Job No.	J7S3506B	JSR0060
Route:	96	96
County:	Jasper	Jasper

JOB SPECIAL PROVISIONS TABLE OF CONTENTS (ROADWAY)

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MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 W. CAPITOL AVE.
JEFFERSON CITY, MO 65102
Phone 1-888-275-6636

OWN, Inc.
2215 Fairlawn Drive,
Carthage, MO 64836
Certificate of Authority: 000062
Consultant Phone (417) 358-9551

If a seal is present on this sheet, JSP's have been electronically sealed and dated.

JOB NUMBER:J7S3506B, JSR0060
JASPER COUNTY, MO
DATE PREPARED:10/01/2026

ADDENDUM DATE:

Only the following items of the Job Special Provisions (Roadway) are authenticated by this seal: All

Job No.	J7S3506B	JSR0060
Route:	96	96
County:	Jasper	Jasper

JOB
SPECIAL PROVISION

A. General – Federal JSP-09-02M

1.0 Description. The Federal Government is participating in the cost of construction of this project. All applicable Federal laws, and the regulations made pursuant to such laws, shall be observed by the contractor, and the work will be subject to the inspection of the appropriate Federal Agency in the same manner as provided in Sec 105.10 of the Missouri Standard Specifications for Highway Construction with all revisions applicable to this bid and contract.

1.1 This contract requires payment of the prevailing hourly rate of wages for each craft or type of work required to execute the contract as determined by the Missouri Department of Labor and Industrial Relations and requires adherence to a schedule of minimum wages as determined by the United States Department of Labor. For work performed anywhere on this project, the contractor and the contractor's subcontractors shall pay the higher of these two applicable wage rates. State Wage Rates, Information on the Required Federal Aid Provisions, and the current Federal Wage Rates are available on the Missouri Department of Transportation web page at www.modot.org under "Doing Business with MoDOT", "Contractor Resources". Effective Wage Rates will be posted 10 days prior to the applicable bid opening. These supplemental bidding documents have important legal consequences. It shall be conclusively presumed that they are in the bidder's possession, and they have been reviewed and used by the bidder in the preparation of any bid submitted on this project.

1.2 The following documents are available on the Missouri Department of Transportation web page at www.modot.org under "Doing Business with MoDOT"; "Standards and Specifications". The effective version shall be determined by the letting date of the project.

General Provisions & Supplemental Specifications

Supplemental Plans to July 2026 Missouri Standard Plans
For Highway Construction

These supplemental bidding documents contain all current revisions to the published versions and have important legal consequences. It shall be conclusively presumed that they are in the bidder's possession, and they have been reviewed and used by the bidder in the preparation of any bid submitted on this project.

B. Contract Liquidated Damages

1.0 Description. Liquidated Damages for failure or delay in completing the work on time for this contract shall be in accordance with Sec 108.8. The liquidated damages include separate amounts for road user costs and contract administrative costs incurred by the Commission.

2.0 Period of Performance. Prosecution of work is expected to begin on the date specified below in accordance with Sec 108.2. Regardless of when the work is begun on this contract, all work on all projects shall be completed on or before the date specified below. Completion by this date shall be in accordance with the requirements of Sec 108.7.1.

Notice to Proceed: January 19, 2027
Contract Completion Date: September 1, 2028

2.1 Calendar Days. Completion of the project is required as specified herein. The count of calendar days will begin on the date the contractor starts any construction operations on the project.

Project	Calendar Days	Daily Road User Cost
J7S3506B	75	$5,400
JSR0060	300	$5,400

3.0 Liquidated Damages for Contract Administrative Costs. Should the contractor fail to complete the work on or before the contract completion date specified in Section 2.0, or within the number of calendar days specified in Section 2.1, whichever occurs first, the contractor will be charged contract administrative liquidated damages in accordance with Sec 108.8 in the amount of **$2,000** per calendar day for each calendar day, or partial day thereof, that the work is not fully completed. For projects in combination, these damages will be charged in full for failure to complete one or more projects within the specified contract completion date or calendar days.

4.0 Liquidated Damages for Road User Costs. Should the contractor fail to complete the work on or before the contract completion date specified in Section 2.0, or within the number of calendar days specified in Section 2.1, whichever occurs first, the contractor will be charged road user costs in accordance with Sec 108.8 in the amount specified in Section 2.1 for each calendar day, or partial day thereof, that the work is not fully completed. These damages are in addition to the contract administrative damages and any other damages as specified elsewhere in this contract.

