backfill and/or street fill placed by CONTRACTOR shall be at CONTRACTOR's expense.

Base course placed on unstable foundation shall be removed and replaced at CONTRACTOR's cost following excavation of the affected area.

Where requested by ENGINEER in the field, excavation below subgrade areas shall be lined with geotextile material and backfilled with Size No. 2 crushed stone base course as specified herein.

6.7 GEOTEXTILES

Geotextile shall be placed as requested by ENGINEER to stabilize street subgrade areas. Construction fabric shall be Mirafi 600X, Propex 2006, or equal. Any alternate fabric must have ENGINEER's approval prior to use. Construction fabric shall be installed in accordance with the manufacturer's recommendations. Vibratory compaction shall not be used in the compaction of base course in areas where construction fabrics are used.

6.8 PREPARATION OF FOUNDATION

The subgrade shall be graded and rolled to provide uniform density and shall comply with the profile and cross sections contained in the Drawings. All Work shall comply with Section 207 of the KYDOH Specifications.

For Review Only

6.9 CRUSHED AGGREGATE BASE COURSE

Crushed aggregate base course shall consist of crushed stone or crushed gravel and be furnished in accordance with Section 302 of the KYDOH Specifications. Crushed aggregate base course shall be placed directly on subgrade areas or on top of salvaged asphaltic millings. CONTRACTOR shall supply ENGINEER with a current sieve analysis of the material prior to use. The material furnished shall be uniformly graded and shall conform to ASTM C33.

For street construction, base course shall be placed to the thickness shown on the standard sections. Where standard sections are not provided, a minimum of 9 inches of base course shall be provided. Base course thickness for utility trench patches in street areas shall match existing base course thickness with 12 inch minimum. The top 3 inches of base course shall be DGA. The remaining base course shall be Size No. 2. Base course shall be wetted and rolled with a self-propelled hydrostatic-drive vibratory roller. Unless otherwise requested by ENGINEER in the field, excavation below subgrade backfill shall be Size No. 2.

The finished new base course shall be fine-graded, rolled, and compacted in preparation for placement of new pavement. CONTRACTOR shall maintain the finished surface until pavement is placed.

6.10 SALVAGED ASPHALT PAVEMENT BASE

Where required on the Drawings or in the **SPECIAL PROVISIONS**, CONTRACTOR shall salvage existing asphaltic pavement for use as base course for street construction and/or restoration. Work shall be completed in accordance with Section 408 and 409 of the KYDOH Specifications as amended herein.

Pulverized asphalt millings shall consist of asphalt pavement that has been pulverized in place to the full depth of existing pavement. Pulverized millings shall be graded and compacted to the grades established by ENGINEER prior to placement of new asphaltic pavement. Ninety-five percent (95%) of pulverized millings shall pass a 1 1/4-inch screen with all material less than 4 inches in its longest dimension.

Salvaged asphalt millings shall consist of asphalt pavement that has been milled and transported for use as base course for street construction and/or restoration. Ninety-five percent (95%) of salvaged millings shall pass a 1 1/4-inch screen with all material less than 4 inches in its longest dimension.

SECTION 7—CONCRETE CURB AND GUTTER, SIDEWALK, AND PAVEMENT

7.1 GENERAL

The Work under this division includes the construction or reconstruction of all concrete improvements required for utility or street construction as shown on the Drawings and as specified. CONTRACTOR shall schedule its Work to comply with the Traffic Control section of Division 1.

Unless otherwise specified, all street construction Work shall conform to the KYDOH Specifications as amended herein.

7.2 CONCRETE

All concrete shall conform to the requirements as called for in Section 601 of the KYDOH Specifications, unless otherwise specified. All concrete shall be normal set air-entrained concrete with water reducing agent, Grade A-WR with Type IA cement capable of producing a minimum compressive strength of 3,000 psi in ten days.

For Review Only

As soon after finishing operations as the free water has disappeared, the concrete surface shall be sealed by spraying on it a uniform coating of curing material to provide a continuous water impermeable film on the entire concrete surface.

Liquid curing compounds shall conform to the requirements of AASHTO Designation M148, Type 2, White Pigmented.

The material shall be applied to form a uniform coverage at the rate of not less than 1/2 gallon per 100 square feet of surface area.

Within 30 minutes after the forms have been removed, the edges of the concrete shall be coated with the curing compound, applied at the same rate as on the finished surface.

CONTRACTOR shall erect and maintain suitable barricades to protect the new concrete. Where it is necessary to provide for pedestrian traffic, CONTRACTOR shall construct adequate crossings. Crossing construction shall be such that no load is transmitted to the new concrete.

Any part of the Work damaged or vandalized prior to final acceptance shall be repaired or replaced at the expense of CONTRACTOR.

Pedestrian traffic shall not be permitted over new concrete prior to 72 hours after application of curing material. Vehicular traffic shall not be permitted over newly placed concrete until a minimum compressive strength of 3,000 psi has been achieved.

When the atmospheric temperature exceeds 80°F during concrete placement, ACI 305.1 shall apply in addition to all other sections of the Specifications.

Cold weather concreting shall conform to the requirements of ACI 306.1 and all other sections of the Specifications. Cold weather is defined as a period when, for more than 3 successive days, the average daily temperature drops below 40°F. The average daily temperature is the average of the highest and lowest temperature during the period from midnight to midnight. When temperatures above 50°F occur during more than half of any 24-hour period, the period will no longer be regarded as cold weather.

The temperature of the delivered concrete shall not exceed 85°F.

Care shall be exercised to keep mixing time and elapse time between mixing and placement at a minimum. Ready-mix trucks shall be dispatched in a timely manner to avoid delay in concrete placement, and the Work shall be organized to use the concrete promptly after arrival at the job site.

The subgrade, forms, and reinforcing shall be sprinkled with cool water just prior to placement of concrete. Prior to placing concrete, there shall be no standing water or puddles on the subgrade.

If approved by ENGINEER, an admixture for retarding the setting of the concrete may be used.

Concrete shall be thoroughly tamped to remove all voids. The exposed surface shall be thoroughly troweled and finished with a brush at right angles to vehicular or pedestrian traffic. All edges shall be rounded with a 1/4-inch-radius edger. Honeycombed areas shall be pointed and rubbed with mortar to provide a void-free surface.

Before final finishing, a 10-foot straight edge shall be used to check the surface. Any areas showing a variation of more than 1/4 inch from the straight edge shall be corrected. Final finishing shall be delayed a sufficient time so that excess water and grout will not be brought to the surface.

For Review Only

7.3 CURB AND GUTTER

Curb and gutter where required for street construction, site Work construction, or for restoration of utility construction shall be placed using forms or a machine to the dimensions and shape shown. Where curb and gutter details are not provided, curb and gutter shape and dimensions shall match existing adjacent curb and gutter. The base course beneath the curb and gutter shall be trimmed or filled as necessary to provide a full depth of curb and gutter as shown on the Detail Drawings. In the absence of Detail Drawings, depth shall be to the adjacent street subgrade with a minimum 4 inches. Prior to placement of concrete, the base shall be thoroughly compacted and moistened.

Where forms are used, they shall be of metal and of sufficient strength to resist distortion or displacement. Forms shall be full depth of the Work. Facing boards, if used, shall be built to obtain the cross section called for on the Detail Drawings. Forms shall be securely staked and held firmly to line and grade. Forms shall be cleaned thoroughly and oiled before reuse.

All curved curb and gutter shall form smooth curves and shall not be a series of chords. Radius forms shall be used for all curved curb and gutter where the radius of curvature is 100 linear feet or less.

Driveway openings in the curb line will be staked by ENGINEER in the field. The details for concrete gutter sections through a driveway are shown on the Detail Drawings.

A 3/4-inch expansion joint filler shall be placed through the curb and gutter at the radius points of all intersection curbs at storm inlets and at a maximum interval of 100 feet. This expansion joint filler shall extend through the entire thickness of concrete and shall be perpendicular to the surface and at right angles to the line of the curb and gutter.

At intervals of not more than 10 feet, a contraction joint shall be tooled to a depth of 1/5 of the total concrete thickness with a 1/4-inch-radius jointer. The contraction joint shall be at right angles to the line of the curb and gutter.

If machine-formed curb and gutter is placed by CONTRACTOR, CONTRACTOR shall create a plane of weakness at all joints that is sufficient to cause contraction cracking at the joints.

CONTRACTOR may saw contraction joints. The depth of cut shall be a minimum of 1/5 of the total concrete thickness. Sawing shall be done as soon as practicable after the concrete has set sufficiently to preclude raveling during the sawing and before any shrinkage cracking takes place in the concrete. If this results in random cracking, CONTRACTOR will be required to tool the contraction joints as specified above.

Steel separator plates of a section conforming to the curb and gutter as shown on the Detail Drawings shall be placed directly opposite all contraction joints in abutting street pavement. After separator plates have been removed, the edges of the joints shall be rounded with a 1/4-inch-radius edge. The use of steel separator plates at other locations will not be allowed.

7.4 CONCRETE SIDEWALK AND DRIVEWAYS

Concrete sidewalk and driveway construction required for a street or site work construction or for restoration of utility construction shall be placed using forms or machines to the dimensions and thicknesses shown. Where details are not provided match existing, but sidewalks shall be no less than 5 inches thick and driveways shall be no less than 7 inches thick.

The subgrade shall be thoroughly compacted and finished to a trim, firm surface. All soft or unsuitable material shall be removed and replaced with suitable material.

For Review Only

A minimum 4-inch-thick layer of sand, sand and gravel, or base course shall be placed under all sidewalks and driveways. This material shall be thoroughly moistened and compacted before the concrete is placed.

Where forms are used, they shall be of metal or wood and shall be of sufficient strength to resist distortion or displacement. They shall be full depth of the Work and shall be securely staked to hold the required line and grade. Where machines are used, concrete mixture shall be controlled to prevent distortion from sloughing.

Concrete sidewalk shall be segmented into 5-foot-long rectangular blocks with tooled joints. Concrete driveways shall be segmented into uniform rectangular blocks with tooled joints at a maximum spacing of 10 feet in each direction. The joint must extend at least 1/5 of the total thickness of concrete. The edges of the sidewalk along forms and joints shall be rounded with an edging tool of 1/4-inch radius. All joints shall be at right angles to the centerline of the sidewalk.

A 3/4-inch-thick expansion joint filler shall be placed at sidewalk-driveway intersections, at sidewalk-sidewalk intersections, at the intersection with new or existing curb and gutter, around all castings, and at maximum 50-foot intervals in sidewalks.

Sidewalk cross slope shall be 1/4-inch per foot unless otherwise noted in the Drawings or requested by ENGINEER. Handicap ramps shall have a maximum slope of 1:12 and be provided with a truncated dome patterned surface meeting ADA requirements.

SECTION 8--ASPHALTIC PAVING

8.1 GENERAL

The Work under this division includes asphaltic concrete pavement and other miscellaneous items and Work required for utility or street construction as shown on the Drawings and included in the Specifications for paving.

Unless otherwise specified, all paving shall conform to the KYDOH Specifications as amended by these Specifications and by the **SPECIAL PROVISIONS**.

ENGINEER may request samples of asphaltic concrete for testing. CONTRACTOR shall cut samples from the finished pavement where requested by ENGINEER and patch the sample area. Samples for sieve analysis and asphalt content will be taken by ENGINEER prior to placement.

8.2 ADJUSTING CASTINGS

Where surface course paving is completed in the following construction season, castings shall initially be set to the finished lower course grade before lower course is placed. Where upper course paving and lower course paving are completed in the same construction season, castings shall be adjusted to final grade prior to paving.

Where adjustments are required, they shall not be made more than 48 hours prior to the anticipated time of paving. CONTRACTOR shall furnish Class 1 barricades with flashers on all adjusted castings until paving has been completed.

Internal chimney seals, where required, shall be installed after castings have been adjusted to finished grade.

For Review Only

Valve boxes shall be adjusted by turning the box. The valve box shall be seated on the adjusting threads to prevent future settlement. The box shall be adjusted to conform to the finished pavement and shall be plumb to allow valve operation. OWNER shall be contacted by CONTRACTOR to check operation of valve after box adjustment and prior to paving.

8.3 ASPHALTIC CONCRETE PAVING

This Work shall include the construction of asphaltic concrete surface course for areas to be paved including utility trench restoration and new street construction. All Work shall be performed in accordance with Section 403 of the KYDOH Specifications and as modified by **SPECIAL PROVISIONS**.

Asphaltic concrete pavement shall be ESAL Class 2.

Asphaltic binder for intermediate course and surface course shall be PG 64-22 per Section 806 unless specified otherwise in the **SPECIAL PROVISIONS**.

Aggregate shall comply with Sections 804 and 805.

Prior to the commencement of paving, mix designs and aggregate sieve analysis shall be submitted to ENGINEER.

The pavement structure for street areas and driveways shall be in accordance with the standard sections. Where standard sections are not provided, the minimum pavement structure shall consist of 2-1/4 inches of asphaltic concrete intermediate course material and 1-3/4 inches of asphaltic concrete surface course for street and parking lot construction and 2-1/2 inches of surface course material for bike paths, sidewalks, and asphalt driveways. Pavement thickness for trench restoration shall match adjacent pavement thickness or minimum thickness as specified for street construction, whichever is greater.

8.4 TACK COAT

Unless otherwise specified in the **SPECIAL PROVISIONS** or shown on the Drawings, CONTRACTOR shall provide tack coat between all layers of new asphalt and on existing pavement to be overlaid with new asphalt. Tack coat shall meet the requirements of Section 406 of the KYDOH Specifications.

8.5 PAVEMENT STRIPING

Where required on the Drawings or in the **SPECIAL PROVISIONS**, CONTRACTOR shall provide painted pavement markings.

Two-way traffic shall be maintained at all times.

Centerline marking shall be double 4-inch solid yellow line, placed at the marked centerline.

Traffic lane marking shall be single 4-inch broken white line, placed 12 feet from median curb flange or as shown or requested by ENGINEER. Turning lane markings and crosswalk markings shall be 8 inch and 6 inch solid white, respectively. Stop bars shall be 18 inch solid white.

All markings shall be applied in accordance with Sections 713 and 842 of the KYDOH Specifications and the Manual on Uniform Traffic Control Devices.

Markings shall be placed at locations noted within 1-inch tolerance.

For Review Only

SECTION 9—RESTORATION AND SITE WORK

9.1 SCOPE

The Work under this portion of the Contract includes finished grading, seeding, sodding, miscellaneous restoration, and other miscellaneous items of Work outside of the areas to be paved.

Unless otherwise specified, all restoration Work shall conform to the KYDOH Specifications and the **SPECIAL PROVISIONS**.

See **SPECIAL PROVISIONS** for availability of water for use in restoration and site Work.

9.2 SEEDING AND SODDING

Seeding and sodding shall be completed in all areas disturbed by construction other than areas with finished gravel, brick, asphalt, concrete, or decorative landscape treatments.

9.2.1 SEED RESTORATION

Unless otherwise shown on the Drawings or specified in the **SPECIAL PROVISIONS**, all areas disturbed by construction shall be restored with seed restoration. Prior to seeding, disturbed areas shall be graded to subgrade for placement of topsoil.

Topsoil shall consist of salvaged topsoil or hauled-in topsoil provided and placed in accordance with Sections 212 and 827 of the KYDOH Specifications. Topsoil shall be placed to a uniform depth of 6 inches in place.

All areas requiring terrace restoration that do not require sod restoration shall be restored by seed restoration. Seed restoration shall consist of placing and grading topsoil, seeding, fertilizing, and mulching.

Seed materials and placement shall conform to Sections 212 and 827 of the KYDOH Specifications unless otherwise requested by ENGINEER. CONTRACTOR shall not be responsible for watering. Fertilizer shall conform to Sections 212 and 827. Mulching shall conform to Sections 213 and 827 for straw mulch.

9.2.2 SOD RESTORATION

Specific areas to be restored with sod shall be shown on the Drawings or specified in the **SPECIAL PROVISIONS**. Sod restoration shall be completed in accordance with the following:

Prior to placement of sod, finish grading shall be completed. Finish grading shall consist of placing topsoil to the edge of hard-surfaced areas or to limits established by ENGINEER.

Topsoil shall be of humus-bearing soil, adapted to the sustenance of plant life and commonly known as black dirt, and shall be free of stones, debris, vegetable material, and excesses of peat, sand, or clay. Unless otherwise specified, topsoil shall be placed 4 inches thick and shall be graded and raked. Finished top soiled areas shall be free of stones, road material, or lumps of dirt. The soil in the area to be sodded shall be loosened and brought to a reasonably fine granular texture to a depth of not less than about 1 inch.

For Review Only

A 15-30-15 fertilizer shall be spread uniformly over the areas at the rate of 17 pounds per 1,000 square feet of area unless otherwise specified in the Contract. Fertilizer shall be worked into the soil prior to placing sod.

Sod shall consist of a dense, well-rooted growth of permanent and desirable grasses, indigenous to the general locality where it is to be used, and shall be practically free from weeds or undesirable grasses. At the time the sod is cut, the grass on the sod shall have a length of approximately 2 inches (if longer, the grass shall be cut to approximately this length), and the sod shall have been raked free from debris.

The sod shall be cut in uniform strips approximately 18 inches by 36 inches but no longer than is convenient for handling and transporting.

The thickness of the sod shall be as uniform as possible, approximately 1-1/2 inches or more, depending on the nature of the sod, so that almost all of the dense root system of the grasses will be retained, but exposed, in the sod strip and so that the sod can be handled without undue tearing or breaking.

Sod shall be laid so that the joints caused by abutting ends of sod strips are not continuous. Each sod strip shall be so laid as to abut snugly against the strip previously laid.

As the sod is being laid, it shall be rolled or firmly but lightly tamped with suitable wooden or metal tampers to set or press the sod into the underlying soil.

At points where water will flow over a sodded area, the upper edges of the sod strips shall be turned into the soil below the adjacent area and a layer of earth placed over this juncture, which earth shall be thoroughly compacted to conduct the surface water over the upper edge of the sod.

At the limits of sodded areas, wherever practical or feasible, the end strips shall be placed to effect a broken line, and ends of the strips shall be turned in and treated as above described.

All sodded areas shall be kept thoroughly moist until the sod is established. Sod that dies during warranty period shall be replaced at no cost to OWNER.

9.3 MISCELLANEOUS RESTORATION ITEMS

CONTRACTOR shall be responsible for the proper replacement of all damaged street and highway signs and markers at all times during construction. Repair or replacement of signs shall be subject to review of ENGINEER and applicable local, state, and federal highway departments before final acceptance of the Work.

CONTRACTOR shall restore all culverts removed, damaged, or disturbed during construction to their original condition or they shall be replaced. Mailboxes shall be restored to their original locations and height. Light poles and power poles shall be restored to their original location. Underground improvements, such as water main, electric lines or drain tiles shall be restored to original condition. At all locations where utilities cross, compacted backfill shall be used from the bottom of the excavation to the top of the highest conduit. All street improvements, fences, walkways, and home and yard improvements, if destroyed, damaged, or removed shall be replaced to original condition or better.

Where construction interrupts existing private or public sewer and water systems, it shall be CONTRACTOR's responsibility to maintain these systems or provide alternative means until the new system is placed in operation or until final acceptance of the Work, whichever occurs first. No bypassing of untreated wastewater will be allowed.

For Review Only

CONTRACTOR shall proceed with restoration of property and clean up of all disturbed areas concurrently with the installation of utilities and street construction.

Where restoration is included as a portion of a Bid item, the estimated cost of restoration and cleanup, up to a maximum of 15% of each Bid item, may be withheld until final cleanup of the Work in each Bid item.

9.4 RETAINING WALLS

9.4.1 BOULDER WALLS

In areas as generally shown on the Drawings and as specifically noted in the field by ENGINEER, CONTRACTOR shall construct boulder walls.

The boulders shall be round field stone. The stone shall consist of varying sizes and weights. The minimum weight shall be 250 pounds.

The stone shall be placed randomly. The larger stone shall be placed at the bottom; minimum 12 inches deep into the soil. The minimum batter shall be 3 inches in one vertical foot unless otherwise allowed by ENGINEER. Geotextile fabric shall be installed behind the wall to prevent the backfill from eroding through the joints and courses. Backfill shall meet the requirements of the Backfilling section. The layout of the wall shall be approved by ENGINEER prior to construction of the wall. A suitable foundation, as approved by ENGINEER, shall be provided to preclude settlement. The wall may be constructed in conjunction with the new embankment. Chinking shall be provided to secure stability of the stones.

9.4.2 CUT BLOCK MODULAR RETAINING WALL

This Work includes construction of interlocking modular concrete retaining wall units and accessories at locations shown on the Drawings and as requested by ENGINEER in the field.

Modular wall units shall be constructed in accordance with ASTM C90, ASTM C140, ASTM D2339, and ASTM D4475.

Masonry units, when delivered to the site, shall be thoroughly cured and shall be dry. When stored on the site, they shall not be in contact with the ground and shall be kept clean.

CONTRACTOR shall submit gradation of base leveling pad material and unit fill material as well as color samples for OWNER's selection.

CONTRACTOR shall provide to ENGINEER design calculations prepared and stamped by a Professional Engineer registered in the state of the Project verifying the proposed design satisfies the design parameters as shown on the Drawings and as required herein.

Masonry units shall be Keystone Retaining Units, or equal, as manufactured in accordance with ASTM C90 and ASTM C140.

Masonry units shall have a minimum 28-day compressive strength of 3,000 psi. The concrete shall have a maximum moisture absorption of 8%.

Standard units shall be classic straight split face, 8 inches high by 18 inches wide. Top row of units shall have a smooth face. Color of units will be selected by OWNER from manufacturer's standard color selections. A concrete wall cap/sidewalk will be constructed on top of the wall.

For Review Only

Units shall be interlocked with noncorrosive fiberglass pins.

Connecting pins shall be 1/2-inch-diameter thermoset isophthalic polyester resin-pultruded fiberglass reinforcement rods.

Pins shall have a minimum flexural strength of 128,000 psi and short beam shear of 6,400 pounds per ASTM D4475.

Construction adhesive shall be Keystone Kapseal, or equal, and shall meet requirements of ASTM D2339.

Base leveling pad material shall be 6 inches of compacted crushed stone, 3/8 inch to 3/4 inch. Pea gravel shall not be allowed.

Unit fill shall be free-draining, well-graded crushed stone, 3/8 inch to 3/4 inch, with no more than 5% passing the No. 200 sieve. Masonry unit voids shall be capable of accepting a railing post diameter of up to 3 inches. Non-shrink grout shall be used in voids accepting railing posts.

All walls shall be designed for a surcharge of 250 psf and a railing load of 50 plf in addition to the loads imposed by the retained material. The engineered design shall be in accordance with the AASHTO Standard Specifications for Highway Bridges, Section 5.8.

Foundation soil shall be excavated as required for leveling pad dimensions shown on the Drawings.

Subgrade shall be approved by the Project Soils Engineer to confirm that the actual foundation soil conditions meet or exceed assumed design strength. Soils not meeting required strength shall be removed and replaced with acceptable material.

Leveling pad materials shall be placed as shown on the Drawings to a minimum thickness of 6 inches and shall extend laterally a minimum of 6 inches in front of and behind the modular wall.

Materials shall be compacted to provide a level surface on which to place the first course of units. Compaction shall be to 95% of standard proctor for sand or gravel type materials. For crushed rock, material shall be densely compacted.

Leveling pad shall be prepared to ensure complete contact of retaining wall unit with base.

Units shall be installed to conform to elevations shown on the Drawings or as staked in the field to match existing grade.

The first course of concrete wall units shall be placed on the base leveling pad. The units shall be checked for level and alignment. Bottom of wall shall be minimum 12 inches below finished grade.

Units shall be placed side by side for full length of wall alignment. Alignment may be done by a string line or offset from base line.

Units shall be interlocked with fiberglass pins. Pins shall protrude into adjoining courses above a minimum of 1 inch. Two pins required per unit.

All voids inside and between units and drainage zone behind units shall be filled with tamped unit fill material. Automated compaction equipment shall not be used directly over the units. Walk-behind mechanical compaction equipment may be used to compact soils that are placed beyond the drainage zone behind the unit. Mobile mechanical compaction equipment shall not be used within 5 feet of the wall face.

For Review Only

While placing material behind first course of units, the passive soil wedge at the front of these units shall be placed.

All excess material from top of units shall be cleaned prior to installing the next course. Each course is to be completely filled, backfilled, and compacted prior to proceeding to next course.

A permanent mechanical connection of cap units to wall units shall be provided with construction adhesive.

9.4.3 STRUCTURAL GEOGRID

Geogrid shall be a product with a regular grid structure of a select high density polyethylene or polypropylene resin, UX1500HP, as manufactured by Tensar Corporation, or equal.

Minimum allowable junction strength of the geogrid, per G.R.I.–GG2, shall be equal to or greater than 90% of the ultimate strength of the geogrid, as per G.R.I.–GG1.

The geogrid soil reinforcement shall be laid horizontally on compacted backfill. Place the next course of modular concrete facing units over geogrid. The geogrid shall be pulled taut and anchored prior to backfill placement on the geogrid.

Geogrid reinforcement shall be continuous throughout their embedment length(s). Spliced connections between shorter pieces of geogrid will not be allowed.

9.5 PLANTINGS

Plantings shall be provided as shown on the Drawings or as otherwise specified in the **SPECIAL PROVISIONS**. Plants should be planted on the day of delivery. If this is not possible, protect the stock not planted. Plant material shall be kept in the shade, well-protected with soil, wet moss or other acceptable material and shall be well-watered. Plants shall not be bound with wire or rope at any time to avoid damaging the bark or breaking branches.

Plants shall be lifted and handled from the bottom of the ball only. Plants moved with a ball will not be accepted if the ball is cracked, loose, or broken before or during the planting operations.

Fertilizer shall be delivered to site in original, unopened containers, each bearing manufacturer's guaranteed analysis. Packaged materials shall be stored off ground and protected from moisture.

CONTRACTOR shall coordinate planting Work with installation of sod and the construction of other site features.

CONTRACTOR shall take precautions to ensure that equipment and vehicles do not disturb or damage existing site grading, walks, drives, utilities, plants, etc., and shall replace and/or return to original condition any damage caused by CONTRACTOR's negligence at no cost to OWNER.

CONTRACTOR shall maintain plantings immediately upon installation of plants and continue until acceptance, including watering, weeding, removal of dead material, resetting of plants to proper grade and plumb position, and other necessary operations.

Plants shall be alive and in good, healthy, and flourishing condition of growth at the end of the guarantee period.

Any plant installed under this Contract that is dead or not in a vigorous, thriving condition shall be removed from the site and replaced at CONTRACTOR's cost as soon as conditions permit during the

For Review Only

normal planting season. In case of any questions regarding the condition of a rejected plant, CONTRACTOR may elect to allow such plant to remain through another complete growing season. If at that time, the rejected plant is found to be dead or in an unhealthy or badly impaired condition, it shall be replaced. One replacement after acceptance shall constitute fulfillment of CONTRACTOR's guarantee for the particular plant replaced. All replacements shall be plants of the same kind and size as specified originally. CONTRACTOR shall make all necessary repairs required because of plant replacements. Such repairs shall be done at no extra cost to OWNER. Plants shall be replaced, mulched, wrapped, fertilized, pruned, and restored to original condition at no extra cost to OWNER.

Plant names shall conform to those given in *Standardized Plant Names*, 1942 Edition, American Joint Committee on Horticultural Nomenclature. All plants shall be true to name and legibly tagged as to name and size. Federal or other governmental certificates of inspection shall accompany all shipments as required.

Plant materials, methods, etc. shall conform to the latest edition of ANSI Z60.1.

CONTRACTOR shall have investigated the sources of supply and shall be satisfied that CONTRACTOR can supply the listed plants in the size, variety and quality specified before submitting a Bid. Failure to do so will not relieve CONTRACTOR of the responsibility for furnishing and installing all plant materials in strict accordance with the Contract Documents.

All material shall be the highest quality. Plants shall have typical growth habit for their species. Plants shall be sound, healthy, vigorous, and free from insect pests, plant diseases, and injury. One-sided plants and plants taken from tightly planted nursery rows will be rejected.

All plants shall equal or exceed measurements specified, measured before pruning with branches in normal position. Height and spread refers to main body of plant and not from tip to tip of branches and roots. Trees shall have a well-defined central leader.

Soil excavated from plant pits that is similar in nature to topsoil and is determined to be suitable for planting soil shall be thoroughly mixed with one part of peat to five parts of existing soil. Very poor soils of clay, gumbo, gravel, hard-pan, or other soils injurious to plants shall not be used.

If quantity of soil excavated from planting pits is not adequate for planting, CONTRACTOR shall furnish imported planting soil consisting of partially decomposed vegetable matter of natural occurrence. Such soil shall be black, clean, low in content of mineral or woody material, mildly acidic, fertile and friable. This soil shall be mixed with one part of peat to five parts of soil. Peat shall be a domestic product consisting of partially decomposed vegetable matter of natural occurrence-black, clean, granulated, or shredded.

Fertilizer shall be equal to Milorganite (6-2-0), Louisville Green (5-3-0), or equal uniform in composition and free-flowing. Fertilizer which becomes caked or otherwise damaged making it unsuitable for use will not be accepted. Rate of application shall be as recommended by nursery.

Wood mulch shall be shredded hardwood bark of local origin, similar in physical composition to shredded mulches sold under the brand names of Montaho, Pay-Gro, or equal.

Mulches shall be a minimum of 4 inches thick.

Deciduous trees and shrubs shall be planted from November 1 to April 1. All trees and shrubs shall be planted so as to provide the maximum growing time allowable under the Contract Times. At the option and on full responsibility of CONTRACTOR, planting operations may be conducted under unseasonable conditions without additional compensation or change to warranty.

For Review Only

ENGINEER shall stake out on the ground the location of all plants before excavation is begun. Plants installed at incorrect locations shall be relocated by CONTRACTOR at no expense to OWNER.

CONTRACTOR shall excavate the plant pit, centered at the location stake, cylindrical in shape with vertical sides and flat or saucer-shaped bottom. Planting soil for backfilling shall be kept separate from excavated subsoil. Pit shall be large enough to provide at least 12 inches of planting soil backfill around and beneath the root system. Where surface or subsurface conditions prevent digging a plant pit to specified dimensions, obtain approval from landscape architect to modify location or pit dimensions.

The root ball shall be centered in the plant pit resting on 12 inches of planting soil well-tamped. The plant hole shall be backfilled with planting soil placed in layers around the root ball. Each layer shall be hand-tamped in place in a manner to avoid injury to roots and ball. When approximately two thirds of the plant hole has been backfilled, the hole shall be filled with water to allow the soil to settle around the roots. Top of root ball shall be 1 inch above surrounding grade. The cord or wire securing burlap at base of tree shall be cut, with the burlap folded back.

Just prior to inspection for acceptance, CONTRACTOR shall prune all plantings. The amount of pruning will be limited to the minimum necessary to remove dead or injured twigs and branches and as directed to compensate for loss of roots as a result of transplanting operations. Pruning shall be done in such a manner as not to change the natural habit or shape of the plant.

CONTRACTOR shall promptly remove any soil, peat or similar material that has been brought onto paved areas by planting operations, keeping those areas clean at all times, and shall remove all debris resulting from planting operations from the site.

Replacement plantings shall match existing plant type, with minimum 4-year nursery growth.

SECTION 10–MISCELLANEOUS REQUIREMENTS

10.1 GRADE STAKES AND PROPERTY STAKES

CONTRACTOR shall furnish and place in position all items necessary to control the horizontal and vertical accuracy of the Work including lasers, batterboards, string lines, plummets and graduated poles.

Where lasers are used, CONTRACTOR shall check the Work against intermediate grade stakes. Prior to initial use of the laser, CONTRACTOR shall set up laser on ground surface and check line and gradient controls. Lasers not functioning properly shall be immediately removed.

If existing property stakes, not within the limits of the trench or street slope limits, are removed or damaged by CONTRACTOR, CONTRACTOR shall bear the cost of replacement. Replacement shall be made by a legal survey performed by a licensed Land Surveyor hired by OWNER. Cost for survey shall be deducted from the Contract Price.

10.2 TESTING PIPELINES

10.2.1 GENERAL

CONTRACTOR shall conduct testing on all new pipe lines as specified below.

Utility installations which fail to meet the test limits shall be repaired in a manner acceptable to ENGINEER. In general, defective pipe installations should be uncovered and relaid, with new pipe if necessary, to repair the defect. Under no circumstances shall defects be sealed from the interior of the

For Review Only

pipe, and only where specifically allowed by ENGINEER, shall defects be sealed from the exterior of the pipe.

10.2.2 SANITARY SEWER AIR AND LEAKAGE TESTING

All sanitary sewer gravity mains shall be tested for leakage after installation of laterals and placement of backfill. Leakage testing of thermoplastic sanitary sewer gravity mains shall be conducted in accordance with ASTM F1417. Testing of rigid sanitary sewer mains shall be in accordance with ASTM C828 for clay pipe and ASTM C924 for concrete pipe. CONTRACTOR shall keep a record of all tests performed. These records shall show the individual lengths of main tested and test results.

All sanitary sewer gravity mains in groundwater shall also be tested by measuring the infiltration through the use of a weir installed in the manhole at the downstream end of the sewer being tested. Groundwater shall be at least 2 feet above the crown of the sewer at the upstream end for all such tests.

Sewers 18 inches and larger may be tested for leakage by infiltration or exfiltration in lieu of air testing. If groundwater is 2 feet or more above the sewer, measurements will be taken to determine the rate of infiltration into the sewer. If groundwater is below 2 feet above the sewer, the stretch of sewer shall be plugged at its downstream end and water shall be placed inside the sewer to provide a minimum of 4 feet of head above the upstream end.

Measurements will then be taken to determine the rate of leakage out of the sewer. CONTRACTOR shall furnish all labor and materials necessary for making the tests. The allowable leakage shall be as indicated below for final acceptance.

At the conclusion of construction and before final acceptance of the Work, the downstream end of the sewer will be measured for infiltration. Allowable infiltration shall not exceed 200 gallons/inch of pipe diameter/mile/day for that portion of the Work under groundwater. If infiltration is exceeded, the leak or leaks shall be located and repaired.

CONTRACTOR shall prepare all pipeline for testing and shall furnish all equipment, materials, tools, and labor necessary for performance of the tests. Equipment for the low pressure air test of gravity mains shall be equal in all operational aspects to that as furnished by Cherne Industrial, Inc, or United Survey, Inc.

Air and leakage testing of storm sewers will not be required.

10.2.3 MANHOLE TESTING

If required on the Drawings or in the **SPECIAL PROVISIONS**, sanitary sewer manholes shall be vacuum tested in accordance with ASTM C1244. Pipes entering the manhole shall be plugged and the seal inflated in accordance with manufacturer's recommendations.

Vacuum testing of storm sewer and other manholes will not be required.

10.2.4 TELEVISED INSPECTION

Where specified in the **SPECIAL PROVISIONS**, a color televised survey of installed sanitary sewer shall be provided after air testing to confirm branch locations, verify cleanliness of sewer, and confirm presence or absence of sags or deviations in sewer alignment. Sewers shall be cleaned immediately prior to the survey. The survey shall conform to NASCO PACP standards.

Televised inspection of storm sewers will not be required.

For Review Only

10.2.5 DEFLECTION TESTING

All PVC pipe used for sanitary sewer shall be tested for vertical deflection. Maximum deflection after completion of backfilling shall be 5% of the inside pipe diameter. Testing shall not be started until trench backfill has been in place for 30 days. CONTRACTOR shall keep a record of all tests performed. These records shall show the individual lengths of main tested and test results. Deflection shall be measured by pulling a mandrel with a vertical diameter equal to 95% of the pipe inside diameter through the line, after thoroughly flushing the lines to be tested. The testing device shall be controlled using cables at both the upstream and downstream manholes. The testing device must pass freely through the sewer without the use of unreasonable force on the control cables. Any line that will not pass the test cylinder will not be accepted until the faulty sections have been removed and replaced and the line retested.

Deflection testing of thermoplastic storm sewer shall be provided in accordance with the above requirements.

10.2.6 WATER MAIN DISINFECTION

CONTRACTOR shall furnish all water and other materials, equipment, and labor necessary to disinfect all new water mains and all existing water mains disturbed by construction. Sampling and testing shall conform to AWWA C651 and Section 4 of 401 KAR 8:150. CONTRACTOR shall coordinate and bear cost for necessary testing by a certified laboratory and shall submit the results to the Environmental and Public Protection Cabinet. Sampling and testing shall be scheduled to complete the Work within the Contract Times. A water main shall not be placed in service until satisfactory test results are obtained. Items of material for testing shall be furnished in the size and quantity necessary to properly complete the test. Interruption or delay of CONTRACTOR's Work progress caused by testing and sampling shall not be cause for extra payment under the Contract nor shall they be cause for extension of Contract Time.

10.2.7 WATER MAIN AND FORCE MAIN TESTING

CONTRACTOR shall conduct hydrostatic pressure tests and leakage tests of all joints in accordance with the requirements of AWWA C600 for iron pipe and AWWA C605 for PVC pipe. During performance of the hydrostatic pressure test, water main shall be subjected to a minimum pressure of at least 50 percent above normal working pressure with a minimum pressure 125 psi. Force main shall be tested to 200% of normal operating pressure in the main, but to no more than the pressure rating of the pipe. All air shall be removed from the main during testing. This shall be done by flushing, by installing corporations at high points, or by releasing air at valves at high points. Test pumping equipment used shall be centrifugal pumps or other pumping equipment that will not place shock pressures on the main. Power plunger pumps will not be permitted for use on closed pipe systems. Pumps shall be disconnected during test periods.

Prior to conducting the pressure and leakage test, CONTRACTOR shall backfill the trench for its full depth. All bends and special connections to the main shall be adequately blocked and tied prior to the test. Any damage caused to the main or its appurtenances during performance of these tests shall be corrected by CONTRACTOR at its expense.

CONTRACTOR shall keep a record of all tests performed. These records shall show the individual lengths of main tested and test results.

Where connections are made to existing mains, it shall be the responsibility of CONTRACTOR to provide the necessary hydrostatic tests on all new mains installed. This may necessitate, but is not limited to, the installation of temporary valves to isolate the new system from the existing system. All

For Review Only

materials, Work, and equipment necessary for this Work shall be furnished by CONTRACTOR at its expense.

All testing of pipelines shall proceed concurrently with installation. CONTRACTOR is advised that it may be advantageous to conduct daily preliminary testing of its Work.

Water from disinfection testing shall not be discharged to a stream, creek, river, storm sewer tributary thereto, or to a navigable water without first neutralizing the chlorine residual in the water and complying with local, state, and federal laws thereto.

10.3 TRAFFIC CONTROL

CONTRACTOR shall conduct its Work to minimize disruption of traffic on the job site and on adjacent streets and alleys. Where construction is in an area having only one vehicular access, CONTRACTOR shall conduct its Work to avoid or minimize blockage of such access. Blocking of streets or providing detours shall only be done if allowed in the **SPECIAL PROVISIONS**. Safe access shall be provided at all times for local traffic when CONTRACTOR is not working. CONTRACTOR shall keep local police and fire departments informed as to traffic access status as the Work proceeds.

CONTRACTOR shall furnish and install all necessary flagmen, barricades, signs, warning lights, and appurtenances to provide for safe and convenient control of traffic throughout the Project site. Barricading, signing and flagging shall be accomplished in strict accordance with the Manual on Uniform Traffic Control Devices and the KYDOH Specifications.

10.4 EROSION CONTROL

Where land disturbance activities do not exceed one acre, CONTRACTOR shall maintain site conditions where erosion and pollution are controlled.

Unless otherwise specified in the **SPECIAL PROVISIONS**, CONTRACTOR shall, for land disturbance activities exceeding one acre, develop and implement a Storm Water Erosion and Pollution Control Plan in accordance with conditions of federal and state permits, local ordinances, Best Management Practices, and as required by the Notice of Intent (NOI).

The following certification shall be included in the Storm Water Erosion and Pollution Control Plan, which CONTRACTOR and all subcontractors shall sign:

"I certify under penalty of law that I understand the terms and conditions of the General Pollutant Discharge Elimination System (NPDES) Permit that authorizes the storm water discharges associated with industrial activities from the construction site and as may be detailed in the Contract Documents. I agree to indemnify and hold OWNER harmless from any claims, demands, suits, causes of action, settlements, fines, or judgments and the costs of litigation, including, but not limited to, reasonable attorneys fees and costs of investigation and arising from a condition, obligation or requirement assumed or to be performed by CONTRACTOR for storm water pollution and erosion control."

Where land disturbances exceed one acre, CONTRACTOR shall execute a Notice of Intent (NOI) and send to OWNER and the Kentucky Division of Water, KPDES Branch.

Such controls as identified in the Storm Water Erosion and Pollution Control Plan shall be installed prior to disturbing any soil on the site. CONTRACTOR shall construct, maintain, and remove the erosion and pollution controls in accordance with the plan.

For Review Only

CONTRACTOR shall provide a “qualified” inspector to inspect erosion control and pollution controls. Inspector shall have prior experience with erosion and pollution controls and have knowledge of installation and maintenance of erosion and pollution controls as described by the Best Management Practices. Inspector shall be identified in the erosion and pollution control plan. In accordance with the General Pollution Elimination Systems General Permit conditions, the Project site erosion control inspection shall be every seven days and after each 1/2 inch rainfall or greater. CONTRACTOR shall maintain hard copies of the inspection report with Storm Water Erosion and Pollution Control Plan for the duration of the Project.

CONTRACTOR shall respond within 24 hours to all corrective measures noted on the inspection report to address pollution issues. CONTRACTOR shall submit to OWNER a written notice stating the times, dates and actions taken to rectify the defective pollution and erosion controls.

CONTRACTOR shall pay any fines or other fees resulting from failure of CONTRACTOR to comply with the permit requirements or failure to provide a permit.

CONTRACTOR shall submit a “Notice of Termination” (NOT) to KDOW at end of the Project.

10.5 MISCELLANEOUS WORK

CONTRACTOR shall provide miscellaneous Work as specified in the **SPECIAL PROVISIONS**.

SECTION 11—MEASUREMENT AND PAYMENT

11.1 GENERAL

Payment for changes in quantities, as shown in the Bid and Contract, shall be made in accordance with the prices bid. No change of grade, alignment or location shall annul or impair the Contract made and entered into relative to said Work. Payment shall be made for the quantities of each Bid item as actually installed. If a price is not provided in the Bid for an item of Work, the Work shall be considered incidental and included in adjacent items of Work.

11.2 UTILITY CONSTRUCTION

Payment for utility construction including water main, storm sewer, sanitary sewer, and force main will be made as listed in the Bid for furnishing all materials, labor, and equipment for the complete installation of the sewers, mains, and appurtenances as shown and specified.

The prices bid shall include the pipe, excavation, dewatering, bedding, laying, jointing, backfilling, paving, restoration, testing, and maintenance of surface, and all other labor and material necessary for complete compliance with these Specifications. Wye and tee branches shall be included in the prices bid for sewer main unless otherwise listed in the Bid proposal form. The cost of all special connections to existing mains and appurtenances shall be included in the prices bid. Unless otherwise shown on the Drawings or specified in the **SPECIAL PROVISIONS**, the prices bid for utility construction shall include the cost of backfilling with existing materials.

11.3 SERVICES, LATERALS, AND RISERS

Water services, standard sewer laterals, and modified sewer laterals, as listed in the Bid, will be paid for in addition to the prices bid for water main and sanitary sewer. The prices bid for services and laterals shall include the entire cost for all labor, tools, bends, couplings and incidentals to install the services and laterals beyond the tap or wye or tee branches as shown and specified. Lengths of services and laterals for payment will be measured along the centerline of the pipe from the center of

For Review Only

the main to the end of service. The cost of tunneling under or removing and replacing existing sidewalk and curb and gutter or other existing improvements shall be included in the prices bid. The cost of connecting existing water services to new water services shall be considered incidental to the Work

Risers will be paid for in addition to the prices bid for sanitary sewer main. The prices bid for risers shall be for the installation of risers constructed of ductile iron complete in place as shown on Drawing 01-975-75A. If included in the Bid, lengths of risers for payment will be measured along the centerline of the riser from the center of the main to the top 90° bend. In the prices bid, CONTRACTOR shall include all labor, equipment, and material necessary to install and support the riser column and to also provide ductile iron pipe from the riser column to the end of the service. If not included in the Bid, risers shall be paid for the same as for sanitary sewer laterals above.

11.4 INLET LEADS

The prices bid for inlet leads shall include the entire cost of all labor, excavations, backfilling, and material necessary for installation of the pipe from the center of the sewer main to the inlet box. The costs of special pipe fittings necessary to make the connections at the sewer main and at the inlet box shall be included in the prices bid.

The depth of service laterals and inlet leads will vary. The prices bid shall be for pipe installed at depths as shown on the Drawings or as requested by ENGINEER.

11.5 MANHOLES

Where manholes are not included in other Bid items, they will be paid for according to the prices bid. The prices bid for manholes shall include the cost of all material, Work, excavation, and backfilling necessary for construction of manholes as shown on the Drawings. Special bedding or pipe adjacent to manholes to standard trench width shall be included in the manhole price. The prices bid shall include the furnishing and installation of casting, steps, adjusting rings, and eccentric cone or flat slab as shown on the Drawings.

Special manholes will be paid for as shown on the Drawings and as listed in the Bid.

11.6 DROP ENTRANCES

Drop entrances to manholes shall be furnished and installed as shown on the Drawings and as specified. No additional payment will be made for drop entrances to manholes. Drop entrances will vary in depth from a minimum of 2 feet to the maximum as indicated on the Drawings.

11.7 STORM SEWER INLETS

The prices bid for inlets is to include the entire cost of all materials, labor, excavation, and backfilling necessary for complete construction of the inlets as shown and as specified. The cost of inlet lead pipe will be paid for under a separate Bid item. The depth of inlet will vary from the minimum shown on Drawing 01-975-41A to the amount specified. The prices bid shall apply for all inlet depths as actually installed. The cost of concrete encasement at the sewer main, where necessary, shall be included in the prices bid for inlets.

11.8 ROCK EXCAVATION, UTILITIES

Rock excavation for utility trenches shall be paid at the price bid, if listed separately. Such price bid may either be per linear foot regardless of trench depth or on a cubic yard basis as measured in place. If not included in the Bid, it shall be considered incidental and included in the price bid for adjacent Work.

For Review Only

Rock excavation, if paid for separately, shall include the cost of hauling and disposal of excavated rock and furnishing and placing backfill material and will be in addition to the prices bid for utility or street installations and appurtenances thereto.

11.9 SPECIAL BEDDING AND CONCRETE CRADLE

Where ENGINEER determines that unstable soils are present and are not CONTRACTOR's fault, payment for special bedding will be made. The price bid for special bedding shall include excavation for the bedding and furnishing and placing the bedding material.

The price bid for concrete cradle shall include forming, sheeting, excavation, and all materials for installation as shown on the Drawings. Measurement of concrete cradle will be made within the trench width for the depth as shown on the Drawings or requested by ENGINEER.

Special bedding and concrete cradle, where requested, will be paid for in addition to the prices bid for utility installations.

11.10 GRANULAR BACKFILL

The cost of granular backfill shall be included in the prices bid for utility installations and appurtenances where shown on the Drawings or specified. Where requested in the field by ENGINEER, payment will be made based on the prices bid measured in place following compaction. Costs shall include hauling away and disposing of material replaced by the granular backfill. Volume allowed for payment on a unit price basis shall not exceed an average trench width of 8 feet for the depth of fill placed.

Cover material and material placed within the zone of the trench where restoration materials are to be placed, such as topsoil and base course, shall not be included in the quantity measured for hauled-in granular backfill.

11.11 TRENCH SHEETING

Payment will be made only for sheeting required on the Drawings or **SPECIAL PROVISIONS**. The prices bid shall include the entire cost of furnishing all materials and labor for installation of the sheeting.

11.12 DEWATERING

The cost of removal of ground water and surface water shall be included in the prices bid for utility and street construction. No separate payment will be made for dewatering.

11.13 TUNNELING, BORING, JACKING, OR BORING AND JACKING

Payment for placement of casing pipe and carrier pipe inside the casing pipe shall be for the limits as shown on the Drawings and as listed in the Bid. The prices bid shall include the cost for furnishing the casing and carrier pipes, equipment, and labor necessary for installation including jacking pits, sheeting, special Work to install the casing and carrier pipe, backfilling, and restoration of surface improvements. Placement of the carrier pipe inside the casing pipe, including blocking and filling of the annular space, shall also be included in the prices bid.

For Review Only

11.14 EROSION CONTROL

Erosion control shall be paid at the various prices bid, if listed individually, or shall be included in the price bid for erosion control. If not included in the Bid, erosion control shall be considered incidental and included in the price bid for adjacent Work.

11.15 BEDDING DIKE

Bedding dike shall be paid at the prices bid, if listed separately. If not included in the Bid, it shall be considered incidental and included in the price bid for adjacent Work.

11.16 AGGREGATE SLURRY (FLOWABLE) BACKFILL

Aggregate slurry (flowable) backfill shall be paid at the prices bid, if listed separately. If individual Bid items are not provided in the Bid, it shall be considered incidental and included in the price bid for adjacent Work.

11.17 CLEARING AND GRUBBING

Cost for clearing and grubbing as described shall be paid for according to the Bid items included in the Bid. If individual Bid items are not provided in the Bid, the cost of this Work shall be considered incidental to adjacent utility and street construction Work.

11.18 COMMON EXCAVATION

Common excavation shall be included in the price bid for the Work, if listed separately. If individual Bid items are not provided in the Bid, the cost of this Work shall be considered incidental to adjacent utility and street construction Work.

The cost for utility installations within areas where common excavation is to be performed shall not include the cost for common excavation required in this Contract for street construction.

If listed separately, the price bid shall include excavation of materials and placement and compaction of excavated materials, except topsoil, to subgrade elevations. For lump sum bids, CONTRACTOR shall be responsible to make its own computations for common excavation in compiling the price bid. No changes in payment for common excavation will be allowed unless changes in the Work to be completed have been approved by ENGINEER. If not on a unit price basis, payment for any such changes shall be determined by calculating the common excavation quantity related to the change in Work and applying a unit price cost based on the lump sum bid and ENGINEER's original estimated common excavation quantity. For CONTRACTOR's information, ENGINEER's estimated quantity for common excavation will be noted in the Bid.

Saw cutting will be paid for according to the price bid, if listed separately. If individual Bid items are not provided, the cost of this Work shall be considered incidental.

11.19 ROCK EXCAVATION, STREETS

If listed separately, rock excavation for grading of streets or for site work shall be paid at the price bid, and shall include the hauling and disposal of the excavated rock. Such price bid will be on a cubic yard basis as measured in place by cross sectioning the rock before and after its removal. If not included in the Bid, it shall be considered incidental and included in the price bid for adjacent work.

For Review Only

11.20 BORROW EXCAVATION

Cost for borrow excavation shall be paid for according to the items included in the Bid. If individual Bid items are not provided in the Bid, the cost of this Work shall be considered incidental to adjacent utility and street construction Work.

11.21 EXCAVATION BELOW SUBGRADE

Payment for excavation below subgrade will only be made if excavation below subgrade is approved by ENGINEER and only within the limits as requested. Excavation below subgrade shall be measured in place. The price bid for excavation below subgrade shall include all costs to excavate, remove, and dispose of undesirable material.

Cost for providing geotextile beneath excavation below subgrade shall be paid for in accordance with the price bid, if listed separately. If individual Bid items are not provided in the Bid, it shall be considered incidental and included in the price bid for adjacent Work.

11.22 GEOTEXTILES

Geotextile fabrics shall be paid at the prices bid, if listed separately. If individual Bid items are not provided in the Bid, they shall be considered incidental and included in the price bid for adjacent Work.

11.23 BASE COURSE

Payment for crushed aggregate base course shall be made at the price bid and shall include all labor, materials, and Work necessary for complete installation. Payment will be made based on weight tickets provided to ENGINEER within one week of delivery for each truckload of base course.

Fine grading shall be included in the price bid for fine grading, if listed separately. If a Bid price for fine grading is not provided in the Bid, the cost of this Work shall be considered incidental to adjacent utility and street construction Work.

Placement of base course for driveways, sidewalks, and outside the limits of a 1:1 slope from the bottom pavement or curb edge or top of shoulder edge shall not be eligible for payment unless the limits are extended on the typical section.

11.24 SALVAGED ASPHALT PAVEMENT

Cost for placement of salvaged asphalt pavement as base course shall be included in the price bid, if listed separately. This price shall include grading and compaction. Cost for salvaged asphalt milling shall include the cost of milling and transport. If a Bid price is not provided in the Bid, the cost of this Work shall be considered incidental to adjacent utility and street construction Work.

11.25 CONCRETE

The cost for removal of existing concrete pavement, curb and gutter, sidewalk, driveway, and pavement shall be paid for according to the price bid for these items. If a Bid price is not provided in the Bid, the cost for these removals shall be included in the price bid for adjacent utility and street construction Work.

Concrete pavement shall be included in the price bid for the Work, if listed separately. If a Bid price is not provided in the Bid, the cost of this Work shall be considered incidental to adjacent utility and street construction Work.

For Review Only

11.26 CURB AND GUTTER

The prices bid for concrete curb and gutter, if listed separately, shall apply to both straight and curved curb and gutter (outside of median nose areas), to standard and reject curb and gutter, and to driveway sections at driveways and curb ramps (outside of median nose areas). Curb and gutter will be paid for through all inlets. The cost of base preparation, placing and finishing, jointing, tie bars, and utility markings, shall be included in the price bid for curb and gutter. The cost of curb and gutter placed in median nose areas shall be included in the price bid for median nose, if listed separately. If Bid prices are not provided in the Bid, the cost for these items shall be included in the cost for adjacent utility and street construction Work.

11.27 CONCRETE SIDEWALK AND DRIVEWAYS

Cost for new concrete sidewalk and driveway, if listed separately, shall be paid for according to the price bid. Price shall include grading, subgrade preparation, base material, placement, finish, and all other items necessary to complete the Work. If a Bid price is not provided in the Bid, the cost for these items shall be included in the price bid for adjacent utility and street construction Work.

Cost for replacement sidewalk and driveways shall be considered incidental to the Work.

11.28 ASPHALTIC CONCRETE PAVING

The cost for adjusting castings for new utility construction shall be considered incidental to the Work.

If existing castings are being replaced as part of the Work, the cost for adjusting the replacement castings shall be included in the price bid for the replacement castings.

Payment for adjusting new manhole castings from the finished intermediate course surface to finished grade and for adjusting existing castings to intermediate course and/or surface course grades shall be in accordance with the prices bid, if listed separately. If a Bid price is not provided in the Bid, the cost for these adjustments shall be included in the price bid for adjacent utility and street construction Work.

Providing and placing asphaltic tack coat material, if listed separately in the Bid shall include all labor, materials, and equipment necessary to provide the tack coat as specified herein. If not included in the Bid, it shall be considered incidental to the Work.

The price bid for new asphaltic concrete intermediate and surface course pavement, if listed separately, will be based on the price bid for the Work. Payment will only be made for the quantities where weight tickets for each truckload have been delivered to ENGINEER within one week of placement. Price bid shall include all materials, labor, and Work necessary for complete, in-place, asphaltic concrete pavement including fine grading and ramps. Asphaltic material will not be paid for as a separate item. The price bid for asphaltic pavement shall include CONTRACTOR's costs for labor, tools, and materials to cut, excavate, and match the new Work to the existing pavement. Where a unit price is not provided, the cost for paving shall be considered incidental to the Work.

11.29 PAVEMENT STRIPING

Pavement striping, if listed separately in the Bid, shall include all labor, materials, and equipment necessary to provide the markings as specified herein, including traffic control. If not included in the Bid, it shall be considered incidental and included in the price bid for adjacent Work.

For Review Only

11.30 SEEDING AND SODDING

Seeding and sodding (including topsoil), if listed separately, shall be paid for in accordance with the prices bid, which price shall be full compensation for preparing the earth bed including providing, grading, and rolling topsoil; furnishing and placing seed or sod, watering; and for all labor, equipment, tools, and incidentals necessary to complete the Work. Where prices are not provided, the cost for this Work shall be considered incidental to the Work and included in the costs for adjacent utility and street construction Work.

11.31 MISCELLANEOUS RESTORATION

Cost for miscellaneous restoration items shall be paid for according to the prices bid, if listed separately. Where prices are not provided in the Bid, the costs shall be included in the price bid for adjacent utility and street construction Work.

11.32 BOULDER WALLS

Boulder wall will be paid for at the price bid, which price shall be full compensation for furnishing and installing the stone, for selecting the stone, preparation of the foundation, including excavation, backfilling, disposing excess materials, for all labor, tools, and equipment, and transportation necessary to complete the Work. Payment shall include the stone wall face that is buried 12 inches.

11.33 CUT BLOCK MODULAR RETAINING WALLS

Modular retaining wall will be paid for at the price bid, which price shall be full compensation for furnishing and installing the wall; preparation of the foundation, including excavation, backfilling, and disposing excess materials; and for all labor, tools, equipment, and transportation necessary to complete the Work.

11.34 PLANTINGS

Plantings, if listed separately, shall be paid for in accordance with the prices bid. The price bid for plantings shall include all items as specified herein and as shown on the Drawings. Where unit prices are not provided for, they shall be included in the cost for adjacent utility and street construction Work.

11.35 DUST CONTROL

Unless, provided for in the Bid, dust control shall be considered incidental to the Work and included in adjacent or related items of Work.

11.36 SUPPLEMENTAL UNIT PRICES

Supplemental unit prices, if listed in the Bid, shall be furnished. These prices may apply if items of Work as listed under Supplemental Unit Prices are encountered. OWNER reserves the right to accept or reject any or all of the supplemental unit prices bid. If an unreasonable Supplemental Unit Price is submitted, OWNER may reject the proposed unit price and request the Work be completed as specified in the General Conditions.

Payment for items of Work in this category will be made only for Work requested and installed.

For Review Only

11.37 SPECIAL ITEMS OF WORK, MATERIAL, and equipment

Payment for special items of Work, material, and equipment will be paid for as specified in the **SPECIAL PROVISIONS.**

11.38 MISCELLANEOUS WORK

Payment for miscellaneous Work will be paid for as specified in the **SPECIAL PROVISIONS.**

For Review Only

SECTION 12—SPECIAL PROVISIONS

The following modifies, expands, or clarifies the Standard Specifications for Utility and Street Construction. Reference is made in this Section 12 to the specific provision of the Standard Specifications being clarified, modified, or expanded. These **SPECIAL PROVISIONS** shall govern whenever there is conflict or discrepancy with the Standard Specifications and the KYDOH Specifications.

12.1 1.2 PIPE

The following pipe materials shall be used on the Project:

Pipe Application	Material
Water Main	Ductile Iron PVC Pipe (SDR-PR)
Water Services	Copper, Polyethylene
Fittings for PVC and DI Pipe Used in Water Main	Ductile or Cast Iron

12.2 1.2.11 PVC PIPE (SDR-PR)

Standard dimension ratio PVC pressure rated pipe in sizes 2 inch to 3 inch may be used. Pipe shall comply with all other requirements of the Standard Specifications.

12.3 1.2.13 HIGH DENSITY POLYETHYLENE PRESSURE (HDPE) PIPE AND FITTINGS

For water main and casing pipe used in directional drilling, HDPE pipe shall comply with AWWA C906 and shall be DIPS. Pipe shall be NSF approved and have a rated working pressure of 200 psi.

12.4 1.3 VALVES

The following valves shall be used on the Project:

Valve Applications	Type
Water Main ≤12 inches	Resilient Wedge Gate Valves

12.5 1.3.6 CORPORATION STOPS, CURB STOPS, AND TAPPING SADDLES

Corporations stops shall be Mueller H-15000 (flair connections), H-15008 (compression connections), or equal. Tapping saddles are required at PVC main installations.

Curb stops shall be Mueller Mark II Oriseal with H-15204 (flair connections), H-15209 (compression connections), or equal. Contractor shall provide all necessary transition fittings to make connections to existing services on the customer side of the curb stop.

12.6 1.3.7 FIRE HYDRANTS

Fire hydrants are not required for the Project. Provide flush hydrants meeting the requirements of Standard Specifications except that the 4 1/2-inch nozzle is not to be provided.

For Review Only

12.7 1.13 SPECIAL MATERIALS AND EQUIPMENT

Tracer Wire: PVC water main shall be provided with #12 gauge solid insulated copper tracer wire taped at 5-foot intervals. Wire shall be continuous between and terminate at valve boxes, manholes, and fire hydrants. Any splices shall be soldered and fitted with a Raco, or equal insulated water-tight boot.

Air Release Valves: Automatic air release valves shall be installed at locations shown on the Drawings or as indicated below. Automatic air release valves shall be Val-Matic Model 25, APCO, or equal iron body with bronze or stainless steel internals with 1-inch screw connection. Air release valves shall be lever and pin operated, 150 psi working pressure with flanged top plate cover for ease of repair. Valve body shall contain drain and blow-off plugs.

Manual air release valve shall be as shown on the "Miscellaneous Detail" Drawing.

Pressure Reducing Valves: When required for individual customer service as shown on the Drawings, pressure reducing valves shall be provided. For services sizes 1 inch and less valves shall be Wilkins 70 Series, or equal. CONTRACTOR shall provide, as needed, adapter for proper laying length. For services greater than 1 inch, see Drawings for requirements.

Tapping Sleeves and Valves: Tapping sleeves shall be A. P. Smith Division of U. S. Pipe or equal, ductile iron, 200 psi working pressure with cadmium plated cast iron nuts and bolts. Provide gaskets for full area of sleeve flanges. Tapping valves shall conform to requirements for gate valves except that one end shall be flanged and the other mechanical joint. Tapping valves shall be provided with oversized openings to permit use of full sized cutters.

Water Meters and Boxes: Water meters shall be straight reading, US gallon type, SUS gallon type, Hersey Meter Model No. 1 Automatic Reads "Hot Rods" (automatic reads shall be included in the unit price bid) rated for 150 psi working pressure meeting requirements of AWWA C700. All 5/8-inch x 3/4-inch meters shall be cold water rotating type with hermetically sealed magnetically driven registers with single register, sweep test hand, and split case body—bronze bottom with plastic top.

Meter boxes shall be "ultra-rib" boxes Extrusion Technologies, Inc., or equal. They shall be made of PVC material, 18-inch-diameter by 30-inches long, with two-piece cast iron lids capable of automatic reads.

Provide Mueller H-15403, or equal compression union for splicing copper.

Meter Setters: Meter setters for services 1 inch or less shall be copper with plain stop, with appropriate riser. Setters shall be 5/8 inch x 3/4 inch x 7 inch with dual check valves and shall have a 1-inch FML x 1-inch CTS grip. Copper setters shall be Mueller Model, Ford Model VHH 727W-4F-44G, or equal. Tandem setters with PRVs shall be Mueller Model, Ford Model TVHH727W-4F-44G, or equal. Custom setters shall be Mueller Model, Ford Model, or equal for sizes larger than 1 inch. Where pressure reducing valves are required setter shall accommodate their installation.

Service Saddles: Saddles for service connections to PVC pipe shall be Dresser Series 194, Ford Model S70 or S90 Series, Mueller, or equal made of bronze or stainless steel.

Saddles for cast iron sized pipe shall be Dresser Industries, Inc. Style 91 or 291, Smith-Blair, Inc. Style 311 or 313, Ford, Mueller, or equal with malleable or ductile iron bodies that extend at least 160 degrees around the circumference of the pipe. Clamps shall have neoprene gaskets cemented to the saddle bodies. Clamps with tap sizes 1 inch and smaller may be single strap design. Clamps with taps sizes larger than 1 inch shall be double strap design.

For Review Only

Asbestos Pipe Removal: An asbestos pipe removal bid item has been established in the quantities of relocation for facilities owned by OWNER. The quantity shown is for bidding purposes only. The actual quantity is unknown. CONTRACTOR shall not construe this amount as a true estimate of quantity to be removed. The true amount of removal will be measured for payment at the time of removal.

Payment shall be made under this item **only when asbestos pipe is removed, handled, and disposed of in accordance with all governmental environmental regulations**. Even though this item is reflected only in the quantities for OWNER, the item is to be used for payment of asbestos pipe removal regardless of original ownership.

Payment under this item shall be made regardless of the size of the pipe being removed and shall be made only when removal of the pipe is required because of conflicts with the proposed construction. In those areas where there are no conflicts and the pipe will not be disturbed, the pipe shall be left in place.

No payment will be made under this item where asbestos pipe removal is required to make utility connections and tie-ins. Asbestos pipe removal for connections and tie-ins shall be considered incidental to the item of utility work performed and disposed of in accordance with all governmental environmental regulations.

Asbestos pipe removed shall be paid based on actual field measured quantities.

12.8 2.1 SERVICE LINE LOCATIONS

OWNER will provide meter and service locations.

12.9 3.10 TUNNELING, BORING, JACKING, OR BORING AND JACKING

Boring and jacking shall be utilized where shown on the Drawings.

12.10 6.1 STREET CONSTRUCTION-GENERAL

See Section 01500 for availability of water.

12.11 9.1 RESTORATION AND SITE WORK-SCOPE

See Section 01500 for availability of water.

END DIVISION 20

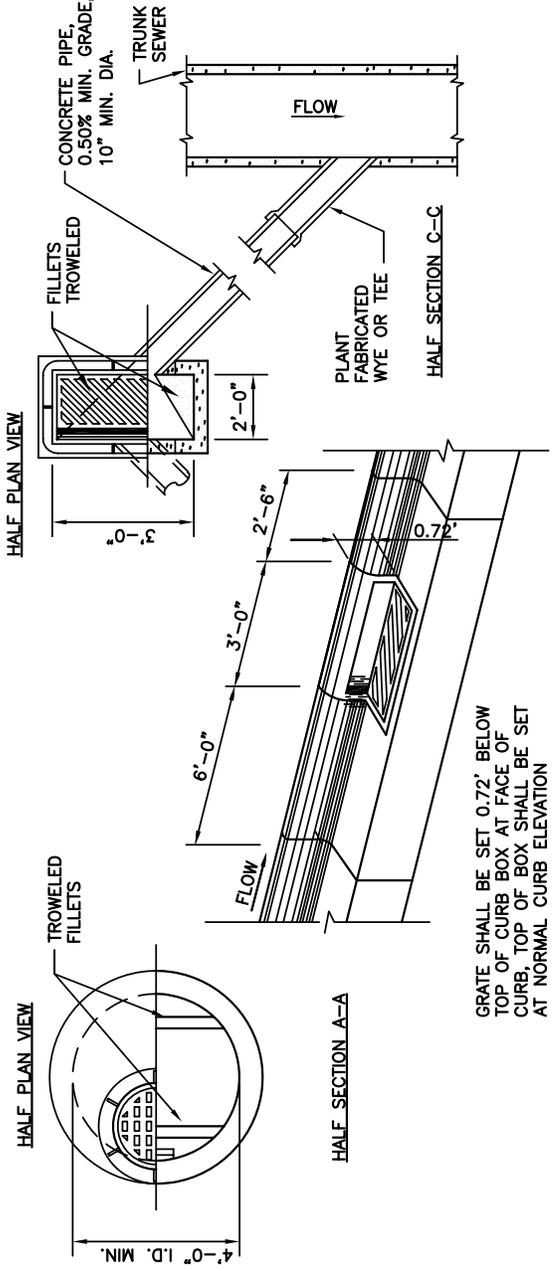
For Review Only

DRAWINGS

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NOTES

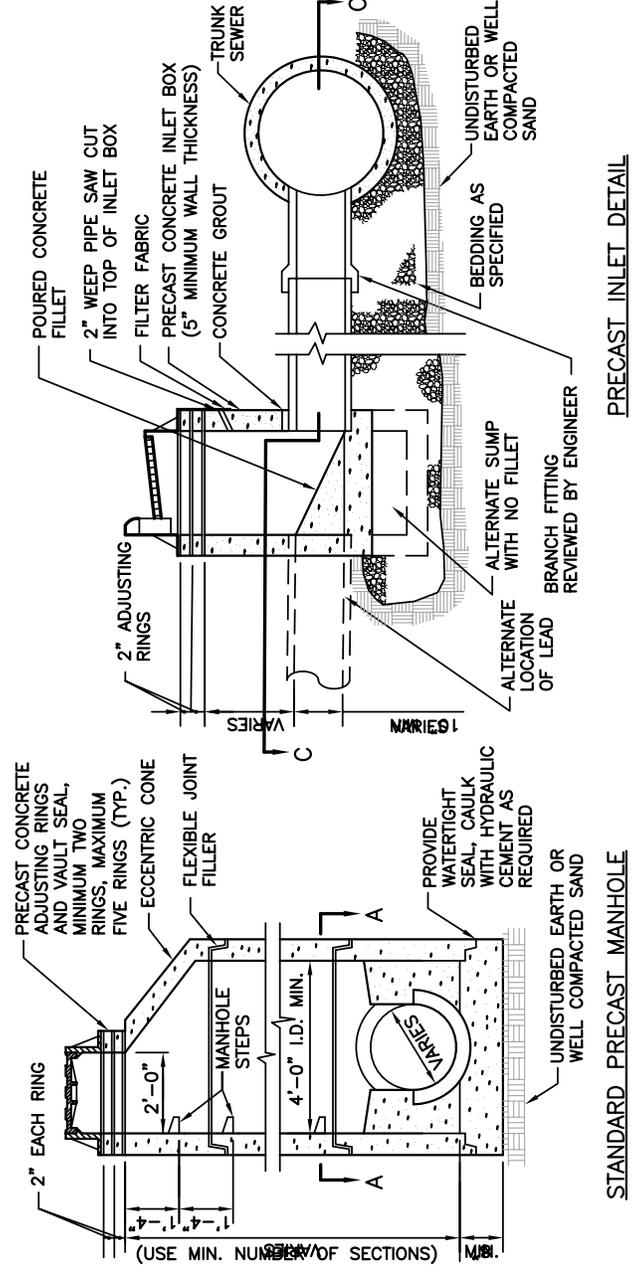
1. DETAILS RELATIVE TO ITEMS SHOWN ON THIS DRAWING SHALL CONFORM TO THE PERTINENT REQUIREMENTS OF THE SPECIFICATIONS.
2. VARIATIONS IN DIMENSIONS AND DESIGN MAY BE PERMISSIBLE PROVIDING EQUIVALENT CAPACITY AND STRENGTH ARE ATTAINED.
3. WHEN ANY STRUCTURE IS CONSTRUCTED OF CONCRETE, CONCRETE BLOCK OR REINFORCED CONCRETE CULVERT PIPE, THE TOP OF THE MASONRY SHALL BE LEFT SUFFICIENTLY LOW TO PERMIT PROPER ADJUSTMENT OF COVER TO GRADE.
4. REINFORCED PRECAST FLAT SLAB SHALL BE USED IN LIEU OF PRECAST ECCENTRIC CONE WHEN SHOWN ON THE DRAWINGS AND SHALL BE DESIGNED FOR H-20 TRUCK LOADING.
5. PRECAST REINFORCED CONCRETE MANHOLE RISERS AND TOPS SHALL CONFORM TO ASTM C-478. JOINTS BETWEEN MANHOLE SECTIONS SHALL BE SEALED WITH RAM NEK, HANDLING HOLES SHALL BE FILLED WITH PUTTY, AND BOTH MADE WATER TIGHT.
6. STEPS SHALL BE INSTALLED IN ALL MANHOLES.
7. AT ALL BENDS IN SEWER, A SMOOTH RADIUS FLOW LINE SHALL BE PROVIDED IN MANHOLES. ALL CONCRETE FILLETS SHALL BE HAND TROWELED.
8. INSIDE DIMENSIONS FOR MANHOLES: USE MINIMUM 4' DIAMETER FOR SEWER LESS THAN 18" IN DIAMETER; USE MINIMUM 5' DIAMETER FOR SEWER 18" THRU 24" IN DIAMETER; USE MINIMUM 6' DIAMETER OR MINIMUM 6' SQUARE FOR SEWER OVER 24" IN DIAMETER UNLESS OTHERWISE SPECIFIED.
9. ARRANGEMENT AND NUMBER OF INLETS AND DISCHARGE PIPES SHALL CONFORM TO THE NEEDS OF THE PERTINENT LOCATION.
10. PROVIDE MINIMUM 2'-0" COVER FOR ALL INLET LEAD PIPE, UNLESS OTHERWISE SPECIFIED.
11. ALL INLETS SHALL BE DEPRESSED AS SHOWN.
12. INLET DEPTH AND GRADE OF INLET LEAD PIPE VARY ACCORDING TO DEPTH OF TRUNK SEWER. MINIMUM INLET DEPTH BELOW TOP OF CURB SHALL BE 4'-0".