5.0 Liquidated Damages for Winter Months. Delete Sec 108.8.1.3 (a).

Liquidated damages for failure to complete the work on time shall not be waived from December 15 to March 15, both dates inclusive.

C. Work Zone Traffic Management

1.0 Description. Work zone traffic management shall be in accordance with applicable portions of Division 100 and Division 600 of the Standard Specifications, and specifically as follows.

1.1 Maintaining Work Zones and Work Zone Reviews. The Work Zone Specialist (WZS) shall maintain work zones in accordance with Sec 616.3.3 and as further stated herein. The WZS shall coordinate and implement any changes approved by the engineer. The WZS shall ensure all traffic control devices are maintained in accordance with Sec 616, the work zone is operated within the hours specified by the engineer, and will not deviate from the specified hours without prior approval of the engineer. The WZS is responsible to manage work zone delay in accordance with these project provisions. When requested by the engineer, the WZS shall submit a weekly report that includes a review of work zone operations for the week. The report shall identify any problems encountered and corrective actions taken. Work zones are subject to unannounced inspections by the engineer and other departmental staff to corroborate the validity of the WZS's review and may require immediate corrective measures and/or additional work zone monitoring.

1.2 Work Zone Deficiencies. Failure to make corrections on time may result in the engineer suspending work. The suspension will be non-excusable and non-compensable regardless if road user costs are being charged for closures.

2.0 Traffic Management Schedule.

2.1 Traffic management schedules shall be submitted to the engineer for review prior to the start of work and prior to any revisions to the traffic management schedule. The traffic management schedule shall include the proposed traffic control measures, the hours traffic control will be in place, and work hours.

2.2 The traffic management schedule shall conform to the limitations specified in Sec 616 regarding lane closures, traffic shifts, road closures and other width, height and weight restrictions.

2.3 The engineer shall be notified as soon as practical of any postponement due to weather, material or other circumstances.

2.4 In order to ensure minimal traffic interference, the contractor shall schedule lane closures for the absolute minimum amount of time required to complete the work. Lanes shall not be closed until material is available for continuous construction and the contractor is prepared to diligently pursue the work until the closed lane is opened to traffic.

2.5 Traffic Congestion. The contractor shall, upon approval of the engineer, take proactive measures to reduce traffic congestion in the work zone. The contractor shall immediately implement appropriate mitigation strategies whenever traffic congestion reaches an excess of 10 minutes to prevent congestion from escalating to 15 minute or above threshold. If disruption of the traffic flow occurs and traffic is backed up in queues of 15 minute delays or longer, then the contractor shall immediately review the construction operations which contributed directly to disruption of the traffic flow and make adjustments to the operations to prevent the queues from reoccurring. Traffic delays may be monitored by physical presence on site or by utilizing real-time travel data through the work zone that generate text and/or email notifications where available. The engineer monitoring the work zone may also notify the contractor of delays that require prompt mitigation. The contractor may work with the engineer to determine what other alternative solutions or time periods would be acceptable.

2.5.1 Traffic Safety.

2.5.1.1 Recurring Congestion. Where traffic queues routinely extend to within 1,000 feet of the ROAD WORK AHEAD, or similar, sign on a divided highway or to within 500 feet of the ROAD WORK AHEAD, or similar, sign on an undivided highway, the contractor shall extend the advance warning area, as approved by the engineer.

2.5.1.2 Non-Recurring Congestion. When traffic queues extend to within 1,000 feet of the ROAD WORK AHEAD, or similar, sign on a divided highway or to within 500 feet of the ROAD WORK AHEAD, or similar, sign on an undivided highway infrequently, the contractor shall deploy a means of providing advance warning of the traffic congestion, as approved by the engineer. The warning location shall be no less than 1,000 feet and no more than 0.5 mile in advance of the end of the traffic queue on divided highways and no less than 500 feet and no more than 0.5 mile in advance of the end of the traffic queue on undivided highways.

2.6 Transportation Management Plan. The contractor Work Zone Specialist (WZS) shall review the Transportation Management Plan (TMP), found as an electronic deliverable on MoDOT's Online Plans Room and discuss the TMP with the engineer during the preconstruction conference. Throughout the construction project, the WZS is responsible for updating any

changes or modifications to the TMP and getting those changes approved by the engineer a minimum of two weeks in advance of implementation. The WZS shall participate in the post construction conference and provide recommendations on how future TMPs can be improved.