**STORM SEWER
 MANHOLES AND INLETS**

STANDARD DETAIL

DEPRESSED INLET DETAIL

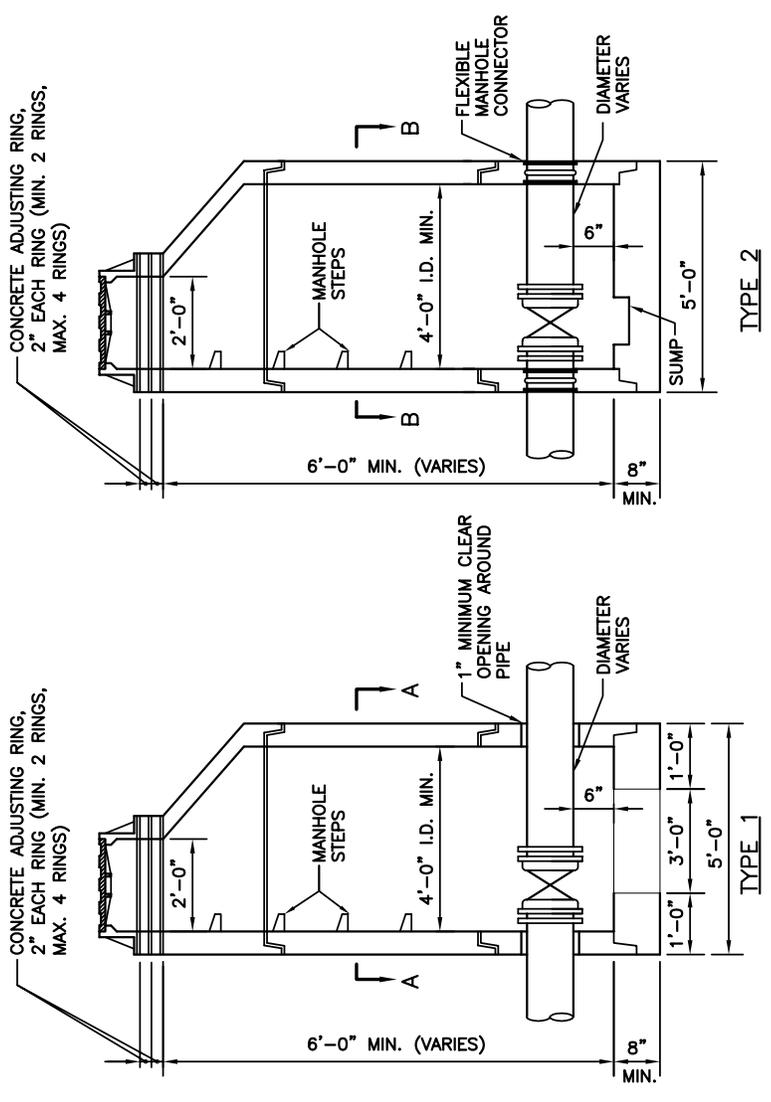
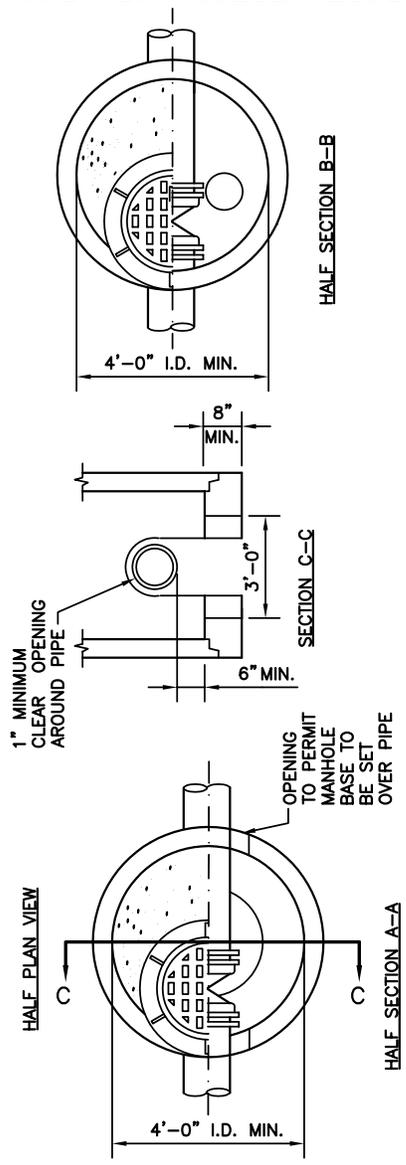


01-975-41A
 AUGUST 2008

NOTES:

1. TYPE 1 OR 2 MANHOLE SHALL BE INSTALLED AS SHOWN ON THE DRAWINGS. TYPE 2 MANHOLE SHALL BE MADE WATERTIGHT AND SHALL BE USED WHEN NORMAL GROUND WATER LINE IS ABOVE BOTTOM SLAB.
2. VARIATION IN DIMENSIONS AND DESIGN MAY BE PERMISSIBLE PROVIDING EQUIVALENT CAPACITY AND STRENGTH ARE ATTAINED.
3. WHEN ANY STRUCTURE IS CONSTRUCTED OF CONCRETE, CONCRETE BLOCK, OR REINFORCED CONCRETE CULVERT PIPE, THE TOP OF THE MASONRY SHALL BE LEFT SUFFICIENTLY LOW TO PERMIT PROPER ADJUSTMENT OF COVER TO GRADE BY THE USE OF MORTAR.
4. CONCRETE BLOCK MANHOLES REVIEWED BY THE ENGINEER WILL BE PERMITTED AS AN ALTERNATE. BACK PLASTER OUTSIDE OF ALL CONCRETE BLOCK. CONCRETE BLOCK MANHOLE WALLS SHALL BE 2 BLOCKS THICK BELOW DEPTHS OF 10 FEET.
5. REINFORCED PRECAST FLAT SLAB SHALL BE USED IN LIEU OF PRECAST ECCENTRIC CONE AS SHOWN ON THE DRAWINGS AS NEEDED TO INSTALL EQUIPMENT OR VALVES.
6. PRECAST REINFORCED CONCRETE MANHOLE RISERS AND TOPS SHALL CONFORM TO ASTM C-478. JOINTS BETWEEN SECTIONS SHALL BE SEALED WATERTIGHT WITH KENT SEAL, RAM SEAL, OR EQUAL.
7. STEPS SHALL BE INSTALLED IN ALL MANHOLES. MANHOLE STEPS SHALL BE NEENAH TYPE R-1981-N, MA INDUSTRIES NO. PS-4, OR EQUAL 1'-4" O.C.
8. MANHOLE COVER SHALL BE NEENAH TYPE R-1550, OR EQUAL, WITH TYPE B NON-SKIDTING LID.
9. TYPE 1 MANHOLE SHALL BE FILLED WITH CLEAN BEDDING UP TO THE BOTTOM OF THE PIPE.
10. DETAILS RELATIVE TO ITEMS SHOWN ON THIS DRAWING SHALL CONFORM TO THE PERTINENT REQUIREMENTS OF THE SPECIFICATIONS.
11. FLAT SLAB TOPS SHALL BE DESIGNED FOR H-20 TRUCK LOADING AND SHALL MEET REQUIREMENTS OF ASTM C-478.
12. BASE SLABS SHALL BE REINFORCED AS FOLLOWS. REINFORCING SHALL BE PLACED IN EACH DIRECTION AT 2" CLEAR FROM TOP SURFACE OF SLAB. REINFORCING SHALL BE GRADE 60 USE OF CAST-IN-PLACE SLAB SHALL NOT RELIEVE CONTRACTOR OF REQUIREMENTS TO PROVIDE WATERTIGHT JOINTS.

INSIDE DIA.	DEPTH	REINF.
4'	≤ 30"	#4@10"
5'	≤ 20"	#4@10"
5'	20'-30"	#4@10"
6'	≤ 20"	#4@10"
6'	20'-25"	#4@10"
6'	25'-30"	#4@6"



**WATER MAIN
 VALVE MANHOLES**

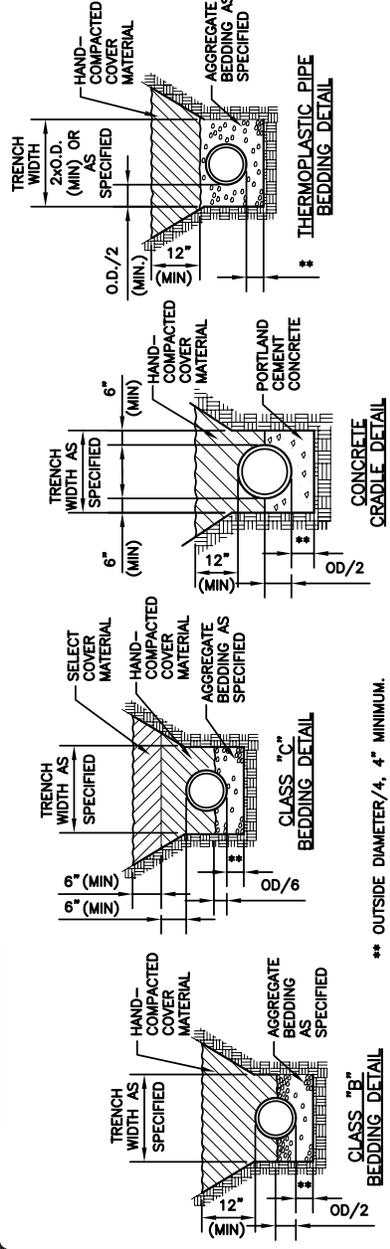
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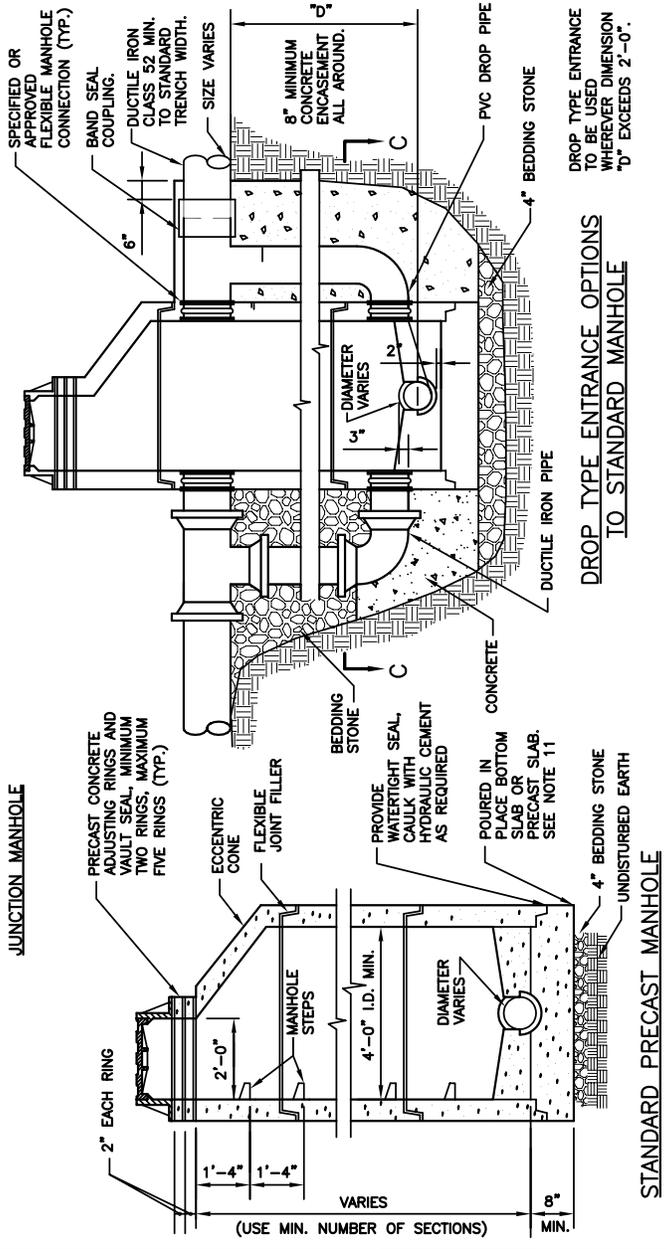
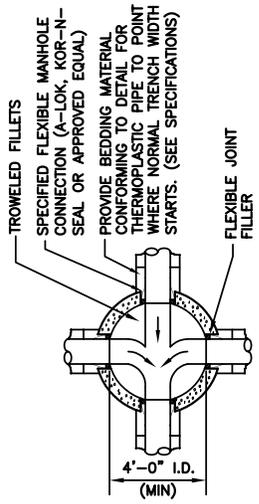
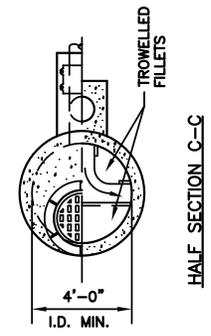
01-975-42A
 DECEMBER 2003

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- NOTES**
1. DETAILS RELATIVE TO ITEMS SHOWN ON THIS DRAWING SHALL CONFORM TO THE PERTINENT REQUIREMENTS OF THE SPECIFICATIONS AND THE APPLICABLE SPECIAL PROVISIONS.
 2. VARIATIONS IN DIMENSIONS AND DESIGN MAY BE PERMISSIBLE, PROVIDING EQUIVALENT CAPACITY AND STRENGTH ARE ATTAINED.
 3. ALL CONCRETE FILLETS SHALL BE HAND TROWELED WITH A 1/4" FT. SLOPE.
 4. INSIDE DIMENSIONS FOR MANHOLES: USE MINIMUM 4' DIAMETER FOR SEWER LESS THAN 18" IN DIAMETER; USE MINIMUM 5' DIAMETER FOR SEWER 18" THRU 24" IN DIAMETER; USE MINIMUM 6' DIAMETER OR MINIMUM 6' SQUARE FOR SEWER OVER 24" IN DIAMETER.
 5. BEDDING CLASSES "B" AND "C" SHALL MEET OR EXCEED ASTM C12 REQUIREMENTS.
 6. DROP TYPE ENTRANCE TO STANDARD MANHOLE WILL BE PAID FOR SEPARATELY IF SO LISTED IN THE BID.
 7. SEE DRAWINGS FOR DROP TYPE ENTRANCES FOR SANITARY SEWERS LARGER THAN 15".
 8. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE REQUIREMENTS OF REGULATORY BODIES OF THE STATE AND APPLICABLE MUNICIPAL ORDINANCES.
 9. ALL NEW CONSTRUCTION SHALL BE PLACED ON UNDISTURBED EARTH OR STONE BEDDING.
 10. FLAT SLAB TOPS SHALL BE DESIGNED FOR H-20 TRUCK LOADING AND SHALL MEET REQUIREMENTS OF ASTM C-478.
 11. BASE SLABS SHALL BE REINFORCED AS FOLLOWS: REINFORCING SHALL BE PLACED IN EACH DIRECTION AT 2" CLEAR FROM TOP SURFACE OF SLAB, REINFORCING SHALL BE GRADE 6 USE OF CAST-IN-PLACE SLAB SHALL NOT RELIEVE CONTRACTOR OF REQUIREMENTS TO PROVIDE WATERTIGHT JOINTS.
 12. FLAT SLABS SHALL BE PROVIDED IN SHALLOW DEPTH SITUATIONS IN LIEU OF ECCENTRIC CONES.



** OUTSIDE DIAMETER/4, 4" MINIMUM.



INSIDE DIA.	DEPTH	REINF.
4'	≤ 30"	#3@8"
5'	≤ 20"	#3@8"
5'	20'-30"	#4@10"
6'	≤ 20"	#4@10"
6'	20'-25"	#4@8"
6'	25'-30"	#4@6"

SANITARY SEWER APPURTENANCES

STANDARD DETAIL



01-975-43A
 DECEMBER 2003

N O T I C E

**DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS
(INDIVIDUAL PERMIT AUTHORIZATION)**

PROJECT: Harrison County- US 27 Cynthiana Bypass
KYTC Item # 6-119.2

The Section 404 activities for this project have been previously permitted under the authority of the Department of the Army Individual Permit. In order for this authorization to be valid, the attached conditions must be followed. The contractor shall post a copy of this Nationwide Permit in a conspicuous location at the project site for the duration of construction and comply with the general conditions as required.

To more readily expedite construction, the contractor may elect to alter the design or perform the work in a manner different from what was originally proposed and specified. Prior to commencing such alternative work, the contractor shall obtain **written** permission from the Division of Construction and the Corps of Engineers. A copy of any request to the Corps of Engineers to alter this proposal and subsequent responses shall be forwarded to the Division of Environmental Analysis, DEA Permit Coordinator, for office records and for informational purposes.

June 30, 2009

Operations Division
Regulatory Branch (South)
ID No. LRL-2005-1875-pjl

Mr. John Purdy
Permits Coordinator
Kentucky Transportation Cabinet
200 Mero Street
Frankfort, Kentucky 40601

Dear Mr. Purdy:

This is in regard to your February 20, 2009, letter requesting a modification to Department of the Army (DA) Permit LRL-2006-566, which authorized the relocation and piping of intermittent and perennial streams to facilitate construction of the Cynthiana Bypass in Harrison County, Kentucky. Authorization was requested for an extension to the construction period. This requested modification is approved.

The time limit for completing the proposed work ends on **June 30, 2012**. All other conditions of the original permit remain in full force and effect.

Please note a correction in the Permit ID Number, above. The **correct DA Permit ID number is LRL-2005-1875**. Please make a note of this ID Number in your records for future reference.

Copies of this letter will be sent to the appropriate coordinating agencies (see enclosure for addresses).

If we can be of any further assistance, please contact us at the above address, ATTN: CELRL-OP-FS, or call me at (502) 315-6693.

FOR THE DISTRICT ENGINEER:

Lee Anne Devine
Chief, South Section
Regulatory Branch

Enclosure

Loeffler/OP-FS/wr/da-mod.doc
Devine/OP-FS



DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, LOUISVILLE
CORPS OF ENGINEERS
P.O. BOX 59
LOUISVILLE, KENTUCKY 40201-0059
<http://www.lrl.usace.army.mil/>

3 JUL '07 AM 10:37

June 29, 2007

Operations Division
Regulatory Branch (South)
ID No. LRL-2005-1875-pmh

Mr. David Waldner
Kentucky Transportation Cabinet
Division of Environmental Analysis
200 Mero Street, W5-22-02
Frankfort, Kentucky 40622

Dear Mr. Waldner:

Enclosed is Department of the Army (DA) Permit Number LRL-2005-1875-pmh authorizing two individual permits for the placement of fill into multiple streams to facilitate the construction of the Cynthiana Bypass in Harrison County, Kentucky. Also enclosed is ENG Form 4336, "Notice of Authorization," which must be displayed at the construction site throughout construction.

Please indicate your acceptance of the terms and conditions of the permit by signing and dating both copies of the permit form on the lines provided for "Permittee" and "Date" and return one copy to us in the enclosed envelope. This permit will not be valid until we receive the signed copy. Upon completion of the work authorized under this permit, the enclosed Completion Report form must be completed and returned to this office.

In addition, ten stream crossings have been reviewed and determined to qualify for authorization under the terms and conditions of the 33 CFR 330 A Nationwide Permit (NWP) No. 14, Linear Transportation Projects, as published in the Federal Register March 12, 2007. Under the provisions of this authorization you must comply with the enclosed:

1. Terms for Nationwide Permit No. 14;
2. Nationwide Permit General Conditions; and
3. Water Quality Certification (WQC) Conditions for Nationwide Permit No. 14 dated March 19, 2007, issued by the Kentucky Division of Water.

Once you obtain your certifications, or if no application was required, you may proceed with the project without further contact or verification from us.

This decision is valid for 2 years from the date of this letter. The enclosed Compliance Certification should be signed and returned when the project is completed. If your project is not completed within this

2-year period or if your project is modified, you must contact us for another permit determination. A copy of this letter is being sent to the KDOW.

For your information, effective March 9, 1999, the Corps of Engineers instituted an administrative appeals process. A permit applicant may appeal an individual permit denial or an individual permit that was issued with conditions (a proffered individual permit). To initiate the appeals process regarding the terms and conditions of this permit, you must write a letter to the district engineer explaining your objections to the permit. The enclosed Notification of Applicant Options (NAO) outlines the initial appeals process and options available to you. The objection letter must be received by the district engineer within 60 days of the date of the NAO. Please be aware that no work can occur in jurisdictional waters until the appeals process is completed.

Should any modification of the plans become necessary for any reason, approval from the District Engineer must be received prior to the start of the work. Copies of this letter will be sent to the appropriate coordinating agencies (see enclosure for addresses).

Sincerely,



Phyllis Hockett
Project Manager
Regulatory Branch

Enclosures

DEPARTMENT OF THE ARMY PERMIT

Permittee: Kentucky Transportation Cabinet

Permit Number: LRL-2006-566-pmh

Issuing Office: U.S. Army Engineer District, Louisville

NOTE: The term "you" and its derivatives, as used in this permit, means the permittee or any future transferee. The term "this office" refers to the appropriate district or division office of the Corps of Engineers having jurisdiction over the permitted activity or the appropriate official acting under the authority of the commanding officer.

You are authorized to perform work in accordance with the terms and conditions specified below.

Project Description: Relocate and pipe 1,187 linear feet of an intermittent stream, relocate and pipe 701 linear feet of a perennial stream to facilitate the construction of the Cynthiana By-pass.

Project Location: The project is located on unnamed perennial and intermittent tributaries to Grays Run Creek, a tributary to the South Fork of the Licking River, off of Highways 32 and 27 in Cynthiana, Harrison County, Kentucky. The project will commence on the south side of Cynthiana and arch around the west side of the City.

Permit Conditions:

General Conditions:

1. The time limit for completing the authorized activity ends on June 30, 2009. If you find that you need more time to complete the authorized activity, submit your request for a time extension to this office for consideration at least one month before the above date is reached.
2. You must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party in compliance with General Condition 4 below. Should you wish to cease to maintain the authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification for this permit from this office, which may require restoration of the area.
3. If you discover any previously unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately notify this office of what you have found. We will initiate the Federal and state coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.
4. If you sell the property associated with this permit, you must obtain the signature of the new owner in the space provided and forward a copy of the permit to this office to validate the transfer of this authorization.
5. If a conditioned water quality certification has been issued for your project, you must comply with the conditions specified in the certification as special conditions to this permit. For your convenience, a copy of the certification is attached if it contains such conditions.
6. You must allow representatives from this office to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished with the terms and conditions of your permit.

Special Condition:

1. The permittee shall pay an in lieu mitigation fee of \$339,840.00 to the Kentucky Department for Fish and Wildlife Resource's Stream and Wetland Mitigation Trust Fund. Written proof of payment must be provided to the U.S. Army Corps of Engineers, Louisville District prior to conducting work in "waters of the United States."

Further Information:

1. Congressional Authorities. You have been authorized to undertake the activity described above pursuant to:
 - () Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403).
 - (X) Section 404 of the Clean Water Act (33 U.S.C. 1344).
 - () Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972 (33 U.S.C. 1413).
2. Limits of this authorization.
 - a. This permit does not obviate the need to obtain other Federal, state, or local authorizations required by law.
 - b. This permit does not grant any property rights or exclusive privileges.
 - c. This permit does not authorize any injury to the property or rights of others.
 - d. This permit does not authorize interference with any existing or proposed Federal project.
3. Limits of Federal Liability. In issuing this permit, the Federal Government does not assume any liability for the following:
 - a. Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.
 - b. Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest.
 - c. Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit.
 - d. Design or construction deficiencies associated with the permitted work.
 - e. Damage claims associated with any future modification, suspension, or revocation of this permit.
4. Reliance on Applicant's Data. The determination of this office that issuance of this permit is not contrary to the public interest was made in reliance on the information you provided.
5. Reevaluation of Permit Decision. This office may reevaluate its decision on this permit at any time the circumstances warrant. Circumstances that could require a reevaluation include, but are not limited to, the following:
 - a. You fail to comply with the terms and conditions of this permit.
 - b. The information provided by you in support of your permit application proves to have been false, incomplete, or inaccurate (See 4 above).
 - c. Significant new information surfaces which this office did not consider in reaching the original public interest decision.

Such a reevaluation may result in a determination that it is appropriate to use the suspension, modification, and revocation procedures contained in 33 CFR 325.7 or enforcement procedures such as those contained in 33 CFR 326.4 and 326.5. The referenced enforcement procedures provide for the issuance of an administrative order requiring you to comply with the terms and conditions of your permit and for the initiation of legal action where appropriate. You will be required to pay for any corrective measure ordered by this office, and if you fail to comply with such directive, this office may in certain situations (such as those specified in 33 CFR 209.170) accomplish the corrective measures by contract or otherwise and bill you for the cost.

6. Extensions. General condition 1 establishes a time limit for the completion of the activity authorized by this permit. Unless there are circumstances requiring either a prompt completion of the authorized activity or a reevaluation of the public interest decision, the Corps will normally give you favorable consideration to a request for an extension of this time limit.

Your signature below, as permittee, indicates that you accept and agree to comply with the terms and conditions of this permit.



(PERMITTEE)

7/6/07

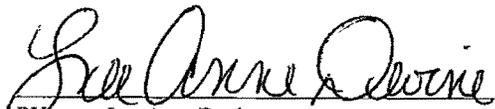
(DATE)

This permit becomes effective when the Federal official, designated to act for the Secretary of the Army, has signed below.

(COMMANDER AND DISTRICT ENGINEER)

7/2/07

(DATE)


BY: Lee Anne Devine
Chief, South Section
Regulatory Branch

When the structures or work authorized by this permit are still in existence at the time the property is transferred, the terms and conditions of this permit will continue to be binding on the new owner(s) of the property. To validate the transfer of this permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below.

(TRANSFEREE)

(DATE)

TERMS FOR NATIONWIDE PERMIT NO. 14

Linear Transportation Projects

Activities required for the construction, expansion, modification, or improvement of linear transportation projects (e.g., roads, highways, railways, trails, airport runways, and taxiways) in waters of the United States. For linear transportation projects in non-tidal waters, the discharge cannot cause the loss of greater than 1/2-acre of waters of the United States. For linear transportation projects in tidal waters, the discharge cannot cause the loss of greater than 1/3-acre of waters of the United States. Any stream channel modification, including bank stabilization, is limited to the minimum necessary to construct or protect the linear transportation project; such modifications must be in the immediate vicinity of the project.

This NWP also authorizes temporary structures, fills, and work necessary to construct the linear transportation project. Appropriate measures must be taken to maintain normal downstream flows and minimize flooding to the maximum extent practicable, when temporary structures, work, and discharges, including cofferdams, are necessary for construction activities, access fills, or dewatering of construction sites. Temporary fills must consist of materials, and be placed in a manner, that will not be eroded by expected high flows. Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The areas affected by temporary fills must be revegetated, as appropriate.

This NWP cannot be used to authorize non-linear features commonly associated with transportation projects, such as vehicle maintenance or storage buildings, parking lots, train stations, or aircraft hangars.

Notification: The permittee must submit a pre-construction notification to the district engineer prior to commencing the activity if: (1) the loss of waters of the United States exceeds 1/10 acre; or (2) there is a discharge in a special aquatic site, including wetlands. (See general condition 27.) (Sections 10 and 404)

Note: Some discharges for the construction of farm roads or forest roads, or temporary roads for moving mining equipment, may qualify for an exemption under Section 404(f) of the Clean Water Act (see 33 CFR 323.4).

NATIONWIDE PERMIT GENERAL CONDITIONS

Note: To qualify for NWP authorization, the prospective permittee must comply with the following general conditions, as appropriate, in addition to any regional or case-specific conditions imposed by the division engineer or district engineer. Prospective permittees should contact the appropriate Corps district office to determine if regional conditions have been imposed on an NWP. Prospective permittees should also contact the appropriate Corps district office to determine the status of Clean Water Act Section 401 water quality certification and/or Coastal Zone Management Act consistency for an NWP.

1. Navigation. (a) No activity may cause more than a minimal adverse effect on navigation.
(b) Any safety lights and signals prescribed by the U.S. Coast Guard, through regulations or otherwise, must be installed and maintained at the permittee's expense on authorized facilities in navigable waters of the United States.
(c) The permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.
2. Aquatic Life Movements. No activity may substantially disrupt the necessary life cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area, unless the activity's primary purpose is to impound water. Culverts placed in streams must be installed to maintain low flow conditions.
3. Spawning Areas. Activities in spawning areas during spawning seasons must be avoided to the maximum extent practicable. Activities that result in the physical destruction (e.g., through excavation, fill, or downstream smothering by substantial turbidity) of an important spawning area are not authorized.
4. Migratory Bird Breeding Areas. Activities in waters of the United States that serve as breeding areas for migratory birds must be avoided to the maximum extent practicable.
5. Shellfish Beds. No activity may occur in areas of concentrated shellfish populations, unless the activity is directly related to a shellfish harvesting activity authorized by NWPs 4 and 48.
6. Suitable Material. No activity may use unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.). Material used for construction or discharged must be free from toxic pollutants in toxic amounts (see Section 307 of the Clean Water Act).
7. Water Supply Intakes. No activity may occur in the proximity of a public water supply intake, except where the activity is for the repair or improvement of public water supply intake structures or adjacent bank stabilization.
8. Adverse Effects From Impoundments. If the activity creates an impoundment of water, adverse effects to the aquatic system due to accelerating the passage of water, and/or restricting its flow must be minimized to the maximum extent practicable.
9. Management of Water Flows. To the maximum extent practicable, the pre-construction course, condition, capacity, and location of open waters must be maintained for each activity, including stream channelization and storm water management activities, except as provided below. The activity must be constructed to withstand expected high flows. The activity must not restrict or impede the passage of normal or high flows, unless the primary purpose of the activity is to impound water or manage high flows. The activity may alter the pre-construction course, condition, capacity, and location of open waters if it benefits the aquatic environment (e.g., stream restoration or relocation activities).
10. Fills Within 100-Year Floodplains. The activity must comply with applicable FEMA-approved state or local floodplain management requirements.
11. Equipment. Heavy equipment working in wetlands or mudflats must be placed on mats, or other measures must be taken to minimize soil disturbance.
12. Soil Erosion and Sediment Controls. Appropriate soil erosion and sediment controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date. Permittees are encouraged to perform work within waters of the United States during periods of low-flow or no-flow.
13. Removal of Temporary Fills. Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The affected areas must be revegetated, as appropriate.

14. Proper Maintenance. Any authorized structure or fill shall be properly maintained, including maintenance to ensure public safety.

15. Wild and Scenic Rivers. No activity may occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a "study river" for possible inclusion in the system while the river is in an official study status, unless the appropriate Federal agency with direct management responsibility for such river, has determined in writing that the proposed activity will not adversely affect the Wild and Scenic River designation or study status. Information on Wild and Scenic Rivers may be obtained from the appropriate Federal land management agency in the area (e.g., National Park Service, U.S. Forest Service, Bureau of Land Management, U.S. Fish and Wildlife Service).

16. Tribal Rights. No activity or its operation may impair reserved tribal rights, including, but not limited to, reserved water rights and treaty fishing and hunting rights.

17. Endangered Species. (a) No activity is authorized under any NWP which is likely to jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act (ESA), or which will destroy or adversely modify the critical habitat of such species. No activity is authorized under any NWP which "may affect" a listed species or critical habitat, unless Section 7 consultation addressing the effects of the proposed activity has been completed.

(b) Federal agencies should follow their own procedures for complying with the requirements of the ESA. Federal permittees must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements.

(c) Non-federal permittees shall notify the district engineer if any listed species or designated critical habitat might be affected or is in the vicinity of the project, or if the project is located in designated critical habitat, and shall not begin work on the activity until notified by the district engineer that the requirements of the ESA have been satisfied and that the activity is authorized. For activities that might affect Federally-listed endangered or threatened species or designated critical habitat, the pre-construction notification must include the name(s) of the endangered or threatened species that may be affected by the proposed work or that utilize the designated critical habitat that may be affected by the proposed work. The district engineer will determine whether the proposed activity "may affect" or will have "no effect" to listed species and designated critical habitat and will notify the non-Federal applicant of the Corps' determination within 45 days of receipt of a complete pre-construction notification. In cases where the non-Federal applicant has identified listed species or critical habitat that might be affected or is in the vicinity of the project, and has so notified the Corps, the applicant shall not begin work until the Corps has provided notification the proposed activities will have "no effect" on listed species or critical habitat, or until Section 7 consultation has been completed.

(d) As a result of formal or informal consultation with the FWS or NMFS the district engineer may add species-specific regional endangered species conditions to the NWPs.

(e) Authorization of an activity by a NWP does not authorize the "take" of a threatened or endangered species as defined under the ESA. In the absence of separate authorization (e.g., an ESA Section 10 Permit, a Biological Opinion with "incidental take" provisions, etc.) from the U.S. FWS or the NMFS, both lethal and non-lethal "takes" of protected species are in violation of the ESA. Information on the location of threatened and endangered species and their critical habitat can be obtained directly from the offices of the U.S. FWS and NMFS or their world wide Web pages at <http://www.fws.gov/> and <http://www.noaa.gov/fisheries.html> respectively.

18. Historic Properties. (a) In cases where the district engineer determines that the activity may affect properties listed, or eligible for listing, in the National Register of Historic Places, the activity is not authorized, until the requirements of Section 106 of the National Historic Preservation Act (NHPA) have been satisfied.

(b) Federal permittees should follow their own procedures for complying with the requirements of Section 106 of the National Historic Preservation Act. Federal permittees must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements.

(c) Non-federal permittees must submit a pre-construction notification to the district engineer if the authorized activity may have the potential to cause effects to any historic properties listed, determined to be eligible for listing on, or potentially eligible for listing on the National Register of Historic Places, including previously unidentified properties. For such activities, the pre-construction notification must state which historic properties may be affected by the proposed work or include a vicinity map indicating the location of the historic properties or the potential for the presence of historic properties. Assistance regarding information on the location of or potential for the presence of historic resources can be sought from the State Historic Preservation Officer or Tribal Historic Preservation Officer, as appropriate, and the National Register of Historic Places (see 33 CFR 330.4(g)). The district engineer shall make a reasonable and good faith effort to carry out appropriate identification efforts, which may include background research, consultation, oral history interviews, sample field investigation, and field survey. Based on the information submitted and these efforts, the district engineer shall determine whether the proposed activity has the potential to cause an effect on the historic properties. Where the non-Federal applicant has identified historic properties which the activity may have the potential to cause effects and so notified the Corps, the non-Federal applicant shall not begin the activity until notified by the district engineer either that the activity has no potential to cause effects or that consultation under Section 106 of the NHPA has been completed.

(d) The district engineer will notify the prospective permittee within 45 days of receipt of a complete pre-construction notification whether NHPA Section 106 consultation is required. Section 106 consultation is not required when the Corps determines that the activity does not have the potential to cause effects on historic properties (see 36 CFR §800.3(a)). If NHPA section 106

consultation is required and will occur, the district engineer will notify the non-Federal applicant that he or she cannot begin work until Section 106 consultation is completed.

(e) Prospective permittees should be aware that section 110k of the NHPA (16 U.S.C. 470h-2(k)) prevents the Corps from granting a permit or other assistance to an applicant who, with intent to avoid the requirements of Section 106 of the NHPA, has intentionally significantly adversely affected a historic property to which the permit would relate, or having legal power to prevent it, allowed such significant adverse effect to occur, unless the Corps, after consultation with the Advisory Council on Historic Preservation (ACHP), determines that circumstances justify granting such assistance despite the adverse effect created or permitted by the applicant. If circumstances justify granting the assistance, the Corps is required to notify the ACHP and provide documentation specifying the circumstances, explaining the degree of damage to the integrity of any historic properties affected, and proposed mitigation. This documentation must include any views obtained from the applicant, SHPO/THPO, appropriate Indian tribes if the undertaking occurs on or affects historic properties on tribal lands or affects properties of interest to those tribes, and other parties known to have a legitimate interest in the impacts to the permitted activity on historic properties.

19. Designated Critical Resource Waters. Critical resource waters include, NOAA-designated marine sanctuaries, National Estuarine Research Reserves, state natural heritage sites, and outstanding national resource waters or other waters officially designated by a state as having particular environmental or ecological significance and identified by the district engineer after notice and opportunity for public comment. The district engineer may also designate additional critical resource waters after notice and opportunity for comment.

(a) Discharges of dredged or fill material into waters of the United States are not authorized by NWP's 7, 12, 14, 16, 17, 21, 29, 31, 35, 39, 40, 42, 43, 44, 49, and 50 for any activity within, or directly affecting, critical resource waters, including wetlands adjacent to such waters.

(b) For NWP's 3, 8, 10, 13, 15, 18, 19, 22, 23, 25, 27, 28, 30, 33, 34, 36, 37, and 38, notification is required in accordance with general condition 27, for any activity proposed in the designated critical resource waters including wetlands adjacent to those waters. The district engineer may authorize activities under these NWP's only after it is determined that the impacts to the critical resource waters will be no more than minimal.

20. Mitigation. The district engineer will consider the following factors when determining appropriate and practicable mitigation necessary to ensure that adverse effects on the aquatic environment are minimal:

(a) The activity must be designed and constructed to avoid and minimize adverse effects, both temporary and permanent, to waters of the United States to the maximum extent practicable at the project site (i.e., on site).

(b) Mitigation in all its forms (avoiding, minimizing, rectifying, reducing, or compensating) will be required to the extent necessary to ensure that the adverse effects to the aquatic environment are minimal.

(c) Compensatory mitigation at a minimum one-for-one ratio will be required for all wetland losses that exceed 1/10 acre and require pre-construction notification, unless the district engineer determines in writing that some other form of mitigation would be more environmentally appropriate and provides a project-specific waiver of this requirement. For wetland losses of 1/10 acre or less that require pre-construction notification, the district engineer may determine on a case-by-case basis that compensatory mitigation is required to ensure that the activity results in minimal adverse effects on the aquatic environment. Since the likelihood of success is greater and the impacts to potentially valuable uplands are reduced, wetland restoration should be the first compensatory mitigation option considered.

(d) For losses of streams or other open waters that require pre-construction notification, the district engineer may require compensatory mitigation, such as stream restoration, to ensure that the activity results in minimal adverse effects on the aquatic environment.

(e) Compensatory mitigation will not be used to increase the acreage losses allowed by the acreage limits of the NWP's. For example, if an NWP has an acreage limit of 1/2 acre, it cannot be used to authorize any project resulting in the loss of greater than 1/2 acre of waters of the United States, even if compensatory mitigation is provided that replaces or restores some of the lost waters. However, compensatory mitigation can and should be used, as necessary, to ensure that a project already meeting the established acreage limits also satisfies the minimal impact requirement associated with the NWP's.

(f) Compensatory mitigation plans for projects in or near streams or other open waters will normally include a requirement for the establishment, maintenance, and legal protection (e.g., conservation easements) of riparian areas next to open waters. In some cases, riparian areas may be the only compensatory mitigation required. Riparian areas should consist of native species. The width of the required riparian area will address documented water quality or aquatic habitat loss concerns. Normally, the riparian area will be 25 to 50 feet wide on each side of the stream, but the district engineer may require slightly wider riparian areas to address documented water quality or habitat loss concerns. Where both wetlands and open waters exist on the project site, the district engineer will determine the appropriate compensatory mitigation (e.g., riparian areas and/or wetlands compensation) based on what is best for the aquatic environment on a watershed basis. In cases where riparian areas are determined to be the most appropriate form of compensatory mitigation, the district engineer may waive or reduce the requirement to provide wetland compensatory mitigation for wetland losses.

(g) Permittees may propose the use of mitigation banks, in-lieu fee arrangements or separate activity-specific compensatory mitigation. In all cases, the mitigation provisions will specify the party responsible for accomplishing and/or complying with the mitigation plan.

(h) Where certain functions and services of waters of the United States are permanently adversely affected, such as the conversion of a forested or scrub-shrub wetland to a herbaceous wetland in a permanently maintained utility line right-of-way, mitigation may be required to reduce the adverse effects of the project to the minimal level.

21. Water Quality. Where States and authorized Tribes, or EPA where applicable, have not previously certified compliance of an NWP with CWA Section 401, individual 401 Water Quality Certification must be obtained or waived (see 33 CFR 330.4(c)). The district engineer or State or Tribe may require additional water quality management measures to ensure that the authorized activity does not result in more than minimal degradation of water quality.

22. Coastal Zone Management. In coastal states where an NWP has not previously received a state coastal zone management consistency concurrence, an individual state coastal zone management consistency concurrence must be obtained, or a presumption of concurrence must occur (see 33 CFR 330.4(d)). The district engineer or a State may require additional measures to ensure that the authorized activity is consistent with state coastal zone management requirements.

23. Regional and Case-By-Case Conditions. The activity must comply with any regional conditions that may have been added by the Division Engineer (see 33 CFR 330.4(e)) and with any case specific conditions added by the Corps or by the state, Indian Tribe, or U.S. EPA in its section 401 Water Quality Certification, or by the state in its Coastal Zone Management Act consistency determination.

24. Use of Multiple Nationwide Permits. The use of more than one NWP for a single and complete project is prohibited, except when the acreage loss of waters of the United States authorized by the NWPs does not exceed the acreage limit of the NWP with the highest specified acreage limit. For example, if a road crossing over tidal waters is constructed under NWP 14, with associated bank stabilization authorized by NWP 13, the maximum acreage loss of waters of the United States for the total project cannot exceed 1/3-acre.

25. Transfer of Nationwide Permit Verifications. If the permittee sells the property associated with a nationwide permit verification, the permittee may transfer the nationwide permit verification to the new owner by submitting a letter to the appropriate Corps district office to validate the transfer. A copy of the nationwide permit verification must be attached to the letter, and the letter must contain the following statement and signature:
"When the structures or work authorized by this nationwide permit are still in existence at the time the property is transferred, the terms and conditions of this nationwide permit, including any special conditions, will continue to be binding on the new owner(s) of the property. To validate the transfer of this nationwide permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below."

(Transferee)

(Date)

26. Compliance Certification. Each permittee who received an NWP verification from the Corps must submit a signed certification regarding the completed work and any required mitigation. The certification form must be forwarded by the Corps with the NWP verification letter and will include:

(a) A statement that the authorized work was done in accordance with the NWP authorization, including any general or specific conditions;

(b) A statement that any required mitigation was completed in accordance with the permit conditions; and

(c) The signature of the permittee certifying the completion of the work and mitigation.

27. Pre-Construction Notification. (a) Timing. Where required by the terms of the NWP, the prospective permittee must notify the district engineer by submitting a pre-construction notification (PCN) as early as possible. The district engineer must determine if the PCN is complete within 30 calendar days of the date of receipt and, as a general rule, will request additional information necessary to make the PCN complete only once. However, if the prospective permittee does not provide all of the requested information, then the district engineer will notify the prospective permittee that the PCN is still incomplete and the PCN review process will not commence until all of the requested information has been received by the district engineer. The prospective permittee shall not begin the activity:

(1) Until notified in writing by the district engineer that the activity may proceed under the NWP with any special conditions imposed by the district or division engineer; or

(2) If 45 calendar days have passed from the district engineer's receipt of the complete PCN and the prospective permittee has not received written notice from the district or division engineer. However, if the permittee was required to notify the Corps pursuant to general condition 17 that listed species or critical habitat might be affected or in the vicinity of the project, or to notify the Corps pursuant to general condition 18 that the activity may have the potential to cause effects to historic properties, the permittee cannot begin the activity until receiving written notification from the Corps that is "no effect" on listed species or "no potential to cause effects" on historic properties, or that any consultation required under Section 7 of the Endangered Species Act (see 33 CFR 330.4(f)) and/or Section 106 of the National Historic Preservation (see 33 CFR 330.4(g)) is completed. Also, work cannot begin

under NWP 21, 49, or 50 until the permittee has received written approval from the Corps. If the proposed activity requires a written waiver to exceed specified limits of an NWP, the permittee cannot begin the activity until the district engineer issues the waiver. If the district or division engineer notifies the permittee in writing that an individual permit is required within 45 calendar days of receipt of a complete PCN, the permittee cannot begin the activity until an individual permit has been obtained. Subsequently, the permittee's right to proceed under the NWP may be modified, suspended, or revoked only in accordance with the procedure set forth in 33 CFR 330.5(d)(2).

(b) Contents of Pre-Construction Notification: The PCN must be in writing and include the following information:

(1) Name, address and telephone numbers of the prospective permittee;

(2) Location of the proposed project;

(3) A description of the proposed project; the project's purpose; direct and indirect adverse environmental effects the project would cause; any other NWP(s), regional general permit(s), or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity. The description should be sufficiently detailed to allow the district engineer to determine that the adverse effects of the project will be minimal and to determine the need for compensatory mitigation. Sketches should be provided when necessary to show that the activity complies with the terms of the NWP. (Sketches usually clarify the project and when provided result in a quicker decision.);

(4) The PCN must include a delineation of special aquatic sites and other waters of the United States on the project site. Wetland delineations must be prepared in accordance with the current method required by the Corps. The permittee may ask the Corps to delineate the special aquatic sites and other waters of the United States, but there may be a delay if the Corps does the delineation, especially if the project site is large or contains many waters of the United States. Furthermore, the 45 day period will not start until the delineation has been submitted to or completed by the Corps, where appropriate;

(5) If the proposed activity will result in the loss of greater than 1/10 acre of wetlands and a PCN is required, the prospective permittee must submit a statement describing how the mitigation requirement will be satisfied. As an alternative, the prospective permittee may submit a conceptual or detailed mitigation plan.

(6) If any listed species or designated critical habitat might be affected or is in the vicinity of the project, or if the project is located in designated critical habitat, for non-Federal applicants the PCN must include the name(s) of those endangered or threatened species that might be affected by the proposed work or utilize the designated critical habitat that may be affected by the proposed work. Federal applicants must provide documentation demonstrating compliance with the Endangered Species Act; and

(7) For an activity that may affect a historic property listed on, determined to be eligible for listing on, or potentially eligible for listing on, the National Register of Historic Places, for non-Federal applicants the PCN must state which historic property may be affected by the proposed work or include a vicinity map indicating the location of the historic property. Federal applicants must provide documentation demonstrating compliance with Section 106 of the National Historic Preservation Act.

(c) Form of Pre-Construction Notification: The standard individual permit application form (Form ENG 4345) may be used, but the completed application form must clearly indicate that it is a PCN and must include all of the information required in paragraphs (b)(1) through (7) of this general condition. A letter containing the required information may also be used.

(d) Agency Coordination: (1) The district engineer will consider any comments from Federal and state agencies concerning the proposed activity's compliance with the terms and conditions of the NWPs and the need for mitigation to reduce the project's adverse environmental effects to a minimal level.

(2) For all NWP 48 activities requiring pre-construction notification and for other NWP activities requiring pre-construction notification to the district engineer that result in the loss of greater than 1/2-acre of waters of the United States, the district engineer will immediately provide (e.g., via facsimile transmission, overnight mail, or other expeditious manner) a copy of the PCN to the appropriate Federal or state offices (U.S. FWS, state natural resource or water quality agency, EPA, State Historic Preservation Officer (SHPO) or Tribal Historic Preservation Office (THPO), and, if appropriate, the NMFS). With the exception of NWP 37, these agencies will then have 10 calendar days from the date the material is transmitted to telephone or fax the district engineer notice that they intend to provide substantive, site-specific comments. If so contacted by an agency, the district engineer will wait an additional 15 calendar days before making a decision on the pre-construction notification. The district engineer will fully consider agency comments received within the specified time frame, but will provide no response to the resource agency, except as provided below. The district engineer will indicate in the administrative record associated with each pre-construction notification that the resource agencies' concerns were considered. For NWP 37, the emergency watershed protection and rehabilitation activity may proceed immediately in cases where there is an unacceptable hazard to life or a significant loss of property or economic hardship will occur. The district engineer will consider any comments received to decide whether the NWP 37 authorization should be modified, suspended, or revoked in accordance with the procedures at 33 CFR 330.5.

(3) In cases of where the prospective permittee is not a Federal agency, the district engineer will provide a response to NMFS within 30 calendar days of receipt of any Essential Fish Habitat conservation recommendations, as required by Section 305(b)(4)(B) of the Magnuson-Stevens Fishery Conservation and Management Act.

(4) Applicants are encouraged to provide the Corps multiple copies of pre-construction notifications to expedite agency coordination.

(5) For NWP 48 activities that require reporting, the district engineer will provide a copy of each report within 10 calendar days of receipt to the appropriate regional office of the NMFS.

(e) District Engineer's Decision: In reviewing the PCN for the proposed activity, the district engineer will determine whether the activity authorized by the NWP will result in more than minimal individual or cumulative adverse environmental effects or may be contrary to the public interest. If the proposed activity requires a PCN and will result in a loss of greater than 1/10 acre of wetlands, the prospective permittee should submit a mitigation proposal with the PCN. Applicants may also propose compensatory

mitigation for projects with smaller impacts. The district engineer will consider any proposed compensatory mitigation the applicant has included in the proposal in determining whether the net adverse environmental effects to the aquatic environment of the proposed work are minimal. The compensatory mitigation proposal may be either conceptual or detailed. If the district engineer determines that the activity complies with the terms and conditions of the NWP and that the adverse effects on the aquatic environment are minimal, after considering mitigation, the district engineer will notify the permittee and include any conditions the district engineer deems necessary. The district engineer must approve any compensatory mitigation proposal before the permittee commences work. If the prospective permittee elects to submit a compensatory mitigation plan with the PCN, the district engineer will expeditiously review the proposed compensatory mitigation plan. The district engineer must review the plan within 45 calendar days of receiving a complete PCN and determine whether the proposed mitigation would ensure no more than minimal adverse effects on the aquatic environment. If the net adverse effects of the project on the aquatic environment (after consideration of the compensatory mitigation proposal) are determined by the district engineer to be minimal, the district engineer will provide a timely written response to the applicant. The response will state that the project can proceed under the terms and conditions of the NWP.

If the district engineer determines that the adverse effects of the proposed work are more than minimal, then the district engineer will notify the applicant either: (1) That the project does not qualify for authorization under the NWP and instruct the applicant on the procedures to seek authorization under an individual permit; (2) that the project is authorized under the NWP subject to the applicant's submission of a mitigation plan that would reduce the adverse effects on the aquatic environment to the minimal level; or (3) that the project is authorized under the NWP with specific modifications or conditions. Where the district engineer determines that mitigation is required to ensure no more than minimal adverse effects occur to the aquatic environment, the activity will be authorized within the 45-day PCN period. The authorization will include the necessary conceptual or specific mitigation or a requirement that the applicant submit a mitigation plan that would reduce the adverse effects on the aquatic environment to the minimal level. When mitigation is required, no work in waters of the United States may occur until the district engineer has approved a specific mitigation plan.

28. Single and Complete Project. The activity must be a single and complete project. The same NWP cannot be used more than once for the same single and complete project.

N O T I C E

DIVISION OF WATER (WATER QUALITY CERTIFICATION)

PROJECT: Harrison County- US 27 Cynthiana Bypass
KYTC Item # 6-119.20

The Division of Water has previously approved the Section 401 activities for this project by issuance of a Water Quality Certification for an Individual Permit Nationwide Permit #14, “Linear Transportation Projects”. In order for this authorization to be valid, the attached conditions must be followed. The contractor shall post a copy of this Water Quality Certification in a conspicuous location at the project site for the duration of construction and comply with the general conditions as required.

To more readily expedite construction, the contractor may elect to alter the design or perform the work in a manner different from what was originally proposed and specified. Prior to commencing such alternative work, the contractor shall obtain **written** permission from the Division of Construction and the appropriate permit agency. A copy of any request to alter this proposal and subsequent responses shall be forwarded to the Division of Environmental Analysis, DA Permit Coordinator, for office records and for informational purposes.



STEVEN L. BESHEAR
GOVERNOR

LEONARD K. PETERS
SECRETARY

ENERGY AND ENVIRONMENT CABINET

DEPARTMENT FOR ENVIRONMENTAL PROTECTION
DIVISION OF WATER
200 FAIR OAKS LANE, 4TH FLOOR
FRANKFORT, KENTUCKY 40601
www.kentucky.gov

March 24, 2011

Mr. David Waldner, KYTC DEA Director
200 Mero Street, 4th Floor
Frankfort, KY 40622

Re: **WQC #2007-0037-1RENEWAL**
US 27 Cynthiana Bypass (KYTC)
KYTC Item No. 06-0119.20 &.50
AI No.: 77237
Activity ID: APE20110001
Harrison County, Kentucky

Dear Mr. Waldner:

Pursuant to Section 401 of the Clean Water Act (CWA), the Commonwealth of Kentucky certifies it has reasonable assurances that applicable water quality standards under Kentucky Administrative Regulations Title 401, Chapter 10, established pursuant to Sections 301, 302, 303, 304, 306, and 307 of the CWA, will not be violated by the above referenced project provided that the U.S. Army Corps of Engineers authorizes the activity under 33 CFR part 330, and the attached conditions are met.

All future correspondence on this project must reference **AI No. 77237**. **The attached document is your official Water Quality Certification; please read it carefully.** If you should have any questions concerning the conditions of this water quality certification, please contact Adam Jackson of my staff by calling (502) 564-3410.

Sincerely,

A handwritten signature in black ink, appearing to read "Adam Jackson".

Adam Jackson, WQC Project Manger
Water Quality Certification Section
Kentucky Division of Water

AG:AJ:aj
Attachment
cc: John Purdy, KYTC DEA



MAR 28 AM 8:56

ERNIE FLETCHER
GOVERNOR

ENVIRONMENTAL AND PUBLIC PROTECTION CABINET

DEPARTMENT FOR ENVIRONMENTAL PROTECTION

DIVISION OF WATER

14 REILLY ROAD

FRANKFORT, KENTUCKY 40601

www.kentucky.gov

TERESA J. HILL
SECRETARY

March 22, 2007

Mr. David Waldner
Division of Environmental Analysis
Kentucky Transportation Cabinet
200 Mero Street
Frankfort, KY 40622

Re: Water Quality Certification #2007-0037-1
US 27 Cynthiana Bypass (KYTC)
USACE Public Notice No.: 200501875
AI No.: 77237, Activity ID: APE20050001
Tributary to Grays Run Creek
Harrison County, Kentucky

Dear Mr. Waldner:

Pursuant to Section 401 of the Clean Water Act (CWA), the Commonwealth of Kentucky certifies it has reasonable assurances that applicable water quality standards under Kentucky Administrative Regulations Title 401, Chapter 5, established pursuant to Sections 301, 302, 303, 304, 306, and 307 of the CWA, will not be violated by the above referenced project provided that the U.S. Army Corps of Engineers authorizes the activity under 33 CFR part 330, and the attached conditions are met.

All future correspondence on this project must reference AI No. 77237. **The attached document is your official Water Quality Certification, please read it carefully.** If you should have any questions concerning the conditions of this water quality certification, please contact Mr. Alan Grant of my staff by calling (502) 564-3410.

Sincerely,

A handwritten signature in cursive script that reads "Jennifer Garland".

Jennifer Garland, Supervisor
Water Quality Certification Section
Division of Water

JG:AG:tw
Attachment

cc: Lee Ann Devine, USACE: Louisville
Ron Mikulak, USEPA: Atlanta
Lee Andrews, USFWS: Frankfort
Mike Hardin, KDFWR: Frankfort
Lajuanda Haight-Maybriar, Licking River Basin Coordinator

KTC Water Quality Certification

US 27 Cynthiana Bypass (KYTC)

Facility Requirements

Permit Number: WQC #2007-0037-11

Activity ID No.: APPE20110001

ACTV0000000001 (US-27 Cynthiana Bypass) Placement of several culverts along U.T Grays Run and S. Fork Licking River:

Submittal/Action Requirements:

Condition No.	Condition
S-1	The Kentucky Transportation Cabinet shall submit notification: Due prior to construction commencement. This notification shall contain proof-of-payment to the Kentucky Department of Fish and Wildlife Stream Restoration Fund for an amount not less than \$279,300.00. [Clean Water Act]

Narrative Requirements:

Condition No.	Condition
T-1	The work approved by this certification shall be limited to: -the installation of 12 culverts along US 27 Cynthiana By-Pass in Harrison Co. (Lat 38-22-02, Long 84-19-16); -a cumulative impact of 4926 linear feet - unnamed tributary of Grays Creek (4069 ft) and an unnamed tributary of South Fork Licking River (857 ft). [Clean Water Act]
T-2	The Kentucky Division of Water requires mitigation for stream loss associated with the impacts at site S01p(a), S03i, S04i, and site S01 p(b). To mitigate these impacts, KTC has chosen to make an in-lieu fee payment to the Kentucky Department of Fish and Wildlife Resources Stream Restoration Fund. A payment of no less than \$279,300.00 is required to mitigate these impacts. The USACE may require additional mitigation. [Clean Water Act]
T-3	Any additional requests to renew or revise this previously, and now currently authorized project, will require the Kentucky Division of Water's Water Quality Certification Section to review the proposed impacts and assess a required mitigation amount using mitigation assessment techniques current to the time of the request. [Clean Water Act]
T-4	All work performed under this certification shall adhere to the design and specifications set forth in the "Summary of Section 404 Impacts, Harrison County Cynthiana Bypass US 27, Item 6-119.02, dated November 21, 2005. Subsequent to this date, KTC, has decided to make an In-Lieu Fee payment to the Kentucky Department of Fish and Wildlife Stream Restoration Fund. The change from stream restoration to in-lieu payment has been noted. [Clean Water Act]
T-5	The Kentucky Transportation Cabinet is responsible for preventing degradation of waters of the Commonwealth from soil erosion. An erosion and sedimentation control plan must be designed, implemented, and maintained in effective operating condition at all times during construction. [Clean Water Act]
T-6	The Division of Water reserves the right to modify or revoke this certification should it be determined that the activity is in noncompliance with any condition set forth in this certification. [Clean Water Act]

KTC Water Quality Certification
US 27 Cynthiana Bypass (KYTC)
Facility Requirements
Permit Number: WQC #2007-0037-11
Activity ID No.: APH20110001

ACTV0000000001 (continued):

Narrative Requirements:

Condition No.	Condition
F-7	If construction does not commence within two years of the date of this letter, this certification will become void. A letter requesting a renewal should be submitted. [Clean Water Act]
F-8	Other permits may be required from the Division of Water for this project. If this project takes place within the floodplain, a permit may be required from the Water Resources Branch. The contact person is Jeff Pratt. If this project will disturb one acre or more of land, or is part of a larger common plan of development or sale that will ultimately disturb one acre or more of land, a KPDES stormwater permit shall be required from the KPDES Branch. The contact person is Allen Ingram. Both can be reached at 502-564-3410. [Clean Water Act]

GENERAL CONDITIONS FOR WATER QUALITY CERTIFICATION

1. Measures shall be taken to prevent or control spills of fuels, lubricants, or other toxic materials used in construction from entering the watercourse.
2. All dredged material shall be removed to an upland location and/or graded on adjacent areas (so long as such areas are not regulated wetlands), to obtain original streamside elevations, i.e. overbank flooding shall not be artificially obstructed.
3. In areas not riprapped or other wise stabilized, revegetation of stream banks and riparian zones shall occur concurrently with project progression. At a minimum, revegetation will approximate pre-disturbance conditions.
4. To the maximum extent practicable, all instream work under this certification shall be performed during low flow.
5. Heavy equipment, e.g. bulldozers, backhoes, draglines, etc., if required for this project, should not be used or operated within the stream channel. In those instances where such instream work is unavoidable, then it shall be performed in such a manner and duration as to minimize resuspension of sediments and disturbance to substrates and bank or riparian vegetation.
6. Any fill or riprap including refuse fill, shall be of such composition that it will not adversely affect the biological, chemical, or physical properties of the receiving waters and/or cause violations of water quality standards. If riprap is utilized, it is to be of such weight and size that bank stress or slump conditions will not be created because of its placement.
7. If there are water supply intakes located downstream that may be affected by increased turbidity and suspended solids, the permittee shall notify the operator when work will be done.
8. Removal of existing riparian vegetation should be restricted to the minimum necessary for project construction.
9. Should evidence of stream pollution or jurisdictional wetland impairment and/or violations of water quality standards occur as a result of this activity (either from a spill or other forms of water pollution), the Kentucky Division of Water shall be notified immediately by calling 800/564-2380.



STEPHEN L.
BESHEAR
GOVERNOR

ENERGY AND ENVIRONMENT CABINET
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DIVISION OF WATER
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www.kentucky.gov

LEONARD K. PETERS
SECRETARY

ATTENTION APPLICANT

If your project involves one or more of the following activities, you may need more than one permit from the Kentucky Division of Water.

***building in a floodplain *road culvert in a stream**

***streambank stabilization *stream cleanout**

***utility line crossing a stream**

***construction sites an acre or more**

- **If the project will disturb one acre or more of land, or is part of a larger common plan of development or sale that will ultimately disturb one acre or more of land, a Kentucky Pollution Discharge Elimination System (KPDES) stormwater permit shall be required from the Operational Permits Section. This permit requires the creation of an erosion control plan.**

Contact Allen Ingram.

- **Projects that involve filling in the floodplain will require a stream construction permit from the Floodplain Management Section.**

Contact Barry Elmore.

- **Projects that involve work IN a stream, such as bank stabilization, road culverts, utility line crossings, and stream alteration will require a stream construction permit and a Water Quality Certification from the Water Quality Certification Section.**

Contact Alan Grant.

All three contacts listed above can be reached at 502/564-3410. A complete listing of environmental programs administered by the Kentucky Department for Environmental Protection is available from Pete Goodman by calling 502/564-3410.



Kentucky Transportation Cabinet

Highway District 6

and

_____ **(2), Construction**

**Kentucky Pollutant Discharge Elimination System
Permit KYR10**

Best Management Practices (BMP) Plan

Groundwater Protection Plan

For Highway Construction Activities

For

US 27 Cynthiana By-Pass (Section 1)

Contract ID (2)

Six Year Plan 6-119.20

Revised
1-28-08

KYTC BMP Plan for Contract ID ##### (6-119.20)

Project Information

Note – (1) = Design (2) = Construction (3) = Contractor

1. Owner – Kentucky Transportation Cabinet, District 6
2. Resident Engineer: (2)
3. Contractor Name: (2)
 - Address: (2)
 - Phone number: (2)
 - Contact: (2)
 - Responsible Person: (3)
4. Contract ID Number: (2)
5. Route (Address): US 27 Cynthiana By-Pass (Section 1), New Route from south US 27 (south of US 62) to KY 356 (just north of)
6. Latitude/Longitude (project mid-point) N38/22/37, W84/19/31
7. County (project mid-point): Harrison
8. Project start date (date work will begin): (2)
9. Projected completion date: (2)

KYTC BMP Plan for Contract ID ##### (6-119.20)

1.0 SITE DESCRIPTION.

- 1) Nature of construction activity (from letting project description): Paris-Covington: West US 27 Cynthiana By-Pass Section 1 from south US 27 to KY 356. Major structures includes 3-span, 323-foot long PCIB bridge over Grays Run; (3) culverts in the following sizes: 10' x 5', 10' x 6', 12' x 7'; and an extension for a double barrel 10' x 4' culvert. Other various culverts are also provided.
- 2) Order of major soil disturbing activities: (2) and (3)
- 3) Projected volume of material to be moved: 891,050 cy
- 4) Estimate of total project area (acres): 119 ac
- 5) Estimate of area to be disturbed (acres): 119 ac
- 6) Post construction runoff coefficient is 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: Reference Soil Data sheets included in Roadway Plan set, Sheets R110 – R118. (2)
- 8) Data describing existing discharge water quality (if any): (2)
- 9) Receiving water name: Grays Run and Unnamed Tributaries which all drain to South Fork of the Licking River.
- 10) TMDLs and Pollutants of Concern in Receiving Waters: N/A per Final 2008 Integrated Report to Congress on the Condition of Water Resources in Kentucky (May 2008). Per this document, the Kentucky Division of Water (KDOW) monitored the tributaries to the South Fork of the Licking River during 2007 and no TMDL for sedimentation/siltation was established.
- 11) Site Map. Project layout sheet plus the erosion control sheets in the project plans that depict Disturbed Drainage Areas (DDAs) and related information. These sheets depict the existing project conditions with areas delineated by DDA (drainage area bounded by watershed breaks and right of way limits), the storm water discharge locations (either as a point discharge or as overland flow) and the areas that drain to each discharge point. These plans define the limits of areas to be disturbed and the location of control measures. Controls will be either site specific as designated by the designer or will be annotated by the Contractor and Resident Engineer before disturbance commences. The project layout sheet shows the surface waters and wetlands.
- 12) Potential sources of pollutants. The primary source of pollutants is solids that are mobilized during storm events. Other sources of pollutants include oil/fuel/grease from servicing and operating construction equipment, concrete washout water, sanitary wastes and trash/debris. (3)

2.0 SEDIMENT AND EROSION CONTROL MEASURES.

KYTC BMP Plan for Contract ID ##### (6-119.20)

2.1 Erosion Control Sheets. 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.

2.2 Annotations. 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 BMPs 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 BMPs in place before being disturbed.

2.3 Disturbed Drainage Areas. As DDAs are prepared for construction, the following will be addressed for the project as a whole or for each DDA as appropriate:

- A) 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.
- B) Sources.** 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.
- C) Clearing and Grubbing.** The following BMPs will be considered and used where appropriate.
 - 1) Leaving areas undisturbed when possible.
 - 2) Silt Basins to provide silt volume for large areas.
 - 3) Silt Traps Type A for small areas.
 - 4) Silt Traps Type C in front of existing and drop inlets which are to be saved.
 - 5) Diversion ditches to catch sheet runoff and carry it to basins or traps or to divert it around areas to be disturbed.
 - 6) Brush and/or other barriers to slow and/or divert runoff.

KYTC BMP Plan for Contract ID ##### (6-119.20)

- 7) Silt fences to catch sheet runoff on short slopes. For longer slopes, multiple rows of silt fence may be considered.
- 8) Temporary Mulch for areas which are not feasible for the fore mentioned types of protections.
- 9) Non-standard or innovative methods.

D) Cut and Fill and Placement of Drainage Structures. The BMP Plan will be modified to show additional BMPs such as:

- 1) Silt Traps Type B in ditches and/or drainways as they are completed.
- 2) Silt Traps Type C in front of pipes after they are placed.
- 3) Channel Lining
- 4) Erosion Control Blanket
- 5) Temporary Mulch and/or seeding for areas where construction activities will be ceased for 21 days or more.
- 6) Non-standard or innovative methods.

E) Profile and X-Section in Place. The BMP Plan will be modified to show elimination of BMPs which had to be removed and the addition of new BMPs as the roadway was shaped. Probable changes include:

- 1) 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.
- 2) Additional Silt Traps Type B and Type C to be placed as final drainage patterns are put in place.
- 3) Additional Channel Lining and/or Erosion Control Blanket.
- 4) Temporary Mulch for areas where Permanent Seeding and Protection cannot be done within 21 days.
- 5) Special BMPs such as Karst Policy.

F) Finish Work (Paving, Seeding, Protect, etc.). A final BMP Plan will result from modifications during this phase of construction. Probable changes include:

- 1) Removal of Silt Traps Type B from ditches and drainways if they are protected with other BMPs which are sufficient to control erosion, i.e. Erosion Control Blanket or Permanent Seeding and Protection on moderate grades.
- 2) Permanent Seeding and Protection.
- 3) Placing Sod.
- 4) Planting trees and/or shrubs where they are included in the project.

G) Post Construction. BMPs including Storm Water Management Devices such as velocity dissipation devices and Karst policy BMPs to be installed during construction to control the pollutants in storm water discharges that will occur after construction has been completed are: Reference Roadway Plan set and Standard Specifications for Road and Bridge Construction.

2.4 Good Housekeeping. The following good housekeeping practices will be followed onsite during the construction project.

KYTC BMP Plan for Contract ID ##### (6-119.20)

- 1) An effort will be made to store only enough product required to do the job.
- 2) 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.
- 3) Products will be kept in their original containers with the original manufacturer's label.
- 4) Substances will not be mixed with one another unless recommended by the manufacturer.
- 5) Whenever possible, all of the product will be used up before disposing of the container.
- 6) Manufacturers' recommendations for proper use and disposal will be followed
- 7) The site Contractor will inspect daily to ensure proper use and disposal of materials onsite.

2.5 Hazardous Products. These practices will be used to reduce the risks associated with any and all hazardous materials.