3.0 Work Hour Restrictions.

3.1 Except for emergency work, as determined by the engineer, and long term lane closures required by project phasing, all lanes shall be scheduled to be open to traffic during the five major holiday periods shown below, from 12:00 noon on the last working day preceding the holiday until 6:00 a.m. on the first working day subsequent to the holiday unless otherwise approved by the engineer.

Memorial Day
Labor Day
Thanksgiving
Christmas
New Year's Day

3.1.1 Independence Day. The lane restrictions specified in Section 3.1 shall also apply to Independence Day, except that the restricted periods shall be as follows:

When Independence Day falls on:	The Holiday is Observed on:	Halt Lane Closures beginning at:	Allow Lane Closures to resume at:
Sunday	Monday	Noon on Friday	6:00 a.m. on Tuesday
Monday	Monday	Noon on Friday	6:00 a.m. on Tuesday
Tuesday	Tuesday	Noon on Monday	6:00 a.m. on Wednesday
Wednesday	Wednesday	Noon on Tuesday	6:00 a.m. on Thursday
Thursday	Thursday	Noon on Wednesday	6:00 a.m. on Friday
Friday	Friday	Noon on Thursday	6:00 a.m. on Monday
Saturday	Friday	Noon on Thursday	6:00 a.m. on Monday

3.1.2 Except for emergency work, as determined by the engineer, and long term lane closures required by project phasing, the contractor's working hours will be restricted for the Special Events as shown below. All lanes shall be scheduled to be open to traffic during these Special Events. The contractor shall be responsible for contacting the city of Carthage to obtain the exact dates and times of the two special events listed below:

Marian Days – Usually held the first Thursday of August through the following Sunday.

Maple Leaf Festival – Friday and Saturday of Parade (second or third weekend of October).

3.2 The contractor shall not perform any construction operation on the roadway, including the hauling of material within the project limits, during restricted periods, holiday periods or other special events specified in the contract documents.

3.3 Excluding when work is placed in head-to-head configuration, any work requiring a reduction in the number of through lanes of traffic shall be completed during nighttime hours. Nighttime hours shall be considered to be 7:00 p.m. to 6:00 a.m. for this project.

4.0 Detours and Lane Closures.

4.1 When a changeable message sign (CMS) is provided, the contractor shall use the CMS to notify motorists of future traffic disruption and possible traffic delays one week before traffic is shifted to a detour or prior to lane closures. The CMS shall be installed at a location as approved or directed by the engineer. If a CMS with Communication Interface is required, then the CMS shall be capable of communication prior to installation on right of way. All messages planned for use in the work zone shall be approved and authorized by the engineer or its designee prior to deployment. When permanent dynamic message signs (DMS) owned and operated by MoDOT are located near the project, they may also be used to provide warning and information for the work zone. Permanent DMS shall be operated by the TMC, and any messages planned for use on DMS shall be approved and authorized by the TMC at least 72 hours in advance of the work.

4.2 At least one lane of traffic in each direction shall be maintained at all times except for brief intervals of time required when the movement of the contractor's equipment will seriously hinder the safe movement of traffic. Periods during which the contractor will be allowed to interrupt traffic will be designated by the engineer.

5.0 Basis of Payment. No direct payment will be made to the contractor to recover the cost of equipment, labor, materials, or time required to fulfill the above provisions, unless specified elsewhere in the contract document. All authorized changes in the traffic control plan shall be provided for as specified in Sec 616.

D. Emergency Provisions and Incident Management – SW

1.0 The contractor shall have communication equipment on the construction site or immediate access to other communication systems to request assistance from law enforcement or other emergency agencies for incident management. In case of traffic accidents or the need for law enforcement to direct or restore traffic flow through the job site, the contractor shall notify law enforcement or other emergency agencies immediately as needed. The resident engineer's office shall also be notified when the contractor requests emergency assistance.

2.0 In addition to the 911 emergency telephone number for ambulance, fire or law enforcement services, the following agencies may also be notified for accident or emergency situation within the project limits.

Missouri Highway Patrol – Troop D: 417-895-6868
MoDOT Customer Service: 417-895-7600
Jasper County Sheriff: 417-358-8177
Jasper County Emergency Services: 417-358-7000
City of Carthage Police: 417-237-7200
City of Carthage Fire: 417-237-7100

Emergency Only Numbers
911 *55 cell phone – Missouri Highway Patrol 417-864-1160 – MoDOT Incident Management Coordinator

2.1 This list is not all inclusive. Notification of the need for wrecker or tow truck services will remain the responsibility of the appropriate law enforcement agency.

2.2 The contractor shall notify law enforcement and emergency agencies before the start of construction to request their cooperation and to provide coordination of services when emergencies arise during the construction at the project site. When the contractor completes this notification with law enforcement and emergency agencies, a report shall be furnished to the engineer on the status of incident management.

3.0 No direct pay will be made to the contractor to recover the cost of the communication equipment, labor, materials or time required to fulfill the above provisions.

E. Order of Work

1.0 Description.

1.1 The work under this contract includes full-depth pavement reconstruction, utility relocations, storm sewer installation, sidewalk/ADA curb ramp upgrades, signalization, permanent signing, and pavement markings along Route 96 (Central Avenue) from Sta. 443+50 to Sta. 507+25 in the city of Carthage, Jasper County.

1.2 To minimize inconvenience to the traveling public, maintain emergency vehicle access, protect commercial property access, and ensure pedestrian accessibility, the contractor shall sequence operations in accordance with this Job Special Provision, the traffic control plans, and as directed by the engineer.

2.0 Construction Sequencing and Staging Requirements. The contractor shall strictly adhere to the following order of work and phasing constraints:

2.1 Initial Setup and Advance Signing (Overall Project).

2.1.1 Prior to initiating any lane closures, pavement removals, or utility operations, the contractor shall deploy all advance work zone signing, portable changeable message signs (CMS Boards 1 through 10), and temporary traffic control barriers in accordance with the traffic control plan.

2.1.2 Changeable Message Signs shall be installed and operational a minimum of fourteen (14) calendar days prior to the implementation of any traffic lane shifts, turning restrictions, or detour routes.

2.1.3 Traffic Phase Length. The length of any phase shall be not more than 2,000 feet, not including the advance warning signs and lane tapers.

2.2 Early Construction Window and Concurrency (Sidewalks, Phase 1, and Phase 2).

2.2.1 The Sidewalk Phase (Sta. 461+50 to Sta. 507+25), Phase 1 (EB Divided Highway, Sta. 448+75 to Sta. 462+00), and Phase 2 (WB Divided Highway, Sta. 443+50 to Sta. 462+00) shall be constructed concurrently during the early construction window.

2.2.2 Sidewalk Phase (South and North Sides).

(a) Phase A (South Side): The contractor shall execute demolition, grading, subgrade compaction, new sidewalk/paved approach concrete placement, ADA curb ramps, and site restoration on the south side of Central Avenue.

(b) Phase B (North Side): Following or concurrently with Phase A, the contractor shall execute demolition, grading, new sidewalk/paved approach concrete placement, ADA curb ramps, pedestrian signal/APS push button installation, and site restoration on the north side.

(c) Mandatory Deadline: ALL sidewalk, curb ramp, and pedestrian accessibility work under the Sidewalk Phase MUST be 100% complete and fully operational on or before July 1, 2027.

(d) Continuous pedestrian routing and ADA-compliant detectable barricades shall be maintained throughout sidewalk construction in accordance with MoDOT standards.

2.2.3 The Sidewalk Phase may be constructed during daytime hours through use of closing the driving lane with the work area. The work area shall be limited to 500 feet in length unless otherwise approved by the Engineer.

2.2.4 Phase 1 (Eastbound Divided Highway at I-49 Interchange).

(a) Phase 1A: Construct EB Driving Lane. Shift EB traffic to the EB passing lane. Excavate, prepare subgrade, place aggregate base, and pave concrete driving lane pavement. Complete Ramp 1 and Ramp 2 culverts and drainage structures.

(b) Phase 1B: Construct EB Passing Lane. Shift EB traffic onto the newly constructed EB driving lane. Excavate, prepare subgrade, place aggregate base, and pave concrete passing lane pavement. Place temporary seeding, mulching, and/or sodding. Remove temporary traffic control barriers.

2.2.5 Phase 2 (Westbound Divided Highway at I-49 Interchange).

(a) Phase 2A: Construct WB Driving Lane. Shift WB traffic to the WB passing lane. Excavate, prepare subgrade, place aggregate base, pave concrete driving lane pavement, and install MGS guardrail/end terminals.