- 1) Products will be kept in original containers unless they are not re-sealable.
- 2) Original labels and material safety data sheets (MSDS) will be reviewed and retained
- 3) Contractor will follow procedures recommended by the manufacturer when handling hazardous materials.
- 4) If surplus product must be disposed of, manufacturers' or state/local recommended methods for proper disposal will be followed.

2.6 The following product-specific practices will be followed onsite:

- 1) **Petroleum Products.** Vehicles and equipment that are fueled and maintained on site will be monitored for leaks, and receive regular preventative maintenance to reduce the chance of leakage. Petroleum products onsite will be stored in tightly sealed containers, which are clearly labeled and will be protected from exposure to weather.

The Contractor shall prepare an Oil Pollution Spill Prevention Control and Countermeasure plan when the project that involves the storage of petroleum products in 55 gallon or larger containers with a total combined storage capacity of 1,320 gallons. This is a requirement of 40 CFR 112.

This project (will / will not) (3) have over 1,320 gallons of petroleum products with a total capacity, sum of all containers 55 gallon capacity and larger.

- 2) **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.
- 3) **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.

KYTC BMP Plan for Contract ID ##### (6-119.20)

- 4) **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
- 5) **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:
 - a) 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.
 - b) 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.
 - c) All spills will be cleaned up immediately after discovery.
 - d) The spill area will be kept well ventilated and personnel will wear appropriate protective clothing to prevent injury from contact with a hazardous substance.
 - e) Spills of toxic or hazardous material will be reported to the appropriate state/local agency as required by KRS 224 and applicable federal law.
 - f) The spill prevention plan will be adjusted as needed to prevent spills from reoccurring and improve spill response and cleanup.
 - g) Spills of products will be cleaned up promptly. Wastes from spill clean up will be disposed in accordance with appropriate regulations.

3.0 OTHER CONTROL MEASURES.

- 1) **Solid Materials.** 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

KYTC BMP Plan for Contract ID ##### (6-119.20)

Resident Engineer if there are any hazardous wastes being generated at the project site and how these wastes are being managed. Site personnel will be instructed with regard to proper storage and handling of hazardous wastes when required. The Transportation Cabinet will file for generator, registration when appropriate, with the Division of Waste Management and advise the Contractor regarding waste management requirements.

- 4) Spill Prevention. The following material management practices will be used to reduce the risk of spills or other exposure of materials and substances to the weather and/or runoff.

4.0 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.

5.0 MAINTENANCE. 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: N/A – Boone County Public Works to maintain detention facilities constructed as part of this project.

6.0 INSPECTIONS. Inspection and maintenance practices that will be used to maintain erosion and sediment controls:

- 1) All erosion prevention and sediment control measures will be inspected by the Contractor at least once each week and following any rain of one-half inch or more.
- 2) Inspections will be conducted by individuals that have received KYTC Grade Level II training or other qualification as prescribed by the cabinet that includes instruction concerning sediment and erosion control.
- 3) Inspection reports will be written, signed, dated, and kept on file.
- 4) Areas at final grade will be seeded and mulched within 14 days.

KYTC BMP Plan for Contract ID ##### (6-119.20)

- 5) 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.
- 6) All measures will be maintained in good working order; if a repair is necessary, it will be initiated within 24 hours of being reported and completed within 5 calendar days.
- 7) Built-up sediment will be removed from behind the silt fence before it has reached halfway up the height of the fence.
- 8) Silt fences will be inspected for bypassing, overtopping, undercutting, depth of sediment, tears, and to ensure attachment to secure posts.
- 9) 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.
- 10) 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.
- 11) 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.
- 12) 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.

7.0 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:

- 1) Water from water line flushings.
- 2) Water from cleaning concrete trucks and equipment.
- 3) Pavement wash waters (where no spills or leaks of toxic or hazardous materials have occurred).
- 4) 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.

8.0 GROUNDWATER PROTECTION PLAN.

This plan serves as the groundwater protection plan as required by 401 KAR 5:037.

Contractor's statement: (3)

KYTC BMP Plan for Contract ID ##### (6-119.20)

The following activities, as enumerated by 401 KAR 5:037 Section 2. (2) requiring the preparation and implementation of a groundwater protection plan, will or may be conducted as part of this construction project:

_____ (e) Land treatment or land disposal of a pollutant;

_____ (f) Storing, treating, disposing, or related handling of hazardous waste, solid waste or special waste, or special waste in landfills, incinerators, surface impoundments, 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);

_____ (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;

_____ (j) Storing or related handling of road oils, dust suppressants, or deicing agents at a central location;

_____ (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);

_____ (m) Installation, construction, operation, or abandonment of wells, bore holes, or core holes, (this does not include bore holes for the purpose of explosive demolition);

Or, check the following only if there are no qualifying activities

_____ There are no activities for this project as listed in 401 KAR 5:037 Section 2 that require the preparation and implementation of a groundwater protection plan.

The Contractor is responsible for the preparation of a plan that addresses the 401 KAR 5:037 Section 3. (3) Elements of site specific groundwater protection plan:

- (a) General information about this project is covered in the Project information;
- (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.

KYTC BMP Plan for Contract ID ##### (6-119.20)

- (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.)

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.

Contractor and Resident Engineer Certification:

(3)
 Signed _____ Title _____ , _____
Type or Print Name¹ Signature

(2)
 Signed _____ Title _____ , _____
Type or Print Name² Signature

1. *Contractor's Note: to be signed by a person who is the owner, a responsible corporate officer, a general partner or the proprietor or a person designated to have the authority to sign reports by such a person in accordance with 401 KAR 5:060 Section 9. This delegation shall be in writing to: Manager, KPDES Branch, Division of Water, 14 Reilly Road, Frankfort Kentucky 40601. Reference the Contract ID number and KPDES number when one has been issued.*

2. *KYTC's Note: to be signed by the Chief District Engineer or a person designated to have the authority to sign reports by such a person (usually the Resident Engineer) in accordance with 401 KAR 5:060 Section 9. This delegation shall be in writing to: Manager, KPDES Branch, Division of Water, 14 Reilly Road, Frankfort Kentucky 40601 Reference the Contract ID number and KPDES number when one has been issued.*

KYTC BMP Plan for Contract ID ##### (6-119.20)

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:

Sub-Contractor

Name:

Address:

Phone:

The part of BMP plan this Sub-Contractor 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 _____ , _____
Type or Print Name *Signature*

- 1. Sub-Contractor's Note: To be signed by a person who is the owner, a responsible corporate officer, a general partner or the proprietor or a person designated to have the authority to sign reports by such a person in accordance with 401 KAR 5:060 Section 9. This delegation shall be in writing to: Manager, KPDES Branch, Division of Water, 14 Reilly Road, Frankfort Kentucky 40601. Reference the Contract ID number and KPDES number when one has been issued.*

EXHIBIT # 2

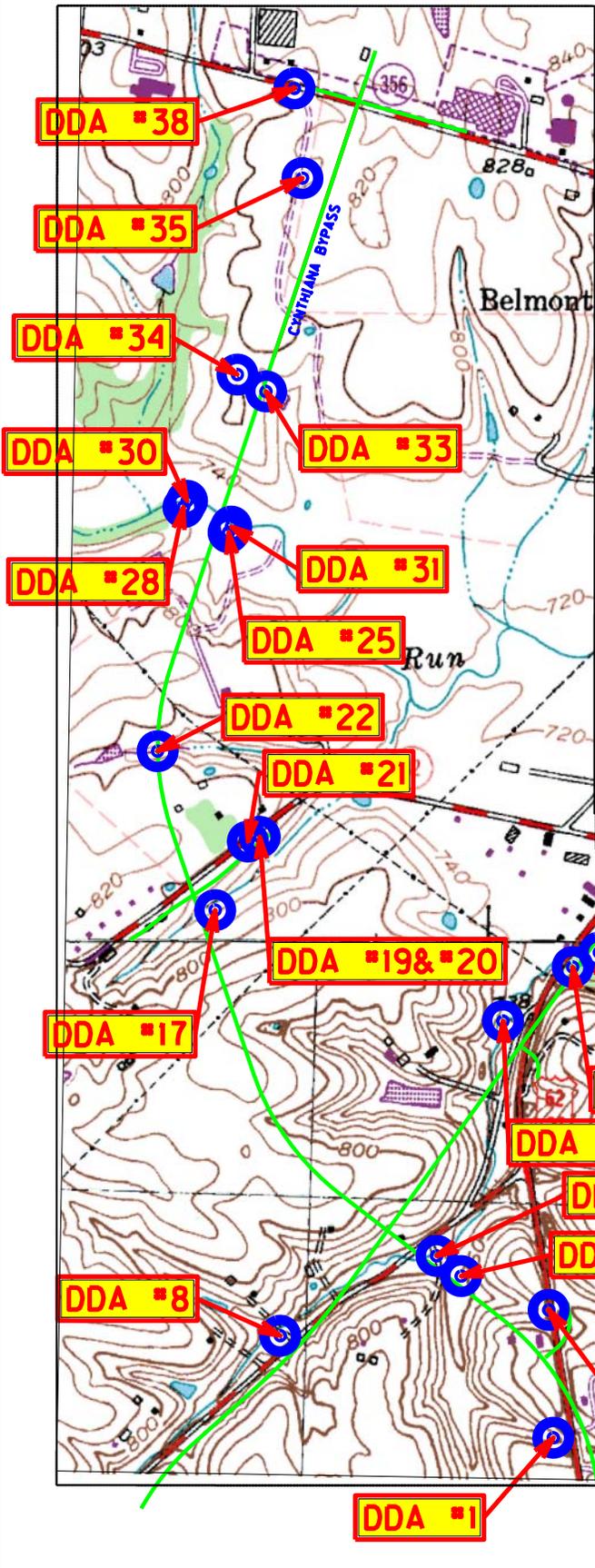
PCN # xxxxxxxx
US 27 Cynthiana By-Pass (Section 1) from US 27 to KY 356
6-119.20

KPDES NOI for Stormwater Discharges Associated with Construction Activity Under the KPDES
General Permit

Transaction ID:

30dd97e1-f1c6-4985-a633-859721024d52

SCALE: 1" = 4500'



DISCHARGE POINT	LATITUDE	LONGITUDE
DDA #1	38° 21'51.27849"	84° 18'53.31810"
DDA #3	38° 22'01.28144"	84° 18'53.79815"
DDA #5& #6	38° 22'03.91674"	84° 19'02.49036"
DDA #7	38° 22'05.50007"	84° 19'04.93569"
DDA #8	38° 21'59.23355"	84° 19'20.44525"
DDA #11& #12	38° 22'23.88005"	84° 18'58.36877"
DDA #13& #15	38° 22'28.11716"	84° 18'51.45447"
DDA #14	38° 22'29.25237"	84° 18'48.80433"
DDA #17	38° 22'18.06834"	84° 19'26.96200"
DDA #19& #20	38° 22'38.26821"	84° 19'22.54258"
DDA #21	38° 22'37.90270"	84° 19'23.73044"
DDA #22	38° 22'44.96143"	84° 19'32.70872"
DDA #25	38° 23'02.09466"	84° 19'25.68598"
DDA #28	38° 23'04.05723"	84° 19'30.16948"
DDA #30	38° 23'04.55974"	84° 19'29.81885"
DDA #31	38° 23'02.54195"	84° 19'25.41352"
DDA #33	38° 23'13.12509"	84° 19'21.98658"
DDA #34	38° 23'14.44272"	84° 19'24.83017"
DDA #35	38° 23'29.81869"	84° 19'18.39008"
DDA #38	38° 23'36.84171"	84° 19'19.20369"

DATE: ***** FILE NAME: ***** USER: *****

<u>Item No.</u>	6-119.02	<u>Project Mgr.</u>	CAROL CALLAN-RAMLER				
<u>CAP #</u>	<u>Date of Promise</u>	<u>Promise made to:</u>	<u>Location of Promise</u>	<u>County</u>	HARRISON	<u>Route</u>	US-27
1	01-NOV-03	Carol Callan-Ramler	Parcel 50				
<u>CAP Description</u> PER CONSENT RELEASE: IMPROVE NORTH DRIVEWAY. 40' WIDE AT THROAT, 60' LONG FROM EX. E/P. TYPICAL SECTION SAME AS OTHER ENTRANCES: 1-1/4" SURF. ASPH., 2" BASE ASPH., 4' DGA							
2	23-AUG-05	Carol Callan-Ramler	Parcel 50				
<u>CAP Description</u> PARCEL 50: IN ADDITION TO CAP #1: "IN ADDITION, AT A COST OF \$4,200.00, TO BE DEDUCTED FROM THE PROCEEDS OF AN AGREEMENT FOR RIGHT OF WAY, THE DEPARTMENT WILL EXTEND THE DRIVEWAY ALONG THE NORTH WEST PROPERTY LINE FOR A DISTANCE OF APPROXIMATELY 275 FEET TO THE BUILDING, WITH A WIDTH OF 20 FEET. THE MATERIAL MAKEUP OF THIS SECTION OF DRIVEWAY SHALL BE 1.25-INCH SURFACE ASPHALT AND 2-INCH BASE ASPHALT." NO DGA IS SPECIFIED AS THE PROPERTY OWNER FEELS THAT THE PRESENT GRAVEL PARKING WILL SERVE AS AN ADEQUATE BASE. ALSO: SLIGHT CORRECTION TO CAP #1: IT SHOULD READ 4 INCHES DGA, NOT 4 FEET.							
3	12-APR-11	Carol Callan-Ramler	Parcel 24				
<u>CAP Description</u> INGRESS AND EGRESS DURING CONSTRUCTION SHALL BE MAINTAINED.							
4	12-APR-11	Carol Callan-Ramler	Parcel 26				
<u>CAP Description</u> ENTRANCE DRIVE CATTLE CROSSING IS NOT TO BE DISTURBED.							
5	12-APR-11	Carol Callan-Ramler	Parcel 28				
<u>CAP Description</u> ENTRANCE TO BE REPLACED IN ASPHALT.							
6	12-APR-11	Carol Callan-Ramler	Parcel 29				
<u>CAP Description</u> ENTRANCE TO BE REPLACED IN ASPHALT, 12' WIDE.							
7	12-APR-11	Carol Callan-Ramler	Parcel 32				
<u>CAP Description</u> CABINET WILL CONSTRUCT FENCING UNDER BRIDGE TO ALLOW PROPERTY OWNER TO ACCESS THEIR PROPERTY ON BOTH SIDES VIA THE R/W UNDER THE BRIDGE AND CONTAIN LIVESTOCK.							

PART II
SPECIFICATIONS AND STANDARD DRAWINGS

SPECIFICATIONS REFERENCE

Any reference in the plans or proposal to the *Standard Specifications for Road and Bridge Construction, Edition of 2004*, and *Standard Drawings, Edition of 2000* are superseded by *Standard Specifications for Road and Bridge Construction, Edition of 2008* and *Standard Drawings, Edition of 2003 with the 2008 Revision*.

**Supplemental Specifications to The Standard Specifications
for Road and Bridge Construction, 2008 Edition**
(Effective with the March 18, 2011 Letting)

SUBSECTION: REVISION:	101.02 Abbreviations. Insert the following abbreviation and text into the section: KEPSC Kentucky Erosion Prevention and Sediment Control
SUBSECTION: REVISION:	101.03 Definitions. Replace the definition for Specifications – <i>Special Provisions</i> with the following: Additions and revisions to the Standard and Supplemental Specifications covering conditions peculiar to an individual project.
SUBSECTION: REVISION:	102.03 Contents of the Bid Proposal Form. Replace the first sentence of the first paragraph with the following: The Bid Proposal form will be available on the Department internet website (http://transportation.ky.gov/contract/). Delete the second paragraph. Delete the last paragraph.
SUBSECTION: REVISION:	102.04 Issuance of Bid Proposal Form. Replace Heading with the following: 102.04 Bidder Registration. Replace the first sentence of the first paragraph with the following: The Department reserves the right to disqualify or refuse to place a bidder on the eligible bidder's list for a project for any of the following reasons: Replace the last sentence of the subsection with the following: The Department will resume placing the bidder on the eligible bidder's list for projects after the bidder improves his operations to the satisfaction of the State Highway Engineer.
SUBSECTION: REVISION:	102.06 Examination of Plans, Specifications, Special Provisions, Special Notes, and Site of Work. Replace the first paragraph with the following: Examine the site of the proposed work, the Bid Proposal, Plans, specifications, contract forms, and bulletins and addendums posted to the Department's website and the Bid Express Bidding Service Website before submitting the Bid Proposal. The Department considers the submission of a Bid Proposal prima facie evidence that the bidder has made such examination and is satisfied as to the conditions to be encountered in performing the work and as to the requirements of the Contract.
SUBSECTION: REVISION:	102.07.01 General. Replace the first sentence with the following: Submit the Bid Proposal on forms furnished on the Bid Express Bidding Service website (www.bidx.com). Replace the first sentence of the third paragraph with the following: Bid proposals submitted shall use an eligible Digital ID issued by Bid Express.

**Supplemental Specifications to The Standard Specifications
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SUBSECTION: REVISION:	<p>102.07.02 Computer Bidding. Replace the first paragraph with the following:</p> <p>Subsequent to registering for a specific project, use the Department's Expedite Bidding Program on the internet website of the Department of Highways, Division of Construction Procurement (http://transportation.ky.gov/contract/). Download the bid file from the Bid Express Bidding Service Website to prepare a Bid Proposal for submission to the Department. Submit Bid Proposal electronically through Bid Express Bidding Service.</p> <p>Delete the second and third paragraph.</p>
SUBSECTION: REVISION:	<p>102.08 Irregular Bid Proposals. Delete the following from the first paragraph: 4) fails to submit a disk created from the Highway Bid Program.</p> <p>Replace the second paragraph with the following: The Department will consider Bid Proposals irregular and may reject them for the following reasons:</p> <ol style="list-style-type: none">1) when there are unauthorized additions, conditional or alternate bids, or irregularities of any kind which may tend to make the Bid Proposal incomplete, indefinite, or ambiguous as to its meaning; or2) when the bidder adds any provisions reserving the right to accept or reject an award, or to enter into a Contract pursuant to an award; or3) any failure to comply with the provisions of Subsection 102.07; or4) Bid Proposals in which the Department determines that the prices are unbalanced; or when the sum of the total amount of the Bid Proposal under consideration exceeds the bidder's Current Capacity Rating.
SUBSECTION: REVISION:	<p>102.09 Bid Proposal Guaranty. Insert the following after the first sentence:</p> <p>Bid Proposals must have a bid proposal guaranty in the amount indicated in the bid proposal form accompany the submittal. A guaranty in the form of a paper bid bond, cashier's check, or certified check in an amount no less than the amount indicated on the submitted electronic bid is required when the electronic bid bond was not utilized with the Bid Express Bidding Service. Paper bid bonds must be delivered to the Division of Construction Procurement prior to the time of the letting.</p>
SUBSECTION: REVISION:	<p>102.10 Delivery of Bid Proposals. Replace paragraph with the following:</p> <p>Submit all Bid Proposals prior to the time specified in the Notice to Contractors. All bids shall be submitted electronically using Bid Express Bidding Services. Electronically submitted bids must be done in accordance with the requirements of the Bid Express Bidding Service.</p>
SUBSECTION: REVISION:	<p>102.11 Withdrawal or Revision of Bid Proposals. Replace the paragraph with the following:</p> <p>Bid Proposals can be withdrawn in accordance the requirements of the Bid Express Bidding Service prior to the time of the Letting.</p>

**Supplemental Specifications to The Standard Specifications
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SUBSECTION: REVISION:	<p>102.13 Public Opening of Bid Proposals. Replace Heading with the following: 102.13 Public Announcement of Bid Proposals.</p> <p>Replace the paragraph with the following: The Department will publicly announce all Bid Proposals at the time indicated in the Notice to Contractors.</p>
SUBSECTION: REVISION:	<p>103.02 Award of Contract. Replace the first sentence of the third paragraph with the following:</p> <p>The Department will normally award the Contract within 10 working days after the date of receiving Bid Proposals unless the Department deems it best to hold the Bid Proposals of any or all bidders for a period not to exceed 60 calendar days for final disposition of award.</p>
SUBSECTION: REVISION:	<p>105.02 Plans and Working Drawings. Insert the following after the fourth paragraph:</p> <p>Submit electrical shop drawings, design data, and descriptive literature for materials in electronic format to the Division of Traffic Operations for approval. Drawings and literature shall be submitted for lighting and signal components. Notify the Engineer when submitting information to the Division of Traffic Operations. Do not begin work until shop drawings are approved.</p> <p>Submit shop drawings for traffic counting equipment and materials in electronic format to the Engineer or the Division of Planning. Notify the Engineer when submitting information directly to the Division of Planning. Do not begin work until shop drawings are reviewed and approved.</p>
SUBSECTION: REVISION:	<p>105.03 Record Plans. Replace the section with the following:</p> <p>Record Plans are those reproductions of the original Plans on which the accepted Bid Proposal was based and, and signed by a duly authorized representative of the Department. The Department will make these plans available for inspection in the Central Office at least 24 hours prior to the time of opening bids and up to the time of letting of a project or projects. The quantities appearing on the Record Plans are the same as those on which Bid Proposals are received. The Department will use these Record Plans as the controlling plans in the prosecution of the Contract. The Department will not make any changes on Record Plans subsequent to their issue unless done so by an approved contract modification. The Department will make 2 sets of Record Plans for each project, and will maintain one on file in the Central Office and one of file in the District Office. The Department will furnish the Contractor with the following: 1 full size, 2 half size and an electronic file copy of the Record Plans at the Pre-Construction conference.</p>

**Supplemental Specifications to The Standard Specifications
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<p>SUBSECTION: REVISION:</p>	<p>105.12 Final Inspection and Acceptance of Work. Insert the following paragraphs after the first paragraph:</p> <p>Notify the Engineer when all electrical items are complete. A notice of the electrical work completion shall be made in writing to the Contractor. Electrical items will be inspected when the electrical work is complete and are not subject to waiting until the project as a whole has been completed. The Engineer will notify the Division of Traffic Operations within 3 days that all electrical items are complete and ready for a final inspection. A final inspection will be completed within 90 days after the Engineer notifies the Division of Traffic Operations of the electrical work completion.</p> <p>Energize all electrical items prior to notifying the Engineer that all electrical items are complete. Electrical items must remain operational until the Division of Traffic Operations has inspected and accepted the electrical portion of the project. Payment for the electrical service is the responsibility of the Contractor from the time the electrical items are energized until the Division of Traffic Operations has accepted the work.</p> <p>Complete all corrective work within 90 calendar days of receiving the original electrical inspection report. Notify the Engineer when all corrective work is complete. The Engineer will notify the Division of Traffic Operations that the corrective work has been completed and the project is ready for a follow-up inspection. Upon re-inspection, if additional corrective work is required, complete within the same 90 calendar day allowance. The Department will not include time between completion of the corrective work and the follow up electrical inspection(s). The 90 calendar day allowance is cumulative regardless of the number of follow-up electrical inspections required.</p> <p>The Department will assume responsibility for the electrical service on a project once the Division of Traffic Operations gives final acceptance of the electrical items on the project. The Department will also assume routine maintenance of those items. Any damage done to accepted electrical work items by other Contractors shall be the responsibility of the Prime Contractor. The Department will not be responsible for repairing damage done by other contractors during the construction of the remaining project.</p> <p>Failure to complete the electrical corrective work within the 90 calendar day allowance will result in penalties assessed to the project. Penalties will be assessed at ½ the rate of liquidated damages established for the contract.</p> <p>Replace the following in the second sentence of the second paragraph:</p> <p>Replace Section 213 with Section 212.</p> <p>Delete the fifth paragraph from the section.</p>
<p>SUBSECTION: REVISION:</p>	<p>105.13 Claim Resolution Process. Replace the last sentence of the 3. Bullet with the following:</p> <p>If the Contractor did not submit an as-bid schedule at the Pre-Construction Meeting or a written narrative in accordance with Subsection 108.02, the Cabinet will not consider the claim for delay.</p> <p>Delete the last paragraph from the section.</p>

**Supplemental Specifications to The Standard Specifications
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<p>SUBSECTION: REVISION:</p>	<p>106.04 Buy America Requirement. Replace the section with the following:</p> <p>106.04 Buy America Requirement. Follow the “Buy America” provisions as required by Title 23 Code of Federal Regulations § 635.410. Except as expressly provided herein all manufacturing processes of steel or iron materials including but not limited to structural steel, guardrail materials, corrugated steel, culvert pipe, structural plate, prestressing strands, and steel reinforcing bars shall occur in the United States of America, including the application of:</p> <ul style="list-style-type: none"> • Coating, • Galvanizing, • Painting, and • Other coating that protects or enhances the value of steel or iron products. <p>The following are exempt, unless processed or refined to include substantial amounts of steel or iron material, and may be used regardless of source in the domestic manufacturing process for steel or iron material:</p> <ul style="list-style-type: none"> • Pig iron, • Processed, pelletized, and reduced iron ore material, or • Processed alloys. <p>The Contractor shall submit a certification stating that all manufacturing processes involved with the production of steel or iron materials occurred in the United States.</p> <p>Produce, mill, fabricate, and manufacture in the United States of America all aluminum components of bridges, tunnels, and large sign support systems, for which either shop fabrication, shop inspection, or certified mill test reports are required as the basis of acceptance by the Department.</p> <p>Use foreign materials only under the following conditions:</p> <ol style="list-style-type: none"> 1) When the materials are not permanently incorporated into the project; or 2) When the delivered cost of such materials used does not exceed 0.1 percent of the total Contract amount or \$2,500.00, whichever is greater. <p>The Contractor shall submit to the Engineer the origin and value of any foreign material used.</p>
<p>SUBSECTION: REVISION:</p>	<p>106.10 Field Welder Certification Requirements. Insert the following sentence before the first sentence of the first paragraph:</p> <p>All field welding must be performed by a certified welder unless otherwise noted.</p>
<p>SUBSECTION: REVISION:</p>	<p>108.02 Progress Schedule. Insert the following prior to the first paragraph:</p> <p>Specification 108.02 applies to all Cabinet projects except the following project types:</p> <ul style="list-style-type: none"> • Right of Way Mowing and/or Litter Removal • Waterborne Paint Striping • Projects that contain Special Provision 82 • Projects that contain the Special Note for CPM Scheduling <p>Insert the following paragraph after paragraph two:</p> <p>Working without the submittal of a Written Narrative is violation of this specification and additionally voids the Contractor’s right to delay claims.</p> <p>Insert the following paragraph after paragraph six:</p> <p>The submittal of bar chart or Critical Path Method schedule does not relieve the Contractor’s requirement to submit a Written Narrative schedule.</p>

**Supplemental Specifications to The Standard Specifications
 for Road and Bridge Construction, 2008 Edition**
 (Effective with the March 18, 2011 Letting)

	<p>Insert the following at the beginning of the first paragraph of A) Written Narrative.:</p> <p>Submit the Written Narrative Schedule using form TC 63-50 available at the Division of Construction's website (http://www.transportation.ky.gov/construction/ResCenter/ResCenter.htm).</p> <p>Replace Part A) Written Narrative 1. And 2. with the following:</p> <ol style="list-style-type: none"> 1. Provide a description that includes how the Contractor will sequence and stage the work, how the Contractor plans to maintain and control traffic being specific and detailed, and what equipment and crew sizes are planned to execute the work. 2. Provide a list of project milestones including, if applicable, winter shut-downs, holidays, or special events. The Contractor shall describe how these milestones and other dates effect the prosecution of the work. Also, include start date and completion date milestones for the contract, each project if the contract entails multiple projects, each phase of work, site of work, or segment of work as divided in the project plans, proposal, or as subdivided by the Contractor.
<p>SUBSECTION: REVISION:</p>	<p>109.07.01 Liquid Asphalt. Add the following to the Adjustable Contract Items:</p> <ul style="list-style-type: none"> • Stone Matrix Asphalt for Base • Stone Matrix Asphalt for Surface
<p>SUBSECTION: REVISION:</p>	<p>110.01 Mobilization. Replace paragraph three with the following:</p> <p>Do not bid an amount for Mobilization that exceeds 5 percent of the sum of the total amounts bid for all items in the Bid Proposal, excluding Mobilization, Demobilization, and contingent amounts established for adjustments and incentives. The Department will automatically adjust any Bid Proposals that are in excess of this amount down to 5 percent to compare Bid Proposals and award the Contract. The Department will award a Contract for the actual amount bid when the amount bid for Mobilization is less than 5 percent, or the Department will award the Contract for the adjusted bid amount of 5 percent when the amount bid for Mobilization is greater than 5 percent. If any errors in unit bid prices for other Contract items in a Contractor's Bid Proposal are discovered after bid opening and such errors reduce the total amount bid for all other items, excluding Mobilization, Demobilization, and contingent amounts established for adjustments and incentives, so that the percent bid for Mobilization is larger than 5 percent, the Department will adjust the amount bid for Mobilization to 5 percent of the sum of the corrected total bid amounts.</p>
<p>SUBSECTION: REVISION:</p>	<p>110.02 Demobilization. Replace the third paragraph with the following:</p> <p>Bid an amount for Demobilization that is a minimum of \$1,000 or 1.5 percent of the sum of the total amounts bid for all other items in the Bid Proposal, excluding Mobilization, Demobilization, and contingent amounts established for adjustments and incentives. The Department will automatically adjust any Bid Proposal that is less than this amount up to \$1,000 or 1.5 percent to compare Bid Proposals and award the Contract. The Department will award a Contract for the actual amount bid when the amount bid for demobilization exceeds 1.5 percent, or the Department will award the Contract for the adjusted bid amount when the amount bid for demobilization is less than the minimum of \$1,000 or less than 1.5 percent of the sum of the total amounts bid for all other items in the Bid Proposal, excluding Mobilization, Demobilization, and contingent amounts established for adjustments and incentives.</p>
<p>SUBSECTION: REVISION:</p>	<p>110.04 Payment. Insert the following paragraph following the demobilization payment schedule (4th paragraph):</p> <p>The Department will withhold an amount equal to \$1,000 for demobilization, regardless of the schedule listed above. The \$1,000 withheld for demobilization will be paid when the final estimate is paid.</p>

**Supplemental Specifications to The Standard Specifications
 for Road and Bridge Construction, 2008 Edition**
 (Effective with the March 18, 2011 Letting)

<p>SUBSECTION: REVISION:</p>	<p>112.03.01 General Traffic Control. Replace paragraph three with the following:</p> <p>All flaggers shall be trained in current MUTCD flagging procedures. Proof of training must be available for review at the Department's request. Flagging credentials must be current within the last 5 years.</p>
<p>SUBSECTION: PART: REVISION:</p>	<p>112.03.11 Temporary Pavement Markings. B) Placement and Removal of Temporary Striping. Replace the 2nd sentence of the first paragraph with the following:</p> <p>On interstates and parkways, and other roadways approved by the State Highway Engineer, install pavement striping that is 6 inches in width.</p>
<p>SUBSECTION: REVISION:</p>	<p>112.03.12 Project Traffic Coordinator (PTC). Add the following at the end of the subsection:</p> <p>After October 1, 2008 the Department will require the PTC to have successfully completed the applicable qualification courses. Personnel that have not successfully completed the applicable courses by that date will not be considered qualified. Prior to October 1, 2008, conform to Subsection 108.06 A) and ensure the designated PTC has sufficient skill and experience to properly perform the task.</p>
<p>SUBSECTION: REVISION:</p>	<p>112.03.15 Non-Compliance of Maintain and Control of Traffic. Add the following section:</p> <p>112.03.15 Non-Compliance of Maintain and Control of Traffic. It is the Contractor's responsibility to conform to the traffic control requirements in the TCP, Proposal, plan sheets, specifications, and the Manual on Uniform Traffic Control Devices.</p> <p>Unless specified elsewhere in the contract, a penalty will be assessed in the event of non-compliance with Maintain and Control of Traffic requirements. These penalties will be assessed when the Contractor fails to correct a situation or condition of non-compliance with the contract traffic control requirements after being notified by the Engineer. The calculation of accrued penalties for non-compliance will be based upon the date/time of notification by the Engineer.</p> <p>The amount of the penalty assessed for non-compliance will be determined based upon the work zone duration, as defined by the MUTCD, and will be the greatest of the different calculation methods indicated below:</p> <p style="padding-left: 40px;">A) Long-term stationary work that occupies a location more than 3 days.</p> <p style="padding-left: 40px;">Correct the non-compliant issue within 24 hours from initial notification by the Engineer. If the issue is not corrected within 24 hours from the initial notification, a penalty for non-compliance will be assessed on a daily basis beginning from the initial notification of non-compliance. The Contractor will be assessed a \$1,000 daily penalty or the amount equal to the contract liquidated damages in Section 108.09, whichever of the 2 is greater. The penalty for non-compliance will escalate as follows for continued non-compliance after the initial notification.</p> <p style="padding-left: 40px;">3 Days after Notification \$1,500 daily penalty or 1.5 times the contract liquidated damages daily charge rate in Section 108.09, whichever is greater.</p> <p style="padding-left: 40px;">7 Days after Notification \$2,000 daily penalty or double the contract liquidated damages daily charge rate in Section 108.09, whichever is greater.</p>

**Supplemental Specifications to The Standard Specifications
 for Road and Bridge Construction, 2008 Edition**
 (Effective with the March 18, 2011 Letting)

	<p>B) Intermediate-term stationary work that occupies a location more than one daylight period up to 3 days, or nighttime work lasting more than 1 hour.</p> <p>Correct the non-compliant issue within 4 hours from initial notification by the Engineer. If the issue is not corrected within 4 hours from notification, a penalty for non-compliance will be assessed on an hourly basis beginning from the initial notification of non-compliance. The penalty for non-compliance will be assessed at \$200 per hour.</p> <p>C) Short-term stationary is daytime work that occupies a location for more than 1 hour within a single daylight period.</p> <p>Correct the non-compliant issue within 1 hour from initial notification by the Engineer. If the issue is not corrected within 1 hour from notification, a penalty for non-compliance will be assessed on an hourly basis beginning from the initial notification of non-compliance. The penalty for non-compliance will be assessed at \$200 per hour.</p> <p>If the Contractor remains in violation of the Maintain and Control of Traffic requirements, or if the Department determines it to be in the public's interest, work will be suspended in accordance with Section 108.08 until the deficiencies are corrected. The Department reserves the right to correct deficiencies by any means available and charge the Contractor for labor, equipment, and material costs incurred in emergency situations.</p>
<p>SUBSECTION: REVISION:</p>	<p>206.03.02 Embankment Replace the last paragraph with the following:</p> <p>When rock roadbed is specified, construct the upper 2 feet of the embankment according to Subsection 204.03.09 A).</p>
<p>SUBSECTION: REVISION:</p>	<p>213.03.03 Inspection and Maintenance. Replace the last sentence of the second paragraph with the following:</p> <p>Initiate corrective action within 24 hours of any noted deficiency and complete the work within 7 calendar days of receipt of the report. The Contractor shall make a concentrated effort to complete any corrective action required prior to the next predicted rainfall event.</p> <p>Insert the following paragraph after the second paragraph:</p> <p>When the Contractor is required to obtain the KPDES permit, it is their responsibility to ensure compliance with the inspection and maintenance requirements of the permit. The Engineer will perform verification inspections a minimum of once per month and within 7 days of a ½ inch or greater rainfall event. The Engineer will document these inspections using Form TC 63-61 A. The Engineer will provide copies of the inspection only when improvements to the BMP's are required. Verification inspections performed by the Engineer do not relieve the Contractor of any responsibility for compliance with the KPDES permit. Initiate corrective action within 24 hours of any noted deficiency and complete the work within 7calendar days of receipt of the report. The Contractor shall make a concentrated effort to complete any corrective action required prior to the next predicted rainfall event.</p>