(b) Phase 2B: Construct WB Passing Lane. Shift WB traffic onto the newly constructed WB driving lane. Excavate, prepare subgrade, place aggregate base, pave concrete passing lane pavement, place temporary seeding/sodding, and remove temporary traffic control barriers.

2.3 Task 2: Permanent Signing and Permanent Traffic Signals for Phases 1 and 2.

2.3.1 Immediately following the completion of Phase 1 and Phase 2 roadway construction, the contractor shall install all permanent ground-mounted signing associated with the I-49 interchange and ramp terminals (Signs 1 through 41 series) along with assuring the permanent traffic signals are operational.

2.3.2 Phase 1 and Phase 2 are shown with No Temporary Traffic Signals. If the contractor elects and the engineer approves the use of Temporary Traffic Signals, there shall be no additional costs paid.

2.4 Phase 3: Central Avenue (Baker Blvd. Segment - Sta. 462+00 to Sta. 478+00).

2.4.1 Phase 3A: Implement head-to-head traffic staging on the WB lanes. Trench and replace 8-inch City of Carthage water main. Install EB trunk storm sewer lines and drop inlets. Excavate, prepare subgrade, and pave EB concrete roadway lanes.

2.4.2 Phase 3B: Shift head-to-head traffic onto the newly constructed EB lanes. Install WB trunk storm sewer lines and drop inlets. Excavate, prepare subgrade, and pave WB concrete roadway lanes and the Baker Blvd. intersection. Install the Baker Blvd. temporary signal system. Perform phase site restoration (seeding/sodding).

2.4.3 Upon completion of Phase 3B paving, the contractor shall remove the temporary signal and traffic control barriers at Baker Blvd.

2.4.4 Upon completion of Phase 3, the new permanent traffic signal at Baker Blvd. shall be operational.

2.5 Phase 4: Central Avenue (Francis Street Segment - Sta. 478+00 to Sta. 498+00).

2.5.1 Intersection Limitation: The intersections of Baker Blvd. (Phase 3) and Francis Street (Phase 4) CANNOT be closed simultaneously.

2.5.2 Phase 4A: Implement head-to-head traffic staging on the WB lanes. Extend the 8-inch water main and service lines. Install EB trunk storm sewer lines and drop inlets. Excavate, prepare subgrade, and pave EB concrete roadway lanes.

2.5.3 Phase 4B: Shift head-to-head traffic onto the newly constructed EB lanes. Install WB trunk storm sewer lines and drop inlets. Excavate, prepare subgrade, and pave WB concrete roadway lanes and the Francis Street intersection. Install the Francis Street temporary signal system. Perform phase site restoration (seeding/sodding).

2.5.4 Upon completion of Phase 4B paving, the contractor shall remove the temporary signal and traffic control barriers at Francis Street.

2.5.5 Upon completion of Phase 4, the new permanent traffic signal at Francis Street shall be operational.

2.6 Phase 5: Central Avenue (Garrison Avenue Segment - Sta. 498+00 to Sta. 506+00).

2.6.1 Phase 5A: Implement head-to-head traffic staging on the WB lanes. Complete the 10-foot deep water line extension. Install EB storm sewer lines and drop inlets. Excavate, prepare subgrade, pave EB concrete lanes, and place the BP-1 asphalt leveling overlay.

2.6.2 Phase 5B: Shift head-to-head traffic onto the newly constructed EB lanes. Install WB storm sewer lines and drop inlets. Excavate, prepare subgrade, pave WB concrete lanes, and construct Garrison Avenue intersection tie-ins to match existing pavement at Sta. 507+25. Perform phase site restoration (seeding/sodding).

2.6.3 Upon completion of Phase 5B paving, the contractor shall remove the temporary signal and traffic control barriers at Garrison Avenue.

2.6.4 Upon completion of Phase 5, the new permanent traffic signal at Garrison Avenue shall be operational.

2.7 Final Permanent Signing and Project-Wide Permanent Pavement Markings.

2.7.1 Remainder Permanent Signing: Following the completion of all roadway paving (Phases 1 through 5), the contractor shall install all remaining ground-mounted highway signing (Signs 42 through 106 series) and erect the overhead sign truss at Sta. 454+25.66.

2.7.2 City Lighting Upgrade: Complete pole foundations, conduit in trench, and lighting wiring for the City of Carthage. The Contractor may also do this task within each Phase.

2.7.3 Project-Wide Permanent Pavement Markings: Permanent pavement markings (paint lines, preformed thermoplastic stop bars, turn arrows, and yield triangles) across the ENTIRE project corridor (Sta. 443+50 to Sta. 507+25) shall be applied in a single, consolidated operation at the completion of all construction phases.

2.8 Overall Project Cleanup and Closeout.

2.8.1 Following the completion of permanent pavement markings, the contractor shall dismantle and remove all remaining temporary traffic control devices and construction signs.

2.8.2 Perform final corridor-wide grading, site cleanup, and Tall Fescue Sodding.

2.8.3 Complete final MoDOT/City joint inspection, punch list items, and project closeout.

2.9 Change in Order of Work. Any change in the order of work may be requested. The engineer will have the sole authority of approving or denying the requested change in the order of work.

3.0 Access and Utility Coordination.

3.1 Commercial and Residential Access: Access to all adjacent businesses and residences shall be maintained at all times. Where properties have a single entrance, construction shall be performed in halves to keep one lane open.

3.2 Emergency Vehicles: Unobstructed access for emergency response vehicles shall be preserved across all intersections and staging areas throughout construction.

3.3 Nighttime Road Closures. If it becomes necessary to install utility service connections or install crossroad culverts or storm sewer pipes through lanes that carry traffic in any Phase, the contractor may elect to close the entire roadway at night. For the purposes of this provision, nighttime work shall be considered from 9:00 p.m. to 6:00 a.m. Any nighttime work involving a road closure shall be approved by the Engineer.

3.3.1 The only work zone operation approved to begin 30 minutes prior to any complete road closure is the installation of traffic control signs. Should lane closures be placed or remain in place, prior to the approved starting time or after the approved ending time, the Commission, the traveling public, and state and local police and governmental authorities will be damaged in various ways, including but not limited to, increased construction administration cost, potential liability, traffic and traffic flow regulation cost, traffic congestion and motorist delays, with a resulting cost to the traveling public. These damages are not easily computed or quantified. Therefore, the contractor will be charged with liquidated damages specified in the amount of

$1,000 per 15 minute increment for each 15 minutes that the temporary lane closures are in place and not open to traffic in excess of the limitation as specified elsewhere in this special provision. It shall be the responsibility of the engineer to determine the quantity of unapproved closure time.

4.0 Basis of Payment. No direct payment will be made for compliance with this Job Special Provision, work sequence restrictions, or movement/relocation of equipment and traffic control devices required to adhere to the order of work. All costs associated with complying with this provision shall be considered incidental to the contract unit prices for the various pay items included in the contract.

F. Project Contact for Contractor/Bidder Questions

1.0 All questions concerning this project during the bidding process shall be forwarded to the project contact listed below.

Craig Switzer, Project Contact
MoDOT Southwest District, Joplin Regional Office
2915 S. Doughboy Drive
Joplin, MO 64804

Telephone Number: 417-621-6331
Email: craig.switzer@modot.mo.gov

1.1 All questions concerning the bid document preparation can be directed to the Central Office – Design as listed below.

Telephone Number: (573) 751-2876
Email: BCS@modot.mo.gov

2.0 Upon award and execution of the contract, the successful bidder/contractor shall forward all questions and coordinate the work with the engineer listed below:

Adam Fields, Resident Engineer
MoDOT Southwest District, Joplin Regional Office
2915 Doughboy Drive
Joplin, MO 64804

Telephone Number: (417) 621-6525
Email: adam.fields@modot.mo.gov

G. Supplemental Revisions JSP-18-01MM

- Compliance with 2 CFR 200.216 – Prohibition on Certain Telecommunications and Video Surveillance Services or Equipment.

The Missouri Highways and Transportation Commission shall not enter into a contract (or extend or renew a contract) using federal funds to procure or obtain equipment, services, or systems that uses covered telecommunications equipment or services as substantial or as critical technology as part of any system where the video surveillance and telecommunications equipment was

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

- Stormwater Compliance Requirements

1.0 Description. This provision requires the contractor to provide a Water Pollution Control Manager (WPCM) for any project that includes land disturbance on the project site and the total area of land disturbance, both on the project site, and all Off-site support areas, is one (1) acre or more. Regardless of the area of Off-site disturbance, if no land disturbance occurs on the project site, these provisions do not apply. When a WPCM is required, all sections within this provision shall be applicable, including assessment of specified Liquidated Damages for failure to correct Stormwater Deficiencies, as specified herein. This provision is in addition to any other stormwater, environmental, and land disturbance requirements specified elsewhere in the contract.