**Supplemental Specifications to The Standard Specifications
 for Road and Bridge Construction, 2008 Edition**
 (Effective with the March 18, 2011 Letting)

<p>SUBSECTION: PART: REVISION:</p>	<p>213.03.05 Temporary Control Measures. E) Temporary Seeding and Protection. Replace the first paragraph with the following:</p> <p>Apply an Annual Rye seed mix at a rate of 100 pounds per acre during the months of March through August. In addition to the Annual Rye, add 10 pounds of German Foxtail-Millet (<i>Setaria italica</i>), when performing temporary seeding during the months of June through August. During the months of September through February, apply Winter Wheat or Rye Grain at a rate of 100 pounds per acre. Obtain the Engineer's approval prior to the application of the seed mixture.</p>
<p>SUBSECTION: PART: REVISION:</p>	<p>213.03.05 Temporary Control Measures. F) Temporary Mulch. Replace the last sentence with the following:</p> <p>Place temporary mulch to an approximate 2-inch loose depth (2 tons per acre) and anchor it into the soil by mechanically crimping it into the soil surface or applying tackifier to provide a protective cover. Regardless of the anchoring method used, ensure the protective cover holds until disturbance is required or permanent controls are in installed.</p>
<p>SUBSECTION: REVISION:</p>	<p>303.05 Payment. Replace the second paragraph of the section with the following:</p> <p>The Department will make payment for Drainage Blanket-Type II (ATDB) according to the Lot Pay Adjustment Schedule for Specialty Mixtures in Section 402.</p>
<p>SUBSECTION: PART: REVISION:</p>	<p>401.02.04 Special Requirements for Dryer Drum Plants. F) Production Quality Control. Replace the first sentence with the following:</p> <p>Stop mixing operations immediately if, at any time, a failure of the automatic electronic weighing system of the aggregate feed, asphalt binder feed, or water injection system control occurs.</p>
<p>SUBSECTION: REVISION:</p>	<p>401.02.04 Special Requirements for Dryer Drum Plants. Add the following:</p> <p>Part G) Water Injection System. Provided each system has prior approval as specified in Subsection 402.01.01, the Department will allow the use of water injection systems for purposes of foaming the asphalt binder and lowering the mixture temperature for production of Warm Mix Asphalt (WMA).</p> <p>Ensure the equipment for water injection meets the following requirements:</p> <ol style="list-style-type: none"> 1) Injection equipment computer controls are automatically coupled to the plants controls (manual operation is not permitted); 2) Injection equipment has variable controls that introduce water ratios based on production rates of mixtures; 3) Injects water into the flow of asphalt binder prior to contacting the aggregate; 4) Provides alarms on the water injection system that operate when the flow of water is interrupted or deviates from the prescribed water rate.
<p>SUBSECTION: REVISION:</p>	<p>401.03.01 Preparation of Mixtures. Replace the last sentence of the second paragraph with the following:</p> <p>Do not use asphalt binder while it is foaming in a storage tank.</p>

**Supplemental Specifications to The Standard Specifications
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<p>SUBSECTION: REVISION:</p>	<p>401.03.01 Preparation of Mixtures. Replace the third paragraph and Mixing and Laying Temperature table with the following:</p> <p>Maintain the temperature of the component materials and asphalt mixture within the ranges listed in the following table:</p> <table border="1"> <thead> <tr> <th colspan="4">MIXING AND LAYING TEMPERATURES (°F)</th> </tr> <tr> <th colspan="2">Material</th> <th>Minimum</th> <th>Maximum</th> </tr> </thead> <tbody> <tr> <td colspan="2">Aggregates</td> <td>240</td> <td>330</td> </tr> <tr> <td colspan="2">Aggregates used with Recycled Asphalt Pavement (RAP)</td> <td>240</td> <td>—</td> </tr> <tr> <td rowspan="2">Asphalt Binders</td> <td>PG 64-22</td> <td>230</td> <td>330</td> </tr> <tr> <td>PG 76-22</td> <td>285</td> <td>350</td> </tr> <tr> <td rowspan="4">Asphalt Mixtures at Plant (Measured in Truck)</td> <td>PG 64-22 HMA</td> <td>250</td> <td>330</td> </tr> <tr> <td>PG 76-22 HMA</td> <td>310</td> <td>350</td> </tr> <tr> <td>PG 64-22 WMA</td> <td>230</td> <td>275</td> </tr> <tr> <td>PG 76-22 WMA</td> <td>250</td> <td>300</td> </tr> <tr> <td rowspan="4">Asphalt Mixtures at Project (Measured in Truck When Discharging)</td> <td>PG 64-22 HMA</td> <td>230</td> <td>330</td> </tr> <tr> <td>PG 76-22 HMA</td> <td>300</td> <td>350</td> </tr> <tr> <td>PG 64-22 WMA</td> <td>210</td> <td>275</td> </tr> <tr> <td>PG 76-22 WMA</td> <td>240</td> <td>300</td> </tr> </tbody> </table>	MIXING AND LAYING TEMPERATURES (°F)				Material		Minimum	Maximum	Aggregates		240	330	Aggregates used with Recycled Asphalt Pavement (RAP)		240	—	Asphalt Binders	PG 64-22	230	330	PG 76-22	285	350	Asphalt Mixtures at Plant (Measured in Truck)	PG 64-22 HMA	250	330	PG 76-22 HMA	310	350	PG 64-22 WMA	230	275	PG 76-22 WMA	250	300	Asphalt Mixtures at Project (Measured in Truck When Discharging)	PG 64-22 HMA	230	330	PG 76-22 HMA	300	350	PG 64-22 WMA	210	275	PG 76-22 WMA	240	300
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<p>SUBSECTION: REVISION:</p>	<p>402.01 Description. Replace the paragraph with the following:</p> <p>Provide the process control and acceptance testing of all classes and types of asphalt mixtures which may be furnished either as hot mix asphalt (HMA) or warm mix asphalt (WMA) produced with water injection systems.</p>																																																	
<p>SUBSECTION REVISION:</p>	<p>402.01.01 Warm Mix Asphalt (WMA) Evaluation and Approval. Add the following subsection:</p> <p>402.01.01 Warm Mix Asphalt (WMA) Evaluation and Approval. The Department will evaluate trial production of WMA by use of a water injection system provided the system is installed according to the manufacturer's requirements and satisfies the requirements of Section 401. Evaluation will include production and placement of WMA to demonstrate adequate mixture quality including volumetric properties and density by Option A as specified in Subsection 402.03.02 D). Do not place WMA for evaluation on Department projects. Provided production and placement operations satisfy the applicable quality levels, the Department will approve WMA production on Department projects using the water injection system as installed on the specific asphalt mixing plant evaluated.</p>																																																	
<p>SUBSECTION: REVISION:</p>	<p>402.05.02 Asphalt Mixtures and Mixtures With RAP. Replace Subsection Title as below:</p> <p>402.05.02 Asphalt Mixtures, HMA and WMA, Including Mixtures With RAP.</p>																																																	
<p>SUBSECTION: REVISION:</p>	<p>402.05.02 Asphalt Mixtures, HMA and WMA, Including Mixtures With RAP. Replace the paragraph with the following:</p> <p>The Department will pay for the mixture at the Contract unit bid price and apply a Lot Pay Adjustment for each lot placed based on the degree of compliance with the specified tolerances. Using the appropriate Lot Pay Adjustment Schedule, the Department will assign a pay value for the applicable properties within each subplot and average the subplot pay values to determine the pay value for a given property for each lot. The Department will apply the Lot Pay Adjustment for each lot to a defined unit price of \$50.00 per ton. The Department will calculate the Lot Pay Adjustment using all possible incentives and disincentives but will not allow the overall pay value for a lot to exceed 1.00.</p>																																																	

**Supplemental Specifications to The Standard Specifications
 for Road and Bridge Construction, 2008 Edition**
 (Effective with the March 18, 2011 Letting)

<p>SUBSECTION: PART: REVISION:</p>	<p>402.05.02 Asphalt Mixtures, HMA and WMA, Including Mixtures With RAP. C) Conventional and RAP Mixtures Placed on Shoulders. Replace Title and Text with the following:</p> <p>C) HMA, WMA and RAP Mixtures Placed on Shoulders or Placed as Asphalt Pavement Wedge.</p> <ol style="list-style-type: none"> 1) Placed monolithically with the Mainline – Width of 4 feet or less. The Department will pay as mainline mixture. 2) Placed monolithically with the Mainline – Width of greater than 4 feet. The Department will pay as mainline mixture but use 1.00 for the Lane and Joint Density Pay Value for shoulder or Asphalt Pavement Wedge quantities. 3) Placed Separately. The Department will use 1.00 for the Lane and Joint Density Pay Value. 												
<p>SUBSECTION: PART: REVISION:</p>	<p>402.05.02 Asphalt Mixtures, HMA and WMA, Including Mixtures With RAP. D) Conventional and RAP Mixtures Placed Monolithically as Asphalt Pavement Wedge. Replace the title with the following: D) HMA, WMA, and RAP Mixtures Placed Monolithically as Asphalt Pavement Wedge.</p> <p>Delete the following: D) HMA, WMA, and RAP Mixtures Placed Monolithically as Asphalt Pavement Wedge. The Department will pay as mainline mixture but use a 1.00 pay value for all properties.</p>												
<p>SUBSECTION: PART: REVISION:</p>	<p>402.05.02 Asphalt Mixtures for Temporary Pavement. E) Asphalt Mixtures for Temporary Pavement. Replace E) Asphalt Mixtures for Temporary Pavement with the following:</p> <p>D) Asphalt Mixtures for Temporary Pavement.</p>												
<p>SUBSECTION: PART: TABLES: REVISION:</p>	<p>402.05.02 Asphalt Mixtures, HMA and WMA, Including Mixtures With RAP. Lot Pay Adjustment Schedule, Compaction Option A, Base and Binder Mixtures VMA Replace the VMA table with the following:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="2" style="text-align: center;">VMA</th> </tr> <tr> <th style="text-align: center;">Pay Value</th> <th style="text-align: center;">Deviation From Minimum</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1.00</td> <td style="text-align: center;">≥ min. VMA</td> </tr> <tr> <td style="text-align: center;">0.95</td> <td style="text-align: center;">0.1-0.5 below min.</td> </tr> <tr> <td style="text-align: center;">0.90</td> <td style="text-align: center;">0.6-1.0 below min.</td> </tr> <tr> <td style="text-align: center;">(1)</td> <td style="text-align: center;">> 1.0 below min.</td> </tr> </tbody> </table>	VMA		Pay Value	Deviation From Minimum	1.00	≥ min. VMA	0.95	0.1-0.5 below min.	0.90	0.6-1.0 below min.	(1)	> 1.0 below min.
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<p>SUBSECTION: PART: TABLES: REVISION:</p>	<p>402.05.02 Asphalt Mixtures, HMA and WMA, Including Mixtures With RAP. Lot Pay Adjustment Schedule, Compaction Option A, Surface Mixtures VMA Replace the VMA table with the following:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="2" style="text-align: center;">VMA</th> </tr> <tr> <th style="text-align: center;">Pay Value</th> <th style="text-align: center;">Deviation From Minimum</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1.00</td> <td style="text-align: center;">≥ min. VMA</td> </tr> <tr> <td style="text-align: center;">0.95</td> <td style="text-align: center;">0.1-0.5 below min.</td> </tr> <tr> <td style="text-align: center;">0.90</td> <td style="text-align: center;">0.6-1.0 below min.</td> </tr> <tr> <td style="text-align: center;">(1)</td> <td style="text-align: center;">> 1.0 below min.</td> </tr> </tbody> </table>	VMA		Pay Value	Deviation From Minimum	1.00	≥ min. VMA	0.95	0.1-0.5 below min.	0.90	0.6-1.0 below min.	(1)	> 1.0 below min.
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**Supplemental Specifications to The Standard Specifications
 for Road and Bridge Construction, 2008 Edition**
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<p>SUBSECTION: PART: TABLE: REVISION:</p>	<p>402.05.02 Asphalt Mixtures, HMA and WMA, Including Mixtures With RAP. Lot Pay Adjustment Schedule, Compaction Option B Mixtures VMA Replace the VMA table with the following:</p> <table border="1"> <thead> <tr> <th colspan="2">VMA</th> </tr> <tr> <th>Pay Value</th> <th>Deviation From Minimum</th> </tr> </thead> <tbody> <tr> <td>1.00</td> <td>≥min. VMA</td> </tr> <tr> <td>0.95</td> <td>0□1-0.5 bel□w min.</td> </tr> <tr> <td>0.9</td> <td>0.6-1.0 below min.</td> </tr> <tr> <td>⁽²⁾</td> <td>> 1.0 below min.</td> </tr> </tbody> </table>	VMA		Pay Value	Deviation From Minimum	1.00	≥min. VMA	0.95	0□1-0.5 bel□w min.	0.9	0.6-1.0 below min.	⁽²⁾	> 1.0 below min.											
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<p>SUBSECTION: PART: NUMBER: REVISION:</p>	<p>403.03.03 Preparation of Mixture. C) Mix Design Criteria. 1) Preliminary Mix Design. Replace the last two sentences of the paragraph and table with the following:</p> <p>Complete the volumetric mix design at the appropriate number of gyrations as given in the table below for the number of 20-year ESAL's. The Department will define the relationship between ESAL classes, as given in the bid items for Superpave mixtures, and 20-year ESAL ranges as follows:</p> <table border="1"> <thead> <tr> <th rowspan="2">Class</th> <th rowspan="2">ESAL's (millions)</th> <th colspan="3">Number of Gyration</th> </tr> <tr> <th>N_{initial}</th> <th>N_{design}</th> <th>N_{max}</th> </tr> </thead> <tbody> <tr> <td>2</td> <td>< 3.0</td> <td>6</td> <td>50</td> <td>75</td> </tr> <tr> <td>3</td> <td>3.0 to < 30.0</td> <td>7</td> <td>75</td> <td>115</td> </tr> <tr> <td>4</td> <td>≥ 30.0</td> <td>8</td> <td>100</td> <td>160</td> </tr> </tbody> </table>	Class	ESAL's (millions)	Number of Gyration			N _{initial}	N _{design}	N _{max}	2	< 3.0	6	50	75	3	3.0 to < 30.0	7	75	115	4	≥ 30.0	8	100	160
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<p>SUBSECTION: PART: REVISION:</p>	<p>403.03.09 Leveling and Wedging, and Scratch Course. A) Leveling and Wedging. Replace the first sentence of the first paragraph with the following:</p> <p>Conform to the gradation requirements (control points) of AASHTO M 323 for base, binder, or surface as the Engineer directs.</p>																							
<p>SUBSECTION: PART: REVISION:</p>	<p>403.03.09 Leveling and Wedging, and Scratch Course. B) Scratch Course. Replace the second sentence of the first paragraph with the following:</p> <p>Conform to the gradation requirements (control points) of AASHTO M 323 for base, binder, or surface as the Engineer directs.</p>																							
<p>SUBSECTION: REVISION:</p>	<p>407.01 DESCRIPTION. Replace the first sentence of the paragraph with the following:</p> <p>Construct a pavement wedge composed of a hot-mixed or warm-mixed asphalt mixture.</p>																							
<p>SUBSECTION: REVISION:</p>	<p>409.01 DESCRIPTION. Replace the first sentence of the paragraph with the following:</p> <p>Use reclaimed asphalt pavement (RAP) from Department projects or other approved sources in hot mix asphalt (HMA) or warm mix asphalt (WMA) provided mixture requirements are satisfied.</p>																							
<p>SUBSECTION: REVISION:</p>	<p>410.01 DESCRIPTION. Delete the second sentence of the paragraph.</p>																							

**Supplemental Specifications to The Standard Specifications
 for Road and Bridge Construction, 2008 Edition
 (Effective with the March 18, 2011 Letting)**

SUBSECTION: REVISION:	410.03.01 Corrective Work. Replace the last sentence of the paragraph with the following: Provide a final surface comparable to the adjacent pavement that does not require corrective work in respect to texture, appearance, and skid resistance.														
SUBSECTION: PART: NUMBER: REVISION:	410.03.02 Ride Quality. B) Requirements. 1) Category A. Replace the last sentence of the first paragraph with the following: At the Department's discretion, a pay deduction of \$1200 per 0.1-lane-mile section may be applied in lieu of corrective work.														
SUBSECTION: PART: NUMBER: REVISION:	410.03.02 Ride Quality. B) Requirements. 2) Category B. Replace the second and third sentence of the first paragraph with the following: When the IRI is greater than 90 for a 0.1-mile section, perform corrective work, or remove and replace the pavement to achieve the specified IRI. At the Department's discretion, a pay deduction of \$750 per 0.1-lane-mile section may be applied in lieu of corrective work.														
SUBSECTION: REVISION:	410.05 PAYMENT. Add the following sentence to the end of the first paragraph: The sum of the pay value adjustments for ride quality shall not exceed \$0 for the project as a whole.														
SUBSECTION: REVISION:	413.05.02 CL3 SMA BASE 1.00D PG76-22. Insert the following sentence between the first and second sentence of the first paragraph: The Department will calculate the Lot Pay Adjustment using all possible incentives and disincentives but will not allow the overall pay value for a lot to exceed 1.00.														
SUBSECTION: TABLE: REVISION:	413.05.02 CL3 SMA BASE 1.00D PG 76-22. JOINT DENSITY TABLE Replace the joint density table with the following: <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="2" style="text-align: center;">LANE DENSITY</th> </tr> <tr> <th style="text-align: center;">Pay Value</th> <th style="text-align: center;">Test Result (%)</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1.05</td> <td style="text-align: center;">95.0-96.5</td> </tr> <tr> <td style="text-align: center;">1.00</td> <td style="text-align: center;">93.0-94.9</td> </tr> <tr> <td style="text-align: center;">0.95</td> <td style="text-align: center;">92.0-92.9 or 96.6-97.0</td> </tr> <tr> <td style="text-align: center;">0.90</td> <td style="text-align: center;">91.0-91.9 or 97.1-97.5</td> </tr> <tr> <td style="text-align: center;">(1)</td> <td style="text-align: center;">< 91.0 or > 97.5</td> </tr> </tbody> </table>	LANE DENSITY		Pay Value	Test Result (%)	1.05	95.0-96.5	1.00	93.0-94.9	0.95	92.0-92.9 or 96.6-97.0	0.90	91.0-91.9 or 97.1-97.5	(1)	< 91.0 or > 97.5
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SUBSECTION: REVISION:	413.05.03 CL3 SMA SURF 0.50A PG76-22 and CL3 SMA SURF 0.38A PG76-22. Insert the following sentence between the first and second sentence of the first paragraph: The Department will calculate the Lot Pay Adjustment using all possible incentives and disincentives but will not allow the overall pay value for a lot to exceed 1.00.														

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 for Road and Bridge Construction, 2008 Edition**
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SUBSECTION: TABLE: REVISION:	413.05.03 CL3 SMA SURF 0.50A PG76-22 and CL3 SMA SURF 0.38A PG76-22. JOINT DENSITY TABLE Replace the joint density table with the following: <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="3" style="text-align: center;">DENSITY</th> </tr> <tr> <th style="text-align: center;">Pay Value</th> <th style="text-align: center;">Lane Density Test Result (%)</th> <th style="text-align: center;">Joint Density Test Result (%)</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1.05</td> <td style="text-align: center;">95.0-96.5</td> <td style="text-align: center;">92.0-96.0</td> </tr> <tr> <td style="text-align: center;">1.00</td> <td style="text-align: center;">93.0-94.9</td> <td style="text-align: center;">90.0-91.9</td> </tr> <tr> <td style="text-align: center;">0.95</td> <td style="text-align: center;">92.0-92.9 or 96.6-97.0</td> <td style="text-align: center;">89.0-89.9 or 96.1-96.5</td> </tr> <tr> <td style="text-align: center;">0.90</td> <td style="text-align: center;">91.0-91.9 or 97.1-97.5</td> <td style="text-align: center;">88.0-88.9 or 96.6-97.0</td> </tr> <tr> <td style="text-align: center;">0.75</td> <td style="text-align: center;">----</td> <td style="text-align: center;">< 88.0 or > 97.0</td> </tr> <tr> <td style="text-align: center;">⁽¹⁾</td> <td style="text-align: center;">< 91.0 or > 97.5</td> <td style="text-align: center;">----</td> </tr> </tbody> </table>	DENSITY			Pay Value	Lane Density Test Result (%)	Joint Density Test Result (%)	1.05	95.0-96.5	92.0-96.0	1.00	93.0-94.9	90.0-91.9	0.95	92.0-92.9 or 96.6-97.0	89.0-89.9 or 96.1-96.5	0.90	91.0-91.9 or 97.1-97.5	88.0-88.9 or 96.6-97.0	0.75	----	< 88.0 or > 97.0	⁽¹⁾	< 91.0 or > 97.5	----
DENSITY																									
Pay Value	Lane Density Test Result (%)	Joint Density Test Result (%)																							
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⁽¹⁾	< 91.0 or > 97.5	----																							
SUBSECTION: REVISION:	501.05.02 Ride Quality. Add the following sentence to the end of the first paragraph: The sum of the pay value adjustments for the ride quality shall not exceed \$0 for the project as a whole.																								
SUBSECTION: REVISION:	505.03.04 Detectable Warnings. Replace the first sentence with the following: Install detectable warning pavers at all sidewalk ramps and on all commercial entrances according to the Standard Drawings.																								
SUBSECTION: REVISION:	505.04.04 Detectable Warnings. Replace the paragraph with the following: The Department will measure the quantity in square feet. All retrofit applications for maintenance projects will require the removal of existing sidewalks to meet the requirements of the standard drawings applicable to the project. The cost associated with the removal of the existing sidewalk will be incidental to the detectable warnings bid item or incidental to the bid item for the construction of the concrete sidewalk unless otherwise noted.																								
SUBSECTION: REVISION:	505.05 PAYMENT. Add the following to the bid item table: <table border="0" style="margin-left: 20px;"> <tr> <td style="text-align: center;"><u>Code</u></td> <td style="text-align: center;"><u>Pay Item</u></td> <td style="text-align: center;"><u>Pay Unit</u></td> </tr> <tr> <td style="text-align: center;">23158ES505</td> <td style="text-align: center;">Detectable Warnings</td> <td style="text-align: center;">Square Foot</td> </tr> </table>	<u>Code</u>	<u>Pay Item</u>	<u>Pay Unit</u>	23158ES505	Detectable Warnings	Square Foot																		
<u>Code</u>	<u>Pay Item</u>	<u>Pay Unit</u>																							
23158ES505	Detectable Warnings	Square Foot																							
SUBSECTION: REVISION:	509.01 DESCRIPTION. Replace the second paragraph with the following: The Department may allow the use of similar units that conform to the National Cooperative Highway Research Program (NCHRP) 350 Test Level 3 (TL-3) requirements and the typical features depicted by the Standard Drawings. Obtain the Engineers approval prior to use. Ensure the barrier wall shape, length, material, drain slot dimensions and locations typical features are met and the reported maximum deflection is 3 feet or less from the NCHRP 350 TL-3 for Test 3 – 11 (pickup truck impacting at 60 mph at a 25-degree angle.)																								

**Supplemental Specifications to The Standard Specifications
 for Road and Bridge Construction, 2008 Edition**
 (Effective with the March 18, 2011 Letting)

<p>SUBSECTION: REVISION:</p>	<p>601.03.02 Concrete Producer Responsibilities. Replace the first sentence with the following:</p> <p>Obtain the concrete from producers that are in compliance with KM 64-323 and on the Department's List of Approved Materials.</p> <p>Add the following to the first paragraph:</p> <p>If a concrete plant becomes unqualified during a project and there are no other qualified plants in the region, the Department will provide qualified personnel to witness and ensure the producer follows the required specifications. The Department will assess the Contractor a \$100 per hour charge for this service.</p>
<p>SUBSECTION: PART: REVISION:</p>	<p>601.03.02 Concrete Producer Responsibilities. B) Certified Personnel. Replace the second sentence with the following:</p> <p>Ensure that the concrete technicians are certified as ACI Level I (Level I) and KRMCA Level II (Level II).</p>
<p>SUBSECTION: PART: REVISION:</p>	<p>601.03.02 Concrete Producer Responsibilities. C) Quality Control. Replace the second sentence with the following:</p> <p>Ensure that the Level II concrete technician is present when work is in progress and is responsible for inspecting trucks, batch weight calculations, monitoring batching, making mixture adjustments, reviewing the slump, air content, unit weight, temperature, and aggregate tests, all to provide conforming concrete to the project.</p>
<p>SUBSECTION: PART: REVISION:</p>	<p>601.03.02 Concrete Producer Responsibilities. D) Producer Testing. Replace with the following:</p> <p>When producing for state work, have a Qualified Concrete Aggregate Technician or KYTC Qualified Aggregate Technician perform, at a minimum, weekly gradations and minus 200 wash tests and daily moisture contents of coarse and fine aggregate (Fine aggregates will not require a minus 200 wash test). Using the daily moisture contents, adjust the approved mix design accordingly prior to production. Ensure that the Level II concrete technician is present when work is in progress and is responsible for inspecting trucks, batch weight calculations, monitoring batching, making mixture adjustments, reviewing the slump, air content, unit weight, temperature, and aggregate tests, all to provide conforming concrete to the project.</p>
<p>SUBSECTION: PART: REVISION:</p>	<p>601.03.02 Concrete Producer Responsibilities. E) Trip Tickets. Replace the second sentence with the following:</p> <p>Include on the trip ticket the Sample ID for the approved mix design and a statement certifying that the data on the ticket is correct and that the mixture conforms to the mix design.</p>
<p>SUBSECTION: PART: NUMBER: REVISION:</p>	<p>601.03.03 Proportioning and Requirements. C) Mixtures Using Type IP, IS, and I(SM) Cement or Mineral Admixtures 2) Mineral Admixtures. Replace the second sentence with the following:</p> <p>Reduction of the total cement content by a combination of mineral admixtures will be allowed, up to a maximum of 40 percent.</p>

**Supplemental Specifications to The Standard Specifications
 for Road and Bridge Construction, 2008 Edition**
 (Effective with the March 18, 2011 Letting)

SUBSECTION: PART: NUMBER: LETTER: REVISION:	601.03.03 Proportioning and Requirements. C) Mixtures Using Type IP, IS, and I(SM) Cement or Mineral Admixtures 2) Mineral Admixtures. a) Fly Ash. Delete the last sentence of the third paragraph.
SUBSECTION: PART: NUMBER: LETTER: REVISION:	601.03.03 Proportioning and Requirements. C) Mixtures Using Type IP, IS, and I(SM) Cement or Mineral Admixtures 2) Mineral Admixtures. b) Ground Granulated Blast Furnace Slag (GGBF Slag). Delete the second sentence of the third paragraph.
SUBSECTION: PART: REVISION:	601.03.03 Proportioning and Requirements. E) Measuring. Add the following sentence: Conform to the individual ingredient material batching tolerances in Appendix A.
SUBSECTION: PART: REVISION:	601.03.09 Placing Concrete. A) General. Replace the last sentence of the fourth paragraph with the following: Do not use aluminum or aluminum alloy troughs, pipes, or chutes that have surface damage or for lengths greater than 20 feet. Replace the second sentence of the fifth paragraph with the following: When pumping, equip the delivery pipe with a nozzle, having a minimum of 2 right angles, at the discharge end. Alternate nozzles or restriction devices may be allowed with prior approval by the Engineer.
SUBSECTION: REVISION:	605.02.05 Forms. Delete the last sentence.
SUBSECTION: REVISION:	605.03.04 Tack Welding. Replace with the following: The Department does not allow tack welding.
SUBSECTION: REVISION:	606.02.11 Coarse Aggregate. Replace with the following: Conform to Section 805, size No. 8 or 9-M.
SUBSECTION: PART: REVISION:	609.03.04 Expansion and Fixed Joints. D) Preformed Neoprene Joint Seals. Replace the last sentence of paragraph seven with the following: Field splices will not be allowed during partial width construction. It is Contractor's responsibility to determine and install the length of seal required for the joint to barrier wall as per the standard drawing.
SUBSECTION: REVISION:	609.03.09 Finish with Burlap Drag. Delete the entire section.
SUBSECTION: REVISION:	609.04.06 Joint Sealing. Replace Subsection 601.04 with the following: Subsection 606.04.08.

**Supplemental Specifications to The Standard Specifications
 for Road and Bridge Construction, 2008 Edition**
 (Effective with the March 18, 2011 Letting)

<p>SUBSECTION: REVISION:</p>	<p>609.05 Payment. Replace the Pay Unit for Joint Sealing with the following: See Subsection 606.05.</p>
<p>SUBSECTION: REVISION:</p>	<p>701.03.06 Initial Backfill. Replace the first sentence of the last paragraph with the following: When the Contract specifies, perform quality control testing to verify compaction according to KM 64-512.</p>
<p>SUBSECTION: REVISION:</p>	<p>701.03.08 Testing of Pipe. Replace and rename the subsection with the following: <p align="center">701.03.08 Inspection of Pipe. The engineer will visually inspect all pipe. The Department will require camera/video inspection on a minimum of 50 percent of the linear feet of all installed pipe structures. Conduct camera/video inspection according to KM 64-114. The pipe to be installed under pavement will be selected first. If the total linear feet of pipe under pavement is less than 50 percent of the linear feet of all pipe installed, the Engineer will randomly select installations from the remaining pipe structures on the project to provide for the minimum inspection requirement. The pipe will be selected in complete runs (junction-junction or headwall-headwall) until the total linear feet of pipe to be inspected is at least 50 percent of the total linear feet of all installed pipe on the project.</p> <p>Unless the Engineer directs otherwise, schedule the inspections no sooner than 30 days after completing the installation and completion of earthwork to within 1 foot of the finished subgrade. When final surfacing conflicts with the 30-day minimum, conduct the inspections prior to placement of the final surface. The contractor must ensure that all pipe are free and clear of any debris so that a complete inspection is possible.</p> <p>Notify the Engineer immediately if distresses or locations of improper installation are discovered. When camera testing shows distresses or improper installation in the installed pipe, the Engineer may require additional sections to be tested. Provide the video and report to the Engineer when testing is complete in accordance with KM 64-114.</p> <p>Pipes that exhibit distress or signs of improper installation may necessitate repair or removal as the Engineer directs. These signs include, but are not limited to: deflection, cracking, joint separation, sagging or other interior damage. If corrugated metal or thermoplastic pipes exceed the deflection and installation thresholds indicated in the table below, provide the Department with an evaluation of each location conducted by a Professional Engineer addressing the severity of the deflection, structural integrity, environmental conditions, design service life, and an evaluation of the factor of safety using Section 12, "Buried Structures and Tunnel Liners," of the AASHTO LRFD Bridge Design Specifications. Based on the evaluation, the Department may allow the pipe to remain in place at a reduced unit price as shown in the table below. Provide 5 business days for the Department to review the evaluation. When the pipe shows deflection of 10 percent or greater, remove and replace the pipe. When the camera/video or laser inspection results are called into question, the Department may require direct measurements or mandrel testing.</p> <p>The Cabinet may elect to conduct Quality Assurance verifications of any pipe inspections.</p> </p>
<p>SUBSECTION: REVISION:</p>	<p>701.04.07 Testing. Replace and rename the subsection with the following: <p align="center">701.04.07 Pipeline Video Inspection. The Department will measure the quantity in linear feet along the pipe invert of the structure inspected. When inspection above the specified 50 percent is performed due to a disagreement or suspicion of additional distresses and the Department is found in error, the Department will measure the quantity as Extra Work according to Subsection 104.03. However, if additional distresses or non-conformance is found, the Department will not measure the additional inspection for payment.</p> </p>

**Supplemental Specifications to The Standard Specifications
 for Road and Bridge Construction, 2008 Edition**
 (Effective with the March 18, 2011 Letting)

SUBSECTION: REVISION:	701.05 PAYMENT. Add the following pay item to the list of pay items: <table border="0"> <tr> <td><u>Code</u></td> <td><u>Pay Item</u></td> <td><u>Pay Unit</u></td> </tr> <tr> <td>23131ER701</td> <td>Pipeline Video Inspection</td> <td>Linear Foot</td> </tr> </table>	<u>Code</u>	<u>Pay Item</u>	<u>Pay Unit</u>	23131ER701	Pipeline Video Inspection	Linear Foot						
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23131ER701	Pipeline Video Inspection	Linear Foot											
SUBSECTION: TABLE: REVISION:	701.05 PAYMENT PIPE DEFLECTION DETERMINED BY CAMERA TESTING Replace this table with the following table and note: <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="2">PIPE DEFLECTION</th> </tr> <tr> <th>Amount of Deflection (%)</th> <th>Payment</th> </tr> </thead> <tbody> <tr> <td>0.0 to 5.0</td> <td>100% of the Unit Bid Price</td> </tr> <tr> <td>5.1 to 9.9</td> <td>50% of the Unit Bid Price ⁽¹⁾</td> </tr> <tr> <td>10 or greater</td> <td>Remove and Replace</td> </tr> </tbody> </table> <p>(1) Provide Structural Analysis as indicated above. Based on the structural analysis, pipe may be allowed to remain in place at the reduced unit price.</p>	PIPE DEFLECTION		Amount of Deflection (%)	Payment	0.0 to 5.0	100% of the Unit Bid Price	5.1 to 9.9	50% of the Unit Bid Price ⁽¹⁾	10 or greater	Remove and Replace		
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SUBSECTION: TABLE: REVISION:	701.05 PAYMENT PIPE DEFLECTION DETERMINED BY MANDREL TESTING Delete this table.												
SUBSECTION: REVISION:	713.02.01 Paint. Replace with the following: Conform to Section 842 and Section 846.												
SUBSECTION: REVISION:	713.03 CONSTRUCTION. Replace the first sentence of the second paragraph with the following: On interstates and parkways, and other routes approved by the State Highway Engineer, install pavement striping that is 6 inches in width.												
SUBSECTION: REVISION:	713.03.03 Paint Application. Replace the second paragraph with the following table: <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Material</th> <th>Paint Application Rate</th> <th>Glass Beads Application Rate</th> </tr> </thead> <tbody> <tr> <td>4 inch waterborne paint</td> <td>Min. of 16.5 gallons/mile</td> <td>Min. of 6 pounds/gallon</td> </tr> <tr> <td>6 inch waterborne paint</td> <td>Min. of 24.8 gallons/mile</td> <td>Min. of 6 pounds/gallon</td> </tr> <tr> <td>6 inch durable waterborne paint</td> <td>Min. of 36 gallons/mile</td> <td>Min. of 6 pounds/gallon</td> </tr> </tbody> </table>	Material	Paint Application Rate	Glass Beads Application Rate	4 inch waterborne paint	Min. of 16.5 gallons/mile	Min. of 6 pounds/gallon	6 inch waterborne paint	Min. of 24.8 gallons/mile	Min. of 6 pounds/gallon	6 inch durable waterborne paint	Min. of 36 gallons/mile	Min. of 6 pounds/gallon
Material	Paint Application Rate	Glass Beads Application Rate											
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6 inch durable waterborne paint	Min. of 36 gallons/mile	Min. of 6 pounds/gallon											
SUBSECTION: REVISION:	713.03.04 Marking Removal. Replace the last sentence of the paragraph with the following: Vacuum all marking material and removal debris concurrently with the marking removal operation.												
SUBSECTION: REVISION:	713.05 PAYMENT. Insert the following codes and pay items below the Pavement Striping – Permanent Paint: <table border="0"> <tr> <td><u>Code</u></td> <td><u>Pay Item</u></td> <td><u>Pay Unit</u></td> </tr> <tr> <td>23159EN</td> <td>Durable Waterborne Marking – 6 IN W</td> <td>Linear Foot</td> </tr> <tr> <td>23160EN</td> <td>Durable Waterborne Marking – 6 IN Y</td> <td>Linear Foot</td> </tr> </table>	<u>Code</u>	<u>Pay Item</u>	<u>Pay Unit</u>	23159EN	Durable Waterborne Marking – 6 IN W	Linear Foot	23160EN	Durable Waterborne Marking – 6 IN Y	Linear Foot			
<u>Code</u>	<u>Pay Item</u>	<u>Pay Unit</u>											
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**Supplemental Specifications to The Standard Specifications
for Road and Bridge Construction, 2008 Edition**
(Effective with the March 18, 2011 Letting)

SUBSECTION: REVISION:	714.03 CONSTRUCTION. Insert the following paragraph at the end of the third paragraph: Use Type I Tape for markings on bridge decks, JPC pavement and JPC intersections. Thermoplastic should only be used for markings on asphalt pavement.
SUBSECTION: REVISION:	714.03.07 Marking Removal. Replace the third sentence of the paragraph with the following: Vacuum all marking material and removal debris concurrently with the marking removal operation.
SUBSECTION: REVISION:	716.01 DESCRIPTION. Insert the following after the first sentence: Energize lighting as soon as it is fully functional and ready for inspection. Ensure that lighting remains operational until the Division of Traffic Operations has provided written acceptance of the electrical work.
SUBSECTION: REVISION:	716.02.01 Roadway Lighting Materials. Replace the last two sentences of the paragraph with the following: Submit for material approval an electronic file of descriptive literature, drawings, and any requested design data to the Division of Traffic Operations. Do not begin work until shop drawings are approved. Notify the Engineer when submitting any information to the Division of Traffic Operations. Do not make substitutions for approved materials without written permission as described above.
SECTION: REVISION:	717 – THERMOPLASTIC INTERSECTION MARKINGS. Replace the section name with the following: INTERSECTION MARKINGS.
SUBSECTION: REVISION:	717.01 DESCRIPTION: Replace the paragraph with the following: Furnish and install thermoplastic or Type I tape intersection markings (Stop Bars, Crosswalks, Turn Arrows, etc.) Thermoplastic markings may be installed by either a machine applied, screed extrusion process or by applying preformed thermoplastic intersection marking material.
SUBSECTION: REVISION:	717.02 MATERIALS AND EQUIPMENT. Insert the following subsection: 717.02.06 Type I Tape. Conform to Section 836.
SUBSECTION: REVISION:	717.03.03 Application. Insert the following part to the subsection: B) Type I Tape Intersection Markings. Apply according to the manufacturer's recommendations. Cut all tape at pavement joints when applied to concrete surfaces.