1.1 Definitions. The project site is defined as all areas designated on the plans, including temporary and permanent easements. The project site is equivalent to the "permitted site", as defined in MoDOT's State Operating Permit. An Off-site area is defined as any location off the project site the contractor utilizes for a dedicated project support function, such as, but not limited to, staging area, plant site, borrow area, or waste area.

1.2 Reporting of Off-Site Land Disturbance. If the project includes any planned land disturbance on the project site, prior to the start of work, the contractor shall submit a written report to the engineer that discloses all Off-site support areas where land disturbance is planned, the total acreage of anticipated land disturbance on those sites, and the land disturbance permit number(s). Upon request by the engineer, the contractor shall submit a copy of its land disturbance permit(s) for Off-site locations. Based on the total acreage of land disturbance, both on and Off-site, the engineer shall determine if these Stormwater Compliance Requirements shall apply. The contractor shall immediately report any changes to the planned area of Off-site land disturbance. The contractor is responsible for obtaining its own separate land disturbance permit for Off-site areas.

2.0 Water Pollution Control Manager (WPCM). The contractor shall designate a competent person to serve as the Water Pollution Control Manager (WPCM) for projects meeting the description in Section 1.0. The contractor shall ensure the WPCM completes all duties listed in Section 2.1.

2.1 Duties of the WPCM:

(a) Be familiar with the stormwater requirements including the current MoDOT State Operating Permit for construction stormwater discharges/land disturbance activities; MoDOT's statewide Stormwater Pollution Prevention Plan (SWPPP); the Corps of Engineers Section 404 Permit, when applicable; the project specific SWPPP, the Project's Erosion & Sediment Control Plan; all applicable special provisions, specifications, and standard drawings; and this provision;

(b) Successfully complete the MoDOT Stormwater Training Course within the last 4 years. The MoDOT Stormwater Training is a free online course available at MoDOT.org;

(c) Attend the Pre-Activity Meeting for Grading and Land Disturbance and all subsequent Weekly Meetings in which grading activities are discussed;

(d) Oversee and ensure all work is performed in accordance with the Project-specific SWPPP and all updates thereto, or as designated by the engineer;

(e) Review the project site for compliance with the Project SWPPP, as needed, from the start of any grading operations until final stabilization is achieved, and take necessary actions to correct any known deficiencies to prevent pollution of the waters of the state or adjacent property owners prior to the engineer's weekly inspections;

(f) Review and acknowledge receipt of each MoDOT Inspection Report (Land Disturbance Inspection Record) for the Project within forty-eight (48) hours of receiving the report and ensure that all Stormwater Deficiencies noted on the report are corrected as soon as possible, but no later than stated in Section 5.0.

3.0 Pre-Activity Meeting for Grading/Land Disturbance and Required Hold Point. A Pre-Activity meeting for grading/land disturbance shall be held prior to the start of any land disturbance operations. No land disturbance operations shall commence prior to the Pre-Activity meeting except work necessary to install perimeter controls and entrances. Discussion items at the pre-activity meeting shall include a review of the Project SWPPP, the planned order of grading operations, proposed areas of initial disturbance, identification of all necessary BMPs that shall be installed prior to commencement of grading operations, and any issues relating to compliance with the Stormwater requirements that could arise in the course of construction activity at the project.

3.1 Hold Point. Following the pre-activity meeting for grading/land disturbance and subsequent installation of the initial BMPs identified at the pre-activity meeting, a Hold Point shall occur prior to the start of any land disturbance operations to allow the engineer and WPCM the time needed to perform an on-site review of the installation of the BMPs to ensure compliance with the SWPPP is met. Land disturbance operations shall not begin until authorization is given by the engineer.

4.0 Inspection Reports. Weekly and post run-off inspections will be performed by the engineer and each Inspection Report (Land Disturbance Inspection Record) will be entered into a web-based Stormwater Compliance database. The WPCM will be granted access to this database and shall promptly review all reports, including any noted deficiencies, and shall acknowledge receipt of the report as required in Section 2.1 (f.).

5.0 Stormwater Deficiency Corrections. All stormwater deficiencies identified in the Inspection Report shall be corrected by the contractor within 7 days of the inspection date or any extended period granted by the engineer when weather or field conditions prohibit the corrective work. If the contractor does not initiate corrective measures within 5 calendar days of the inspection date or any extended period granted by the engineer, all work shall cease on the project except for work to correct these deficiencies, unless otherwise allowed by the engineer. All impact costs related to this halting of work, including, but not limited to stand-by time for equipment, shall be borne by the contractor. Work shall not resume until the engineer approves the corrective work.