**Supplemental Specifications to The Standard Specifications
 for Road and Bridge Construction, 2008 Edition**
 (Effective with the March 18, 2011 Letting)

<p>SUBSECTION: PART: REVISION:</p>	<p>717.03.05 Proving Period. A) Requirements. Insert the following to this section:</p> <p>2) Type I Tape. During the proving period, ensure that the pavement marking material shows no signs of failure due to blistering, excessive cracking, bleeding, staining, discoloration, oil content of the pavement materials, drippings, chipping, spalling, poor adhesion to the pavement, loss of retroreflectivity, vehicular damage, and normal wear. Type I Tape is manufactured off site and warranted by the manufacturer to meet certain retroreflective requirements. As long as the material is adequately bonded to the surface and shows no signs of failure due to the other items listed in Subsection 714.03.06 A) 1), retroreflectivity readings will not be required. In the absence of readings, the Department will accept tape based on a nighttime visual observation.</p>																																							
<p>SUBSECTION: REVISION:</p>	<p>717.03.06 Marking Removal. Replace the third sentence of the paragraph with the following:</p> <p>Vacuum all marking material and removal debris concurrently with the marking removal operation.</p>																																							
<p>SUBSECTION: REVISION:</p>	<p>717.05 PAYMENT. Insert the following bid item codes:</p> <table border="0"> <thead> <tr> <th><u>Code</u></th> <th><u>Pay Unit</u></th> <th><u>Pay Item</u></th> </tr> </thead> <tbody> <tr> <td>06563</td> <td>Pave Marking – R/R X Bucks 16 IN</td> <td>Linear Foot</td> </tr> <tr> <td>20782NS714</td> <td>Pave Marking Thermo – Bike</td> <td>Each</td> </tr> <tr> <td>23251ES717, 23264ES717</td> <td>Pave Mark TY I Tape X-Walk, Size</td> <td>Linear Foot</td> </tr> <tr> <td>23252ES717, 23265ES717</td> <td>Pave Mark TY I Tape Stop Bar, Size</td> <td>Linear Foot</td> </tr> <tr> <td>23253ES717</td> <td>Pave Mark TY I Tape Cross Hatch</td> <td>Square Foot</td> </tr> <tr> <td>23254ES717</td> <td>Pave Mark TY I Tape Dotted Lane Extension</td> <td>Linear Foot</td> </tr> <tr> <td>23255ES717</td> <td>Pave Mark TY I Tape Arrow, Type</td> <td>Each</td> </tr> <tr> <td>23268ES717-23270ES717</td> <td></td> <td></td> </tr> <tr> <td>23256ES717</td> <td>Pave Mark TY I Tape- ONLY</td> <td>Each</td> </tr> <tr> <td>23257ES717</td> <td>Pave Mark TY I Tape- SCHOOL</td> <td>Each</td> </tr> <tr> <td>23266ES717</td> <td>Pave Mark TY 1 Tape R/R X Bucks-16 IN</td> <td>Linear Foot</td> </tr> <tr> <td>23267ES717</td> <td>Pave Mark TY 1 Tape-Bike</td> <td>Each</td> </tr> </tbody> </table>	<u>Code</u>	<u>Pay Unit</u>	<u>Pay Item</u>	06563	Pave Marking – R/R X Bucks 16 IN	Linear Foot	20782NS714	Pave Marking Thermo – Bike	Each	23251ES717, 23264ES717	Pave Mark TY I Tape X-Walk, Size	Linear Foot	23252ES717, 23265ES717	Pave Mark TY I Tape Stop Bar, Size	Linear Foot	23253ES717	Pave Mark TY I Tape Cross Hatch	Square Foot	23254ES717	Pave Mark TY I Tape Dotted Lane Extension	Linear Foot	23255ES717	Pave Mark TY I Tape Arrow, Type	Each	23268ES717-23270ES717			23256ES717	Pave Mark TY I Tape- ONLY	Each	23257ES717	Pave Mark TY I Tape- SCHOOL	Each	23266ES717	Pave Mark TY 1 Tape R/R X Bucks-16 IN	Linear Foot	23267ES717	Pave Mark TY 1 Tape-Bike	Each
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<p>SUBSECTION: REVISION:</p>	<p>725.02.02 Type VI Class C & CT. Replace bullet 2) with the following:</p> <p>2) The SCI100GM System as developed by SCI Products, Inc. of St. Charles, Illinois. For all miscellaneous metal work conform to ASTM A 36 and galvanize according to ASTM A 123. For the SCI100GM fender panels conform to AASHTO 180. Galvanize the SCI100GM fender panels and SCI100GM -beam connectors after fabrication according to ASTM A 123.</p>																																							
<p>SUBSECTION: REVISION:</p>	<p>725.02.04 Type VII Class C. Replace bullet 2) with the following:</p> <p>2) The SCI100GM System as developed by SCI Products, Inc. of St. Charles, Illinois. For all miscellaneous metal work conform to ASTM A 36 and galvanize according to ASTM A 123. For the SCI100GM fender panels conform to AASHTO 180. Galvanize the SCI100GM fender panels and SCI100GM-beam connectors after fabrication according to ASTM A 123.</p>																																							
<p>SUBSECTION: REVISION:</p>	<p>801.01 REQUIREMENTS. Delete the fourth sentence of the first paragraph and add the following to the second paragraph.</p> <p>When supplying cement with a SO₃ content above the value in table I of ASTM C 150, include supportive ASTM C 1038 14-day expansion test data for the supplied SO₃ content on the certification.</p>																																							

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SUBSECTION: REVISION:	805.01 GENERAL. Replace the second paragraph with the following: The Department's List of Approved Materials includes the Aggregate Source List, the list of Class A and Class B Polish-Resistant Aggregate Sources, and the Concrete Restriction List.
SUBSECTION: REVISION:	805.04 CONCRETE. Replace the "AASHTO T 160" reference in first sentence of the third paragraph with "KM 64-629"
SUBSECTION: TABLE: PART: REVISION:	805.15 GRADATION ACCEPTANCE OF NON-SPECIFICATION COARSE AGGREGATE. AGGREGATE SIZE USE Cement Concrete Structures and Incidental Construction Replace "9-M for Waterproofing Overlays" with "8 or 9-M for Waterproofing Overlays"

**Supplemental Specifications to The Standard Specifications
 for Road and Bridge Construction, 2008 Edition**
 (Effective with the March 18, 2011 Letting)

SUBSECTION: REVISION:	805.16 SAMPLING AND TESTING. Replace the "AASHTO T 160" method with the "KM 64-629" method for the Concrete Beam Expansion Test. Replace the "ASTM D 3042" method with the "KM 64-625" method for Insoluble Residue.									
SUBSECTION: REVISION:	810.04.01 Coating Requirements. Replace the "Subsection 806.07" references with "Subsection 806.06"									
SUBSECTION: PART: REVISION:	810.06.01 Polyvinyl Chloride (PVC) Pipe. B) Culvert and Entrance Pipe. Replace the title with the following: B) Culvert Pipe, Storm Sewer, and Entrance Pipe.									
SUBSECTION: REVISION:	823.02 LIQUID MEMBRANE FORMING COMPOUNDS. Add the following: Effective July 1, 2011, to remain on or be added to the Department's approved list, products must have completed testing or been submitted for testing through the National Transportation Product Evaluation Program (NTPEP) for Concrete Curing Compounds.									
SUBSECTION: REVISION:	837.03 APPROVAL. Replace the last sentence with the following: The Department will sample and evaluate for approval each lot of thermoplastic material delivered for use per contract prior to installation of the thermoplastic material. Do not allow the installation of thermoplastic material until it has been approved by the Division of Materials. Allow the Department a minimum of 10 working days to evaluate and approve thermoplastic material.									
SUBSECTION: REVISION:	837.03.01 Composition. COMPOSITION Table: Replace <table border="1" style="margin-left: 20px;"> <tr> <td style="padding: 2px;">Lead Chromate</td> <td style="padding: 2px; text-align: center;">0.0 max.</td> <td style="padding: 2px; text-align: center;">4.0 min.</td> </tr> <tr> <td style="padding: 2px;">with</td> <td colspan="2"></td> </tr> <tr> <td style="padding: 2px;">Heavy Metals Content</td> <td colspan="2" style="padding: 2px; text-align: center;">Comply with 40 CFR 261</td> </tr> </table>	Lead Chromate	0.0 max.	4.0 min.	with			Heavy Metals Content	Comply with 40 CFR 261	
Lead Chromate	0.0 max.	4.0 min.								
with										
Heavy Metals Content	Comply with 40 CFR 261									
SUBSECTION: TABLE: REVISION:	842.02 APPROVAL. PAINT COMPOSITION Revise the following in the table: Replace the 2.0ΔE* values in the table with 4.0ΔE* for both Yellow and White Paint on both the Daytime and Nighttime Color Spectrophotometer.									
SECTION: REVISION:	DIVISION 800 MATERIAL DETAILS Add the following section in Division 800 <p align="center">SECTION 846 – DURABLE WATERBORNE PAINT</p> <p>846.01 DESCRIPTION. This section covers quick-drying durable waterborne pavement striping paint for permanent applications. The paint shall be ready-mixed, one-component, 100% acrylic waterborne striping paint suitable for application on such traffic-bearing surfaces as Portland cement concrete, bituminous cement concrete, asphalt, tar, and previously painted areas of these surfaces.</p> <p>846.02 Approval. Select materials that conform to the composition requirements below. Provide independent analysis data and certification for each formulation stating the total concentration of each heavy metal present, the test method used for each determination, and compliance to 40 CFR 261 for leachable heavy metals content. Submit initial samples for approval before beginning striping</p>									

**Supplemental Specifications to The Standard Specifications
 for Road and Bridge Construction, 2008 Edition
 (Effective with the March 18, 2011 Letting)**

operations. The initial sample may be sent from the manufacture of the paint. The Department will randomly sample and evaluate the paint each week that the striping operations are in progress.

The non-volatile portion of the vehicle shall be composed of a 100% acrylic polymer as determined by infrared spectral analysis. The acrylic resin used shall be a 100% cross-linking acrylic as evidenced by infrared peaks at wavelengths 1568, 1624, and 1672 cm-1 with intensities equal to those produced by an acrylic resin known to be 100% cross-linking.

PAINT COMPOSITION		
Property and Test Method	Yellow	White
Daytime Color (CIELAB) Spectrophotometer using illuminant D65 at 45° illumination and 0° viewing with a 2° observer	L* 81.76 a* 19.79 b* 89.89 Maximum allowable variation 4.0ΔE*	L* 93.51 a* -1.01 b* 0.70 Maximum allowable variation 4.0ΔE*
Nighttime Color (CIELAB) Spectrophotometer using illuminant A at 45° illumination and 0° viewing with a 2° observer	L* 86.90 a* 24.80 b* 95.45 Maximum allowable variation 4.0ΔE*	L* 93.45 a* -0.79 b* 0.43 Maximum allowable variation 4.0ΔE*
Heavy Metals Content	Comply with 40 CFR 261	Comply with 40 CFR 261
Titanium Dioxide ASTM D 4764	NA	10% by weight of pigment min.
VOC ASTM D 2369 and D 4017	1.25 lb/gal max.	1.25 l/gal max.
Contrast Ratio (at 15 mils wft)	0.97	0.99

846.02.01 Manufacturers Certification. Provide a certification of analysis for each lot of traffic paint produced stating conformance to the requirements of this section. Report the formulation identification, traffic paint trade name, color, date of manufacturer, total quantity of lot produced, actual quantity of traffic paint represented, sampling method utilized to obtain the samples, and data for each sample tested to represent each lot produced.

846.03 ACCEPTANCE PROCEDURES FOR NON-SPECIFICATION DURABLE WATERBORNE PAVEMENT STRIPING PAINT. When non-specification paint is inadvertently incorporated into the work the Department will accept the material with a reduction in pay. The percentage deduction is cumulative based on its compositional properties, but will not exceed 60 percent. The Department will calculate the payment reduction on the unit bid price for the routes where the non-specification paint was used.

DURABLE WATERBORNE PAVEMENT STRIPING PAINT REDUCTION SCHEDULE						
Non-conforming Property	Resin	Color	Contrast	TiO ₂	VOC	Heavy Metals Content
Reduction Rate	60%	10%	10%	10%	60%	60%

**Supplemental Specifications to The Standard Specifications
for Road and Bridge Construction, 2008 Edition**
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APPENDIX A: PART: REVISION:	TABLUTION OF CONSTRUCTION TOLERANCES. 601.03.03 Replace with the following: Concrete accuracy of individual ingredient material for each batch. ± 2.0% for aggregates ± 1.0% for water ± 1.0% for cement in batches of 4 cubic yards or greater ± 1.0% for total cementitious materials in batches of 4 cubic yards or greater 0.0% to + 4.0% for cement in batches less than 4 cubic yards 0.0% to + 4.0% for total cementitious materials in batches less than 4 cubic yards ± 3.0% for admixtures
APPENDIX A: PART: REVISION:	TABLUTION OF CONSTRUCTION TOLERANCES. 601.03.03 C) 2) Delete

11

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 or flip disk/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) Allow direct wiring for operation of the sign or arrow board from an external power source when desired.
- 7) Be Highway Orange on all exterior surfaces of the trailer, supports, and controller cabinet.
- 8) Provide operation in ambient temperatures from -30 to + 120 degrees Fahrenheit during snow, rain and other inclement weather.
- 9) 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.
- 10) 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.

- 11) Provide a flat black UV protected coating on the sign hardware, character PCB, and appropriate lens areas.
- 12) Provide a photocell control to provide automatic dimming.
- 13) Allow an on-off flashing sequence at an adjustable rate.
- 14) Provide a sight to aim the message.
- 15) Provide a LED display color of approximately 590 nm amber.
- 16) Provide a controller that is password protected.
- 17) Provide a security device that prevents unauthorized individuals from accessing the controller.
- 18) 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 Requirements for Flip-Disc Type Signs. Flip-disc type signs will have the following additional requirements:

- 1) Disc faces are fluorescent yellow on one side, and flat black on the reverse.
- 2) Discs are at least 3.5 square inches with a minimum character size of 5 discs horizontally by 7 discs vertically.
- 3) Discs are designed to operate without lubrication for at least 200 million operations.
- 4) Line change speed of 600 milliseconds or less.
- 5) When power is lost, the sign automatically becomes blank or displays a preprogrammed default message.

2.4 Power.

- 1) Design solar panels to yield 10 percent or greater additional charge than sign consumption. 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.
- 2) Diesel Power Source. Ensure the following is provided for:
 - a) At least 24 spare bulbs available on the project for quick replacement of burned out bulbs.
 - b) Black light at both top and bottom of each line to illuminate discs for visibility at night or under adverse weather conditions, for flip disk signs.

11

- c) Diesel generator and electric start assembly, including batteries and a fuel capacity adequate to provide at least 72 hours continuous operation without refueling.
- d) Fuel gage.
- e) Provide all other specific features, such as bulb size, protection from sun glare, and shock protection for electronics and bulbs, to the satisfaction of the Engineer.

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. Unless the Contract specifies flip-disk signs, use Class I signs on interstates and parkways.

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 or disk.

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 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

January 5, 2010

9Y

SPECIAL NOTE FOR MATERIAL TRANSFER VEHICLE

This Special Note will apply when indicated on the plans or in the proposal. Section references herein are to the Department's 2008 Standard Specifications for Road and Bridge Construction.

1.0 DESCRIPTION. Provide and use a Material Transfer Vehicle (MTV) to place asphalt mixtures.

2.0 MATERIALS AND EQUIPMENT. In addition to the equipment specified in Subsection 403.02, provide a MTV with the following minimum characteristics:

- 1) A system to independently deliver asphalt mixtures from the hauling equipment to the paving equipment;
- 2) A high capacity truck unloading system, capable of 600 tons per hour, that will receive asphalt mixtures from the hauling equipment;
- 3) A minimum combined capacity, including the MTV storage bin and paver hopper, of 25 tons of asphalt mixture;
- 4) An auger system in the storage bin to continuously blend the asphalt mixture prior to discharge to the conveyor system; and
- 5) A discharge conveyor, with the ability to swivel, to deliver the mixture to the paving spreader while allowing the MTV to operate from an adjacent lane.

3.0 CONSTRUCTION. When constructing driving lanes, use a MTV to place asphalt mixtures. When the Engineer determines the use of the MTV is not practical for a portion of the project he may waive its requirement for that portion.

4.0 MEASUREMENT.

4.1 Asphalt Placement with MTV. The Department will not measure the MTV for payment and will consider its use incidental to the asphalt mixture.

4.2 Asphalt Mixture. The Department will measure the quantity according to Section 402.

5.0 PAYMENT. The Department will make payment for the completed and accepted quantities under the following:

<u>Code</u>	<u>Pay Item</u>	<u>Pay Unit</u>
----	Asphalt Mixture, Type	Ton

March 12, 2008

10L

**SPECIAL NOTE FOR CHANNEL CHANGE
EROSION CONTROL BLANKET**

This Special Note will apply when indicated on the plans or in the proposal.

1.0 DESCRIPTION. This specification covers erosion control blankets used for channel changes.

2.0 MATERIALS.

2.1 Erosion Control Blanket. Use a woven blanket made of 100 percent machine spun bristle coir fiber. Ensure the nominal thickness is at least 0.30 inches. Ensure the blanket’s nominal weight is at least 11.8 ounces per square yard. Ensure the nominal open area of the blanket does not exceed 65 percent.

2.2 Staples. Use steel wire U-shaped staples with a minimum diameter of 0.148 inches (9 gauge), a minimum width of one inch, and a minimum length of 6 inches. Use a heavier gauge when working in rocky or clay soils and longer lengths in sandy soils.

3.0 CONSTRUCTION. Prepare the bed by loosening the soil to a depth of 2 to 3 inches. Apply fertilizer, limestone, and seed at the permanent seeding rate. Cover with the erosion control blanket. Roll out the blanket in the direction of the anticipated channel flow. Anchor the blanket at the top, toe, and edges of channels on a one-foot spacing as the “Anchoring Edges and Ends” figure shows. Secure the blanket by stapling as the “Stapling Pattern” figure shows. At seams, overlap the blanket as the “Seam Overlaps” figure shows. Ensure staples are fully driven and snug against the blanket. If staples are bending, use a heavier gauge staple. Rework areas that become unstable or do not establish vegetation.

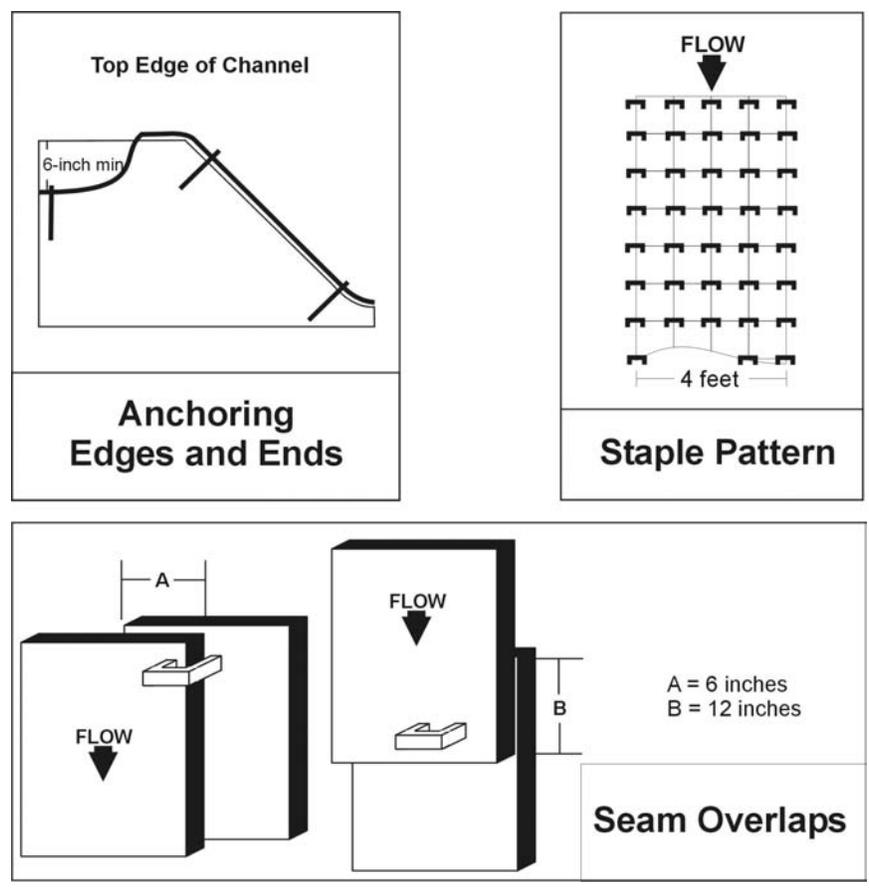
4.0 MEASUREMENT. The Department will measure the quantity of Erosion Control Blanket by the square yard of surface covered. The Department will not measure preparation of the bed or seeding for payment and will consider them incidental to the Erosion Control Blanket. The Department will not measure any reworking of slopes or channels for payment as it is considered corrective work and incidental to the Erosion Control Blanket.

5.0 PAYMENT. The Department will make payment for the completed and accepted quantities under the following:

<u>Code</u>	<u>Pay Item</u>	<u>Pay Unit</u>
----	Channel Change Erosion Control Blanket	Square Yard

The Department will consider payment as full compensation for all work required under this note.

10L



January 1, 2008

SPECIAL PROVISION FOR EMBANKMENT AT BRIDGE END BENT STRUCTURES

This Special Provision will apply when indicated on the plans or in the proposal. Section references herein are to the Department's 2008 Standard Specifications for Road and Bridge Construction.

1.0 DESCRIPTION. Construct a soil, granular, or rock embankment with granular or cohesive pile core and place structure granular backfill, as the Plans require. Construct the embankment according to the requirements of this Special Provision, the Plans, Standard Drawing RGX 100 and 105, and the 2008 Standard Specifications.

2.0 MATERIALS.

2.1 Granular Embankment. Conform to Subsection 805.10. When Granular Embankment materials are erodible or unstable according to Subsection 805.03.04, use the Special Construction Methods found in 3.2 of the Special Provision.

2.2 Rock Embankment. Provide durable rock from roadway excavation that consists principally of Unweathered Limestone, Durable Shale (SDI equal to or greater than 95 according to KM 64-513), or Durable Sandstone.

2.3 Granular Pile Core. Select a gradation of durable rock to facilitate pile driving that conforms to Subsection 805.11. If granular pile core material hinders pile driving operations, take appropriate means necessary to reach the required pile tip elevation, at no expense to the Department.

2.4 Cohesive Pile Core. Conform to Section 206 of the Standard Specifications and use soil with at least 50 percent passing a No. 4 sieve having a minimum Plasticity Index (PI) of 10. In addition, keep the cohesive pile core free of boulders, larger than 6 inches in any dimension, or any other obstructions, which would interfere with drilling operations. If cohesive pile core material interferes with drilling operations, take appropriate means necessary to maintain excavation stability, at no expense to the Department.

2.5 Structure Granular Backfill. Conform to Subsection 805.11

2.6 Geotextile Fabric. Conform to Type I or Type IV in Section 214 and 843 as required in the plans.

3.0 CONSTRUCTION.

3.1 General. Construct roadway embankments at end bents according to Section 206 and in accordance with the Special Provision, the Plans, and Standard Drawings for the full embankment section. In some instances, granular or rock embankment will be required for embankment construction for stability purposes, but this special provision does not prevent the use of soil when appropriate. Refer to the plans for specific details regarding material requirements for embankment construction.

Place and compact granular or cohesive pile core, soil, granular or rock embankment, and structure granular backfill according to the applicable density requirements for the project. When constructing granular or rock embankments, use granular pile core for driven pile foundations and use cohesive pile core for pre-drilled pile or drilled shaft foundations. Place geotextile fabric, Type IV between cohesive pile core and structure granular backfill and granular or rock embankment.

When granular or rock embankment is required for embankment construction, conform to the general requirements of Subsection 206.03.02 B). In addition, place the material in no greater than 2-foot lifts and compact with a vibrating smooth wheel roller capable of producing a minimum centrifugal force of 15 tons. Apply these requirements to the full width of the embankment for a distance of half the embankment height or 50 feet, whichever is greater, as shown on Standard Drawing RGX-105.

When using granular pile core, install 8-inch perforated underdrain pipe at or near the elevation of the original ground in the approximate locations depicted on the standard drawing, and as the Engineer directs, to ensure positive drainage of the embankment. Wrap the perforated pipe with a fabric of a type recommended by the pipe manufacturer.

After constructing the embankment, excavate for the end bent cap, drive piling or install shafts, place the mortar bed, construct the end bent, and complete the embankment to finish grade according to the construction sequence shown on the Plans or Standard Drawings and as specified hereinafter.

After piles are driven or shafts installed (see design drawings), slope the bottom of the excavation towards the ends of the trench as noted on the plans for drainage. Using a separate pour, place concrete mortar, or any class concrete, to provide a base for forming and placing the cap. Place side forms for the end bent after the mortar has set sufficiently to support workmen and forms without being disturbed.

Install 4-inch perforated pipe in accordance with the plans and Standard Drawings. In the event slope protection extends above the elevation of the perforated pipe, extend the pipe through the slope protection.

After placing the end bent cap and removing adjacent forms, fill the excavation with structure granular backfill material to the level of the berm prior to placing beams for the bridge. For soil embankments, place Type IV geotextile fabric between embankment material and structure granular backfill. After completing the end bent backwall, or after completing the span end wall, place the structure granular backfill to subgrade elevation. If the original excavation is enlarged, fill the entire volume with compacted structure granular backfill at no expense to the Department. Do not place backfill before removing adjacent form work. Place structure granular backfill material in trench ditches at the ends of the excavation. Place Geotextile Fabric, Type IV over the surface of structure granular backfill prior to placing aggregate base course.

Tamp the backfill with hand tampers, pneumatic tampers, or other means the Engineer approves. Thoroughly compact the backfill under the overhanging portions of the structure to ensure that the backfill is in intimate contact with the sides of the structure.

Do not apply seeding, sodding, or other vegetation to the exposed granular embankment.

3.2 Special Construction Methods. Erodible or unstable materials may erode even when protected by riprap or channel lining; use the special construction method described below when using these materials.

Use fine aggregates or friable sandstone granular embankment at "dry land" structures only. Do not use them at stream crossings or locations subject to flood waters.

For erodible or unstable materials having 50 percent or more passing the No. 4 sieve, protect with geotextile fabric. Extend the fabric from the original ground to the top of slope over the entire area of the embankment slopes on each side of, and in front of, the end bent. Cover the fabric with at least 12 inches of non-erodible material.

For erodible or unstable materials having less than 50 percent passing a No. 4 sieve, cover with at least 12 inches of non-erodible material.

Where erodible or unstable granular embankment will be protected by riprap or channel lining, place geotextile fabric between the embankment and the specified slope protection.

4.0 MEASUREMENT.

4.1 Granular Embankment. The Department will measure the quantity in cubic yards using the plan quantity, increased or decreased by authorized adjustments as specified in Section 204. The Department will not measure for payment any Granular Embankment that is not called for in the plans.

The Department will not measure for payment any special construction caused by using erodible or unstable materials and will consider it incidental to the Granular Embankment regardless of whether the erodible or unstable material was specified or permitted.

4.2 Rock Embankment. The Department will not measure for payment any rock embankment and will consider it incidental to roadway excavation or embankment in place, as applicable. (embankments requiring rock with none present within project excavation limits will be constructed using granular embankment)

4.3 Granular Pile Core. The Department will measure the quantity in cubic yards using the plan quantity, increased or decreased by authorized adjustments as specified in Section 204. The Department will not measure for payment furnishing and placing 8-inch perforated underdrain pipe and will consider it incidental to the Granular pile core. The Department will not measure for payment any granular pile core that is necessary because the contractor elects to use granular or rock embankment when it is not specified in the plans.

4.4 Cohesive Pile Core. The Department will measure the quantity in cubic yards using the plan quantity, increased or decreased by authorized adjustments as specified in Section 204.

4.5 Structure Granular Backfill. The Department will measure the quantity in cubic yards using the plan quantity, increased or decreased by authorized adjustments as specified in Section 204. The Department will not measure any additional material required for backfill outside the limits shown on the Plans and Standard Drawings for payment and will consider it incidental to the work.

When following construction sequence “A”, as shown on the Standard Drawings, the Department will not measure structure excavation at the end bent for payment and will consider it incidental to Structure Granular Backfill.

The Department will not measure for payment the 4-inch perforated underdrain pipe and will consider it incidental to the Structure Granular Backfill.

4.6 Geotextile Fabric. The Department will measure the quantities as specified in Section 214. The Department will not measure the quantity of fabric used for separating granular or rock embankment and cohesive pile core and will consider it incidental to cohesive pile core.

4.7 End Bent. The Department will measure the quantities according to the Contract. The Department will not measure furnishing and placing the 2-inch mortar or concrete bed for payment and will consider it incidental to the end bent construction.

5.0 PAYMENT. The Department will make payment for the completed and accepted quantities under the following:

<u>Code</u>	<u>Pay Item</u>	<u>Pay Unit</u>
02223	Granular Embankment	Cubic Yards
20209EP69	Granular Pile Core	Cubic Yards
20210EP69	Cohesive Pile Core	Cubic Yards

69

02231	Structure Granular Backfill	Cubic Yards
02596, 02599	Geotextile Fabric, Type	See Section 214

The Department will consider payment as full compensation for all work required in this provision.

April 24, 2008

PART III

EMPLOYMENT, WAGE AND RECORD REQUIREMENTS

**TRANSPORTATION CABINET
DEPARTMENT OF HIGHWAYS**

**LABOR AND WAGE REQUIREMENTS
APPLICABLE TO OTHER THAN FEDERAL-AID SYSTEM PROJECTS**

- I. Application
- II. Nondiscrimination of Employees (KRS 344)
- III. Payment of Predetermined Minimum Wages
- IV. Statements and Payrolls

I. APPLICATION

1. These contract provisions shall apply to all work performed on the contract by the contractor with his own organization and with the assistance of workmen under his immediate superintendence and to all work performed on the contract by piecework, station work or by subcontract. The contractor's organization shall be construed to include only workmen employed and paid directly by the contractor and equipment owned or rented by him, with or without operators.

2. The contractor shall insert in each of his subcontracts all of the stipulations contained in these Required Provisions and such other stipulations as may be required.

3. A breach of any of the stipulations contained in these Required Provisions may be grounds for termination of the contract.

II. NONDISCRIMINATION OF EMPLOYEES

**AN ACT OF THE KENTUCKY
GENERAL ASSEMBLY TO PREVENT
DISCRIMINATION IN EMPLOYMENT
KRS CHAPTER 344
EFFECTIVE JUNE 16, 1972**

The contract on this project, in accordance with KRS Chapter 344, provides that during the performance of this contract, the contractor agrees as follows:

1. The contractor shall not fail or refuse to hire, or shall not discharge any individual, or otherwise discriminate against an individual with respect to his compensation, terms, conditions, or privileges of employment, because of such individual's race, color, religion, national origin, sex, disability or age (between forty and seventy); 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 (between forty and seventy). 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, disability or age (between forty and seventy), except that such notice or advertisement may indicate a preference, limitation, or specification based on religion, or national origin when religion, or national origin 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 (between forty and seventy), 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.

III. PAYMENT OF PREDETERMINED MINIMUM WAGES

1. These special provisions are supplemented elsewhere in the contract by special provisions which set forth certain predetermined minimum wage rates. The contractor shall pay not less than those rates.

2. The minimum wage determination schedule shall be posted by the contractor, in a manner prescribed by the Department of Highways, at the site of the work in prominent places where it can be easily seen by the workers.

IV. STATEMENTS AND PAYROLLS

1. All contractors and subcontractors affected by the terms of KRS 337.505 to 337.550 shall keep full and accurate payroll records covering all disbursements of wages to their employees to whom they are required to pay not less than the prevailing rate of wages. Payrolls and basic records relating thereto will be maintained during the course of the work and preserved for a period of one (1) year from the date of completion of this contract.

2. The payroll records shall contain the name, address and social security number of each employee, his correct classification, rate of pay, daily and weekly number of hours worked, itemized deductions made and actual wages paid.

3. The contractor shall make his daily records available at the project site for inspection by the State Department of Highways contracting office or his authorized representative.

Periodic investigations shall be conducted as required to assure compliance with the labor provisions of the contract. Interrogation of employees and officials of the contractor shall be permitted during working hours.

Aggrieved workers, Highway Managers, Assistant District Engineers, Resident Engineers and Project Engineers shall report all complaints and violations to the Division of Contract Procurement.

The contractor shall be notified in writing of apparent violations. The contractor may correct the reported violations and notify the Department of Highways of the action taken or may request an informal hearing. The request for hearing shall be in writing within ten (10) days after receipt of the notice of the reported violation. The contractor may submit

records and information which will aid in determining the true facts relating to the reported violations.

Any person or organization aggrieved by the action taken or the findings established as a result of an informal hearing by the Division of Contract Procurement may request a formal hearing.

4. The wages of labor shall be paid in legal tender of the United States, except that this condition will be considered satisfied if payment is made by a negotiable check, on a solvent bank, which may be cashed readily by the employee in the local community for the full amount, without discount or collection charges of any kind. Where checks are used for payments, the contractor shall make all necessary arrangements for them to be cashed and shall give information regarding such arrangements.

5. No fee of any kind shall be asked or accepted by the contractor or any of his agents from any person as a condition of employment on the project.

6. No laborers shall be charged for any tools used in performing their respective duties except for reasonably avoidable loss or damage thereto.

7. Every employee on the work covered by this contract shall be permitted to lodge, board, and trade where and with whom he elects and neither the contractor nor his agents, nor his employees shall directly or indirectly require as a condition of employment that an employee shall lodge, board or trade at a particular place or with a particular person.

8. Every employee on the project covered by this contract shall be an employee of either the prime contractor or an approved subcontractor.

9. No charge shall be made for any transportation furnished by the contractor or his agents to any person employed on the work.

10. No individual shall be employed as a laborer or mechanic on this contract except on a wage basis, but this shall not be construed to prohibit the rental of teams, trucks or other equipment from individuals.

No Covered employee may be employed on the work except in accordance with the classification set forth in the schedule mentioned above; provided, however, that in the event additional classifications are required, application shall be made by the contractor to the Department of Highways and (1) the Department shall request appropriate classifications and rates from the proper agency, or (2) if there is urgent need for additional classification to avoid undue delay in the work, the contractor may employ such workmen at rates deemed comparable to rates established for similar classifications provided he has made written application through the Department of Highways, addressed to the proper agency, for the supplemental rates. The contractor shall retroactively adjust, upon receipt of the supplemental rates schedule, the wages of any employee paid less than the established rate and may adjust the wages of any employee overpaid.

11. 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 laborer or mechanic in any work-week in which he is employed on such work, to work in excess of eight hours in any calendar day or in excess of forty hours in such work-week unless such laborer or mechanic receives compensation at a rate not less than one and one half times his basic rate of pay for all hours worked in excess of eight hours in any calendar day or in excess of forty hours in such work-week. 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. This agreement shall be in writing and shall be executed prior to the employee working in excess of eight (8) hours, but not more than ten (10) hours, in any one (1) calendar day.

12. Payments to the contractor may be suspended or withheld due to failure of the contractor to pay any laborer or

mechanic employed or working on the site of the work, all or part of the wages required under the terms of the contract. The Department may suspend or withhold payments only after the contractor has been given written notice of the alleged violation and the contractor has failed to comply with the wage determination of the Department of Highways.

13. Contractors and subcontractors shall comply with the sections of Kentucky Revised Statutes, Chapter 337 relating to contracts for Public Works.

Revised 2-16-95

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 (6) provides:

No present or former public servant shall, within six (6) months of 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 the state in matters in which he was directly involved during 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, provided that, for a period of six (6) months, he personally refrains from working on any matter in which he was directly involved 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.

KRS 11A.040 (8) states:

A former public servant shall not represent a person in a matter before a state agency in which the former public servant was directly involved, 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, Room 136, Capitol Building, 700 Capitol Avenue, Frankfort, Kentucky 40601; telephone (502) 564-7954.

Kentucky Equal Employment Opportunity Act of 1978

The requirements of the Kentucky Equal Employment Opportunity Act of 1978 (KRS 45.560-45.640) shall apply to this Contract. The apparent low Bidder will be required to submit EEO forms to the Division of Construction Procurement, which will then forward to the Finance and Administration Cabinet for review and approval. No award will become effective until all forms are submitted and EEO/CC has certified compliance. The required EEO forms are as follows:

- EEO-1: Employer Information Report
- Affidavit of Intent to Comply
- Employee Data Sheet
- Subcontractor Report

These forms are available on the Finance and Administration's web page under ***Vendor Information, Standard Attachments and General Terms*** at the following address:
<https://www.eProcurement.ky.gov>.

Bidders currently certified as being in compliance by the Finance and Administration Cabinet may submit a copy of their approval letter in lieu of the referenced EEO forms.

For questions or assistance please contact the Finance and Administration Cabinet by email at **finance.contractcompliance@ky.gov** or by phone at 502-564-2874.

General Decision Number: KY100211 03/25/2011 KY211

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).

Modification Number	Publication Date
0	10/22/2010
1	11/05/2010
2	12/03/2010
3	12/17/2010
4	12/31/2010
5	01/28/2011
6	03/25/2011

BRIN0004-003 04/01/2010

BRECKENRIDGE COUNTY

	Rates	Fringes
BRICKLAYER.....	\$ 27.47	12.53

BRKY0001-005 06/01/2009

BULLITT, CARROLL, GRAYSON, HARDIN, HENRY, JEFFERSON, LARUE, MARION, MEADE, NELSON, OLDHAM, SHELBY, SPENCER, & TRIMBLE COUNTIES:

	Rates	Fringes
BRICKLAYER.....	\$ 24.11	9.97

* BRKY0002-006 11/01/2010

BRACKEN, GALLATIN, GRANT, MASON & ROBERTSON COUNTIES:

	Rates	Fringes
BRICKLAYER.....	\$ 26.44	10.01

BRKY0007-004 06/01/2009

BOYD, CARTER, ELLIOT, FLEMING, GREENUP, LEWIS & ROWAN COUNTIES:

	Rates	Fringes
BRICKLAYER.....	\$ 26.82	15.30

BRKY0017-004 06/01/2009

ANDERSON, BATH, BOURBON, BOYLE, CLARK, FAYETTE, FRANKLIN,
HARRISON, JESSAMINE, MADISON, MERCER, MONTGOMERY, NICHOLAS,
OWEN, SCOTT, WASHINGTON & WOODFORD COUNTIES:

	Rates	Fringes
BRICKLAYER.....	\$ 24.11	9.97

CARP0064-001 07/01/2010

	Rates	Fringes
CARPENTER.....	\$ 25.45	12.21
Diver.....	\$ 37.64	10.23
PILEDRIVERMAN.....	\$ 25.09	10.23

ELEC0212-008 05/31/2010

BRACKEN, GALLATIN and GRANT COUNTIES

	Rates	Fringes
ELECTRICIAN.....	\$ 26.11	14.34

ELEC0212-014 01/01/2006

BRACKEN, GALLATIN & GRANT COUNTIES:

	Rates	Fringes
Sound & Communication Technician.....	\$ 20.45	6.95

ELEC0317-012 06/01/2010

BOYD, CARTER, ELLIOT & ROWAN COUNTIES:

	Rates	Fringes
Electricians:		
Cable Splicer.....	\$ 32.68	18.13
Electrician.....	\$ 31.87	19.58

ELEC0369-007 05/26/2010

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.....	\$ 29.27	13.08

ELEC0575-002 12/01/2009		

FLEMING, GREENUP, LEWIS & MASON COUNTIES:

	Rates	Fringes
ELECTRICIAN.....	\$ 30.79	11.88

ENGI0181-018 07/01/2010		

	Rates	Fringes
Operating Engineer:		
GROUP 1.....	\$ 25.35	13.00
GROUP 2.....	\$ 22.93	13.00
GROUP 3.....	\$ 23.31	13.00
GROUP 4.....	\$ 22.67	13.00

OPERATING ENGINEER CLASSIFICATIONS

GROUP 1 - A-Frame Winch Truck; Auto Patrol; Backfiller; Batch 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 06/01/2009

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.....	\$ 23.55	16.72
Structural.....	\$ 26.17	16.72

IRON0070-006 06/01/2010

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.....	\$ 24.99	17.98

 IRON0372-006 06/01/2010

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, Elmville, Longlick, Muddy Ford, Oxford, Rogers
 Gap, Sadieville, Skinnersburg & Stonewall) COUNTIES

	Rates	Fringes
IRONWORKER, REINFORCING Beyond 30-mile radius of Hamilton County, Ohio Courthouse.....	\$ 26.55	17.10
Up to & including 30-mile radius of Hamilton County, Ohio Courthouse.....	\$ 26.30	17.10

 IRON0769-007 06/01/2010

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,
 Pecksridge, 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.....	\$ 29.59	17.77
ZONE 2.....	\$ 29.99	17.77
ZONE 3.....	\$ 31.59	17.77

ZONE 1 - Up to 10 mi. radius of union hall, Ashland, Ky.,
 1643 Greenup Avenue
 ZONE 2 - 10 to 50 mi. radius of union hall;
 ZONE 3 - 50 mi. radius and beyond

 * LABO0189-003 07/01/2010

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.....	\$ 20.61	10.35
GROUP 2.....	\$ 20.86	10.35
GROUP 3.....	\$ 20.91	10.35
GROUP 4.....	\$ 21.51	10.35

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 07/01/2010

ANDERSON, BULLITT, CARROLL, HARDIN, HENRY, JEFFERSON, LARUE,
MARION, MEADE, NELSON, OLDHAM, SHELBY, SPENCER, TRIMBLE &
WASHINGTON COUNTIES

	Rates	Fringes
Laborers:		
GROUP 1.....	\$ 20.91	10.05
GROUP 2.....	\$ 21.16	10.05
GROUP 3.....	\$ 21.21	10.05
GROUP 4.....	\$ 21.81	10.05

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 07/01/2010

BRECKINRIDGE & GRAYSON COUNTIES

	Rates	Fringes
Laborers:		
GROUP 1.....	\$ 21.16	9.80
GROUP 2.....	\$ 21.41	9.80
GROUP 3.....	\$ 21.46	9.80
GROUP 4.....	\$ 22.06	9.80

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

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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 06/01/2010

BRACKEN, GALLATIN, GRANT, MASON & OWEN COUNTIES:

	Rates	Fringes
PAINTER (Heavy & Highway Bridges - Guardrails - Lightpoles - Striping)		
Bridge Equipment Tender and Containment Builder.....	\$ 20.27	8.10
Brush & Roller.....	\$ 22.85	8.10
Elevated Tanks; Steeplejack Work; Bridge & Lead Abatement.....	\$ 23.85	8.10
Sandblasting & Water Blasting.....	\$ 23.60	8.10
Spray.....	\$ 23.35	8.10

 PAIN0118-004 05/01/2010

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	10.30
Spray, Sandblast, Power		

Tools, Waterblast & Steam
Cleaning.....\$ 19.50 10.30

PAIN1072-003 12/01/2010

BOYD, CARTER, ELLIOTT, GREENUP, LEWIS and ROWAN COUNTIES

Rates Fringes

Painters:

Bridges; Locks; Dams;
Tension Towers & Energized
Substations.....\$ 29.03 11.90
Power Generating Facilities.\$ 25.79 11.90

PLUM0248-003 06/01/2010

BOYD, CARTER, ELLIOTT, GREENUP, LEWIS & ROWAN COUNTIES:

Rates Fringes

Plumber and Steamfitter.....\$ 31.37 15.23

PLUM0392-007 06/01/2008

BRACKEN, CARROLL (Eastern Half), GALLATIN, GRANT, MASON, OWEN &
ROBERTSON COUNTIES:

Rates Fringes

Plumbers and Pipefitters.....\$ 28.39 14.30

PLUM0502-003 08/01/2010

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.....\$ 30.50 15.13

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.

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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 (29 CFR 5.5(a)(1)(ii)).

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In the listing above, the "SU" designation means that rates
listed under the
identifier do not reflect collectively bargained wage and
fringe benefit
rates. Other designations indicate unions whose rates have
been determined
to be prevailing.

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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.

These rates are listed pursuant to the Kentucky Determination No. CR-10-III- HWY dated July 12, 2010.

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.

Ryan Griffith, Director
Division of Construction Procurement
Frankfort, Kentucky 40622

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

KENTUCKY TRANSPORTATION CABINET
 DEPARTMENT OF HIGHWAYS
 FRANKFORT, KY 40622

CONTRACT ID: 111027
 COUNTY: HARRISON
 PROPOSAL: JL04 049 0027 BYPASS

PAGE: 1
 LETTING: 06/17/11
 CALL NO: 323

LINE NO	ITEM	DESCRIPTION	APPROXIMATE QUANTITY	UNIT	UNIT PRICE	AMOUNT

ALT GROUPIAA10001 PAVING ALT 1-ASPH						
0010	00003	CRUSHED STONE BASE	67,857.000	TON		
0020	00100	ASPHALT SEAL AGGREGATE	702.000	TON		
0030	00212	CL2 ASPH BASE 1.00D PG64-22	34,809.000	TON		
0040	00221	CL2 ASPH BASE 0.75D PG64-22	4,385.000	TON		
0050	00291	EMULSIFIED ASPHALT RS-2	84.000	TON		
0060	00301	CL2 ASPH SURF 0.38D PG64-22	4,224.000	TON		
0070	00307	CL2 ASPH SURF 0.38B PG64-22	4,275.000	TON		
0080	02084	JPC PAVEMENT-8 IN	1,225.000	SQYD		
0090	10203ND	PAVEMENT ADJUSTMENT ASPH	(1.00)	LS	514,672.00	514,672.00

ALT GROUPIAA20002 PAVING ALT 2-CONC WITH CONC SHOULDER						
0100	00003	CRUSHED STONE BASE	52,745.000	TON		
0110	00100	ASPHALT SEAL AGGREGATE	53.000	TON		
0120	00212	CL2 ASPH BASE 1.00D PG64-22	5,301.000	TON		
0130	00221	CL2 ASPH BASE 0.75D PG64-22	4,385.000	TON		
0140	00291	EMULSIFIED ASPHALT RS-2	6.000	TON		
0150	00301	CL2 ASPH SURF 0.38D PG64-22	1,879.000	TON		
0160	02078	JPC PAVEMENT-6 IN SHLD	34,005.000	SQYD		
0170	02084	JPC PAVEMENT-8 IN	63,402.000	SQYD		
0180	10203ND	PAVEMENT ADJUSTMENT CONC W/CONC SHOULDER	(1.00)	LS	242,334.00	242,334.00

ALT GROUPIAA30003 PAVING ALT 3-CONC WITH ASPH SHOULDER						
0190	00003	CRUSHED STONE BASE	49,004.000	TON		

KENTUCKY TRANSPORTATION CABINET
 DEPARTMENT OF HIGHWAYS
 FRANKFORT, KY 40622

CONTRACT ID: 111027
 COUNTY: HARRISON
 PROPOSAL: JL04 049 0027 BYPASS

PAGE: 2
 LETTING: 06/17/11
 CALL NO: 323

LINE NO	ITEM	DESCRIPTION	APPROXIMATE QUANTITY	UNIT	UNIT PRICE	AMOUNT
0200	00100	ASPHALT SEAL AGGREGATE	702.000	TON		
0210	00212	CL2 ASPH BASE 1.00D PG64-22	11,477.000	TON		
0220	00221	CL2 ASPH BASE 0.75D PG64-22	4,385.000	TON		
0230	00291	EMULSIFIED ASPHALT RS-2	84.000	TON		
0240	00301	CL2 ASPH SURF 0.38D PG64-22	4,224.000	TON		
0250	00307	CL2 ASPH SURF 0.38B PG64-22	513.000	TON		
0260	02084	JPC PAVEMENT-8 IN	55,937.000	SQYD		
0270	10203ND	PAVEMENT ADJUSTMENT CONC W/ASPH SHOULDER	(1.00)	LS	242,334.00	242,334.00
SECTION 0004 ROADWAY						
0280	00078	CRUSHED AGGREGATE SIZE NO 2	6.000	TON		
0290	00440	ENTRANCE PIPE-15 IN	660.000	LF		
0300	00441	ENTRANCE PIPE-18 IN	86.000	LF		
0310	00443	ENTRANCE PIPE-24 IN	200.000	LF		
0320	00445	ENTRANCE PIPE-30 IN	46.000	LF		
0330	00462	CULVERT PIPE-18 IN	336.000	LF		
0340	00466	CULVERT PIPE-30 IN	672.000	LF		
0350	00468	CULVERT PIPE-36 IN	8.000	LF		
0360	00469	CULVERT PIPE-42 IN	160.000	LF		
0370	00470	CULVERT PIPE-48 IN	481.000	LF		
0380	00473	CULVERT PIPE-66 IN	270.000	LF		
0390	00522	STORM SEWER PIPE-18 IN	2,738.000	LF		

KENTUCKY TRANSPORTATION CABINET
 DEPARTMENT OF HIGHWAYS
 FRANKFORT, KY 40622

CONTRACT ID: 111027
 COUNTY: HARRISON
 PROPOSAL: JL04 049 0027 BYPASS

PAGE: 3
 LETTING: 06/17/11
 CALL NO: 323

LINE NO	ITEM	DESCRIPTION	APPROXIMATE QUANTITY	UNIT	UNIT PRICE	AMOUNT
0400	01001	PERFORATED PIPE-6 IN	354.000	LF		
0410	01011	NON-PERFORATED PIPE-6 IN	971.000	LF		
0420	01021	PERF PIPE HEADWALL TY 1-6 IN	4.000	EACH		
0430	01025	PERF PIPE HEADWALL TY 2-6 IN	1.000	EACH		
0440	01029	PERF PIPE HEADWALL TY 3-6 IN	1.000	EACH		
0450	01433	SLOPED BOX OUTLET TYPE 1-18 IN	1.000	EACH		
0460	01450	S & F BOX INLET-OUTLET-18 IN	11.000	EACH		
0470	01452	S & F BOX INLET-OUTLET-30 IN	4.000	EACH		
0480	01453	S & F BOX INLET-OUTLET-36 IN	1.000	EACH		
0490	01456	CURB BOX INLET TYPE A	26.000	EACH		
0500	01490	DROP BOX INLET TYPE 1	1.000	EACH		
0510	01810	STANDARD CURB AND GUTTER	2,987.900	LF		
0520	01825	ISLAND CURB AND GUTTER	4,169.300	LF		
0530	01845	ISLAND INTEGRAL CURB	100.000	LF		
0540	01875	STANDARD HEADER CURB	1,007.300	LF		
0550	01891	ISLAND HEADER CURB TYPE 2	345.600	LF		
0560	02014	BARRICADE-TYPE III	9.000	EACH		
0570	02091	REMOVE PAVEMENT	6,877.000	SQYD		
0580	02159	TEMP DITCH	26,009.000	LF		
0590	02160	CLEAN TEMP DITCH	26,009.000	LF		
0600	02242	WATER	1,000.000	MGAL		

KENTUCKY TRANSPORTATION CABINET
 DEPARTMENT OF HIGHWAYS
 FRANKFORT, KY 40622

CONTRACT ID: 111027
 COUNTY: HARRISON
 PROPOSAL: JL04 049 0027 BYPASS

PAGE: 4
 LETTING: 06/17/11
 CALL NO: 323

LINE NO	ITEM	DESCRIPTION	APPROXIMATE QUANTITY	UNIT	UNIT PRICE	AMOUNT
0610	02262	FENCE-WOVEN WIRE TYPE 1	22,734.000	LF		
0620	02360	GUARDRAIL TERMINAL SECTION NO 1	21.000	EACH		
0630	02363	GUARDRAIL CONNECTOR TO BRIDGE END TY A	4.000	EACH		
0640	02367	GUARDRAIL END TREATMENT TYPE 1	15.000	EACH		
0650	02369	GUARDRAIL END TREATMENT TYPE 2A	2.000	EACH		
0660	02397	TEMP GUARDRAIL	737.500	LF		
0670	02429	RIGHT-OF-WAY MONUMENT TYPE 1	48.000	EACH		
0680	02432	WITNESS POST	3.000	EACH		
0690	02482	CHANNEL LINING CLASS IA	159.000	TON		
0700	02483	CHANNEL LINING CLASS II	4,110.000	TON		
0710	02484	CHANNEL LINING CLASS III	4,170.000	TON		
0720	02545	CLEARING AND GRUBBING 119 ACRES	(1.00)	LS		
0730	02562	SIGNS	653.000	SQFT		
0740	02585	EDGE KEY	290.000	LF		
0750	02596	FABRIC-GEOTEXTILE TYPE I	2,664.000	SQYD		
0760	02600	FABRIC GEOTEXTILE TY IV FOR PIPE	11,351.000	SQYD		
0770	02650	MAINTAIN & CONTROL TRAFFIC	(1.00)	LS		
0780	02651	DIVERSIONS (BY-PASS DETOURS) #1	(1.00)	LS		
0790	02651	DIVERSIONS (BY-PASS DETOURS) #2	(1.00)	LS		
0800	02651	DIVERSIONS (BY-PASS DETOURS) #3	(1.00)	LS		
0810	02651	DIVERSIONS (BY-PASS DETOURS) #4	(1.00)	LS		

KENTUCKY TRANSPORTATION CABINET
 DEPARTMENT OF HIGHWAYS
 FRANKFORT, KY 40622

CONTRACT ID: 111027
 COUNTY: HARRISON
 PROPOSAL: JL04 049 0027 BYPASS

PAGE: 5
 LETTING: 06/17/11
 CALL NO: 323

LINE NO	ITEM	DESCRIPTION	APPROXIMATE QUANTITY	UNIT	UNIT PRICE	AMOUNT
0820	02651	DIVERSIONS (BY-PASS DETOURS) #5	(1.00)	LS		
0830	02671	PORTABLE CHANGEABLE MESSAGE SIGN	10.000	EACH		
0840	02701	TEMP SILT FENCE	20,980.000	LF		
0850	02703	SILT TRAP TYPE A	238.000	EACH		
0860	02704	SILT TRAP TYPE B	238.000	EACH		
0870	02705	SILT TRAP TYPE C	119.000	EACH		
0880	02706	CLEAN SILT TRAP TYPE A	714.000	EACH		
0890	02707	CLEAN SILT TRAP TYPE B	714.000	EACH		
0900	02708	CLEAN SILT TRAP TYPE C	357.000	EACH		
0910	02709	CLEAN TEMP SILT FENCE	41,960.000	LF		
0920	02726	STAKING	(1.00)	LS		
0930	02731	REMOVE STRUCTURE US 27	(1.00)	LS		
0940	02731	REMOVE STRUCTURE US 62	(1.00)	LS		
0950	05950	EROSION CONTROL BLANKET	11,342.000	SQYD		
0960	05952	TEMP MULCH	575,863.000	SQYD		
0970	05953	TEMP SEEDING AND PROTECTION	575,863.000	SQYD		
0980	05966	TOPDRESSING FERTILIZER	23.000	TON		
0990	05985	SEEDING AND PROTECTION	452,637.000	SQYD		
1000	05989	SPECIAL SEEDING CROWN VETCH	112,776.000	SQYD		
1010	05990	SODDING	570.000	SQYD		
1020	06510	PAVE STRIPING-TEMP PAINT-4 IN	11,600.000	LF		

KENTUCKY TRANSPORTATION CABINET
 DEPARTMENT OF HIGHWAYS
 FRANKFORT, KY 40622

CONTRACT ID: 111027
 COUNTY: HARRISON
 PROPOSAL: JL04 049 0027 BYPASS

PAGE: 6
 LETTING: 06/17/11
 CALL NO: 323

LINE NO	ITEM	DESCRIPTION	APPROXIMATE QUANTITY	UNIT	UNIT PRICE	AMOUNT
1030	06514	PAVE STRIPING-PERM PAINT-4 IN	82,991.000	LF		
1040	06515	PAVE STRIPING-PERM PAINT-6 IN	78.000	LF		
1050	06567	PAVE MARKING-THERMO STOP BAR-12IN	141.000	LF		
1060	06569	PAVE MARKING-THERMO CROSS-HATCH	2,429.000	SQFT		
1070	06573	PAVE MARKING-THERMO STR ARROW	8.000	EACH		
1080	06574	PAVE MARKING-THERMO CURV ARROW	12.000	EACH		
1090	06585	PAVEMENT MARKER TY IVA-MW TEMP	580.000	EACH		
1100	06588	PAVEMENT MARKER TY IVA-BY TEMP	290.000	EACH		
1110	06589	PAVEMENT MARKER TYPE V-MW	31.000	EACH		
1120	06591	PAVEMENT MARKER TYPE V-BY	698.000	EACH		
1130	08100	CONCRETE-CLASS A	43.810	CUYD		
1140	08150	STEEL REINFORCEMENT	3,051.000	LB		
1150	20209EP69	GRANULAR PILE CORE	1,206.000	CUYD		
1160	21655EN	REMOVE ASBESTOS PIPE	515.000	LF		
1170	21802EN	G/R STEEL W BEAM-S FACE (7 FT POST)	9,937.500	LF		
1180	22520EN	PAVE MARKING-THERMO YIELD BAR-36 IN	56.000	LF		
1190	22581EN	ENTRANCE PIPE-36 IN	71.000	LF		
1200	22680EN	QWICK CURB MEDIAN SEPARATOR	1,072.000	LF		
1210	23131ER701	PIPELINE VIDEO INSPECTION	2,864.000	LF		
1220	24097EC	THERMO RUMBLE STRIPS TY 2	720.000	LF		
1230	24114EC	PAVE MARK-THERMO-YIELD	4.000	EACH		

KENTUCKY TRANSPORTATION CABINET
 DEPARTMENT OF HIGHWAYS
 FRANKFORT, KY 40622

CONTRACT ID: 111027
 COUNTY: HARRISON
 PROPOSAL: JL04 049 0027 BYPASS

PAGE: 7
 LETTING: 06/17/11
 CALL NO: 323

LINE NO	ITEM	DESCRIPTION	APPROXIMATE QUANTITY	UNIT	UNIT PRICE	AMOUNT
1240	24115EC	ROUNDAABOUT ARROW	4.000	EACH		

SECTION 0005 BRIDGE						

1250	02231	STRUCTURE GRANULAR BACKFILL	376.000	CUYD		

1260	02403	REMOVE CONCRETE MASONRY	7.000	CUYD		

1270	02596	FABRIC-GEOTEXTILE TYPE I	1,225.000	SQYD		

1280	02599	FABRIC-GEOTEXTILE TYPE IV	394.000	SQYD		

1290	02998	MASONRY COATING	889.000	SQYD		

1300	03299	ARMORED EDGE FOR CONCRETE	89.400	LF		

1310	08002	STRUCTURE EXCAV-SOLID ROCK	579.000	CUYD		

1320	08003	FOUNDATION PREPARATION 25364	(1.00)	LS		

1330	08003	FOUNDATION PREPARATION 25365	(1.00)	LS		

1340	08003	FOUNDATION PREPARATION 25366	(1.00)	LS		

1350	08003	FOUNDATION PREPARATION 25367	(1.00)	LS		

1360	08003	FOUNDATION PREPARATION 25368	(1.00)	LS		

1370	08019	CYCLOPEAN STONE RIP RAP	1,225.000	TON		

1380	08033	TEST PILES	97.000	LF		

1390	08046	PILES-STEEL HP12X53	1,299.000	LF		

1400	08094	PILE POINTS-12 IN	32.000	EACH		

1410	08100	CONCRETE-CLASS A	1,605.300	CUYD		

1420	08104	CONCRETE-CLASS AA	608.700	CUYD		

1430	08150	STEEL REINFORCEMENT	177,634.000	LB		

KENTUCKY TRANSPORTATION CABINET
 DEPARTMENT OF HIGHWAYS
 FRANKFORT, KY 40622

CONTRACT ID: 111027
 COUNTY: HARRISON
 PROPOSAL: JL04 049 0027 BYPASS

PAGE: 8
 LETTING: 06/17/11
 CALL NO: 323

LINE NO	ITEM	DESCRIPTION	APPROXIMATE UNIT QUANTITY	UNIT PRICE	AMOUNT
1440	08151	STEEL REINFORCEMENT-EPOXY COATED	141,955.000 LB		
1450	08635	PRECAST PC I BEAM TYPE 6	1,614.200 LF		
SECTION 0006 SIGNING					
1460	06406	SBM ALUM SHEET SIGNS .080 IN	319.000 SQFT		
1470	06407	SBM ALUM SHEET SIGNS .125 IN	64.000 SQFT		
1480	06411	STEEL POST TYPE 2	1,100.000 LF		
SECTION 0007 LIGHTING					
1490	04701	POLE 40 FT MTG HT	21.000 EACH		
1500	04725	BRACKET 15 FT	21.000 EACH		
1510	04740	POLE BASE	21.000 EACH		
1520	04750	TRANSFORMER BASE	21.000 EACH		
1530	04760	POLE W/SECONDARY CONTROL EQUIP	1.000 EACH		
1540	04770	HPS LUMINAIRE	21.000 EACH		
1550	04780	FUSED CONNECTOR KIT	42.000 EACH		
1560	04793	CONDUIT-1 1/4 IN	4,350.000 LF		
1570	04795	CONDUIT-2 IN	310.000 LF		
1580	04820	TRENCHING AND BACKFILLING	4,590.000 LF		
1590	04832	WIRE-NO. 12	2,310.000 LF		
1600	04833	WIRE-NO. 8	9,620.000 LF		
1610	20391NS835	JUNCTION BOX TYPE A	5.000 EACH		
SECTION 0008 WATERLINE					

KENTUCKY TRANSPORTATION CABINET
 DEPARTMENT OF HIGHWAYS
 FRANKFORT, KY 40622

CONTRACT ID: 111027
 COUNTY: HARRISON
 PROPOSAL: JL04 049 0027 BYPASS

PAGE: 9
 LETTING: 06/17/11
 CALL NO: 323

LINE NO	ITEM	DESCRIPTION	APPROXIMATE QUANTITY	UNIT	UNIT PRICE	AMOUNT
1620	01065	STEEL ENCASEMENT PIPE-8 IN	120.000	LF		
1630	01067	STEEL ENCASEMENT PIPE-10 IN	405.000	LF		
1640	01069	STEEL ENCASEMENT PIPE-12 IN OPEN CUT	165.000	LF		
1650	01073	STEEL ENCASEMENT PIPE-16 IN OPEN CUT	150.000	LF		
1660	01075	STEEL ENCASEMENT PIPE-18 IN OPEN CUT	300.000	LF		
1670	01081	STEEL ENCASEMENT PIPE-24 IN OPEN CUT	280.000	LF		
1680	01095	DUCTILE IRON PIPE-8 IN	1,151.000	LF		
1690	01314	PLUG PIPE	10.000	EACH		
1700	01799	SANITARY SEWER MANHOLE	3.000	EACH		
1710	02605	REMOVE & RESET FIRE HYDRANT	1.000	EACH		
1720	02606	FIRE HYDRANT 4 IN	1.000	EACH		
1730	02606	FIRE HYDRANT 6 IN	6.000	EACH		
1740	03383	PVC PIPE-4 IN	1,250.000	LF		
1750	03385	PVC PIPE-6 IN DR 18	6,770.000	LF		
1760	03385	PVC PIPE-6 IN SDR 21	1,650.000	LF		
1770	03391	PVC PIPE-12 IN	1,016.000	LF		
1780	03391	PVC PIPE-12 IN SEWER PIPE	365.000	LF		
1790	03430	INSTALL WATER METER	12.000	EACH		
1800	03460	TIE-IN TO WATER LINE	7.000	EACH		
1810	03495	AIR RELEASE VALVE	3.000	EACH		
1820	03522	GATE VALVE-2 IN	1.000	EACH		

KENTUCKY TRANSPORTATION CABINET
 DEPARTMENT OF HIGHWAYS
 FRANKFORT, KY 40622

CONTRACT ID: 111027
 COUNTY: HARRISON
 PROPOSAL: JL04 049 0027 BYPASS

PAGE: 10
 LETTING: 06/17/11
 CALL NO: 323

LINE NO	ITEM	DESCRIPTION	APPROXIMATE QUANTITY	UNIT	UNIT PRICE	AMOUNT
1830	03524	GATE VALVE-4 IN	3.000	EACH		
1840	03526	GATE VALVE-6 IN	21.000	EACH		
1850	03539	BEND 11.25 DEG 8 IN HORIZONTAL	1.000	EACH		
1860	03539	BEND 11.25 DEG 8 IN VERTICAL	1.000	EACH		
1870	03541	BEND 11.25 DEG 12 IN VERTICAL	5.000	EACH		
1880	03546	BEND 22.50 DEG 8 IN HORIZONTAL	3.000	EACH		
1890	03556	BEND 45 DEG 12 IN HORIZONTAL	4.000	EACH		
1900	20255EC	INSTALL SERVICE PIPING	12.000	EACH		
1910	20772ND	TIE-IN TO MANHOLE	1.000	EACH		
1920	20794ND	REDUCER 8 IN X 6 IN	2.000	EACH		
1930	21109ND	RELOCATE SERVICE	1.000	EACH		
1940	21558EC	SERVICE LINE - 1 IN	250.000	LF		
1950	22609NN	CAP AND BLOCK-12 IN	2.000	EACH		
1960	22815NN	TEE AND BLOCK-12 X 12 X 6 IN	1.000	EACH		
1970	22984EN	PVC FORCE MAIN-6 IN	841.000	LF		
1980	23310EC	VALVE BOX	4.000	EACH		
1990	24135EC	OPEN CUT-8 IN FOR LEACHFIELD CROSSING	250.000	LF		
2000	24136EC	OPEN CUT-10 IN FOR LEACHFIELD CROSSING	350.000	LF		
2010	24137EC	OPEN CUT-10 IN FOR STREAM CROSSING	310.000	LF		
2020	24138EC	PVC PIPE-10 IN WITH CONC CAP LEACHFIELD CROSSING	350.000	LF		
2030	24138EC	PVC PIPE-10 IN WITH CONC CAP STREAM CROSSING	390.000	LF		

KENTUCKY TRANSPORTATION CABINET
 DEPARTMENT OF HIGHWAYS
 FRANKFORT, KY 40622

CONTRACT ID: 111027
 COUNTY: HARRISON
 PROPOSAL: JL04 049 0027 BYPASS

PAGE: 11
 LETTING: 06/17/11
 CALL NO: 323

LINE NO	ITEM	DESCRIPTION	APPROXIMATE QUANTITY	UNIT	UNIT PRICE	AMOUNT
2040	24139EC	OPEN CUT-8 IN FOR ROAD CROSSING	120.000	LF		
2050	24140EC	OPEN CUT-10 IN FOR ROAD CROSSING	345.000	LF		
2060	24141EC	ASBESTOS CONCRETE PIPE REMOVAL	50.000	LF		
2070	24142EC	BOOSTER PUMP STATION	1.000	EACH		
2080	24143EC	TEMP TIE-IN TO BOOSTER PUMP STATION	1.000	EACH		
2090	24144EC	TAPPING SLEEVE-12 IN	2.000	EACH		
2100	24145EC	TAPPING VALVE-12 IN	2.000	EACH		
2110	24146EC	TAPPING SLEEVE-6 IN	2.000	EACH		
2120	24149EC	BORE AND JACK PIPE-10 IN	60.000	LF		
SECTION 0009 MOB AND DEMOB						
2130	02568	MOBILIZATION (NO MORE THAN 5%)		LUMP		
2140	02569	DEMOBILIZATION (AT LEAST 1.5%)		LUMP		
		TOTAL BID				