5.1 Liquidated Damages. If the contractor fails to complete the correction of all Stormwater Deficiencies listed on the MoDOT Inspection Report within the specified time limit, the Commission will be damaged in various ways, including but not limited to, potential liability, required mitigation, environmental clean-up, fines, and penalties. These damages are not reasonably capable of being computed or quantified. Therefore, the contractor will be charged

with liquidated damages specified in the amount of $2,000 per day for failure to correct one or more of the Stormwater Deficiencies listed on the Inspection Report within the specified time limit. In addition to the stipulated damages, the stoppage of work shall remain in effect until all corrections are complete.

6.0 Basis of Payment. No direct payment will be made for compliance with this provision.

- *Delete Sec 106.9, including all subsections and substitute the following:*

106.9 Buy America Requirements.
Buy America Requirements are waived if the total amount of Federal financial assistance applied to the project, through awards or subawards, is below $500,000.

106.9.1 Buy America Requirements for Iron or Steel Products.
The contractor's attention is directed to Title 23 CFR 635.410 *Buy America Requirements*. Where articles, materials or supplies that consist wholly or predominantly of iron or steel or a combination of both are to be permanently incorporated into the contract work, steel and iron material shall be manufactured, from the initial melting stage through the application of coatings, in the USA except for "minimal use" as described herein. Predominantly of iron or steel or a combination of both means that the cost of the iron and steel content exceeds 50 percent of the total cost of all its components. Under a general waiver from FHWA the use of pig iron and processed, pelletized, and reduced iron ore manufactured outside of the USA will be permitted in the domestic manufacturing process for steel or iron material.

106.9.1.1 Any sources other than the USA as defined will be considered foreign. The required domestic manufacturing process shall include formation of ingots and any subsequent process. Coatings shall include any surface finish that protects or adds value to the product.

106.9.1.2 "Minimal use" of foreign steel, iron or coating processes will be permitted, provided the cost of such products does not exceed 1/10 of one percent (0.1 percent) of the total contract cost or $2,500.00, whichever is greater. If foreign steel, iron, or coating processes are used, invoices to document the cost of the foreign portion, as delivered to the project, shall be provided and the engineer's written approval obtained prior to placing the material in any work.

106.9.1.3 Buy America requirements include a step certification for all fabrication processes of all steel or iron materials that are accepted per Sec 1000. The AASHTO Product Evaluation and Audit Solutions compliance program verifies that all steel and iron products fabrication processes conform to 23 CFR 635.410 Buy America Requirements and is an acceptable standard per 23 CFR 635.410(d). AASHTO Product Evaluation and Audit Solutions compliant suppliers will not be required to submit step certification documentation with the shipment for some selected steel and iron materials. The AASHTO Product Evaluation and Audit Solutions compliant supplier shall maintain the step certification documentation on file and shall provide this documentation to the engineer upon request.

106.9.1.3.1 Items designated as Category 1 will consist of steel girders, piling, and reinforcing steel installed on site. Category 1 items require supporting documentation prior to incorporation into the project showing all steps of manufacturing, including coating, as being completed in the United States and in accordance with CFR Title 23 Section 635.410 Buy America Requirements. This includes the Mill Test Report from the original producing steel mill and certifications documenting the manufacturing process for all subsequent fabrication, including coatings. The certification shall include language that certifies all steel and iron materials permanently

incorporated in this project was procured and processed domestically and all manufacturing processes, including coating, as being completed in the United States and in accordance with CFR Title 23 Section 635.410.

106.9.1.3.2 Items designated as Category 2 will include all other steel or iron products not in Category 1 and permanently incorporated in the project. Category 2 items shall consist of, but not be limited to items such as fencing, guardrail, signing, lighting and signal supports. The prime contractor is required to submit a material of origin form certification prior to incorporation into the project from the fabricator for each item that the product is domestic. The Certificate of Materials Origin form (link to certificate form) from the fabricator must show all steps of manufacturing, including coating, as being completed in the United States and in accordance with CFR Title 23 Section 635.410 Buy America Requirements and be signed by a fabricator representative. The engineer reserves the right to request additional information and documentation to verify that all Buy America requirements have been satisfied. These documents shall be submitted upon request by the engineer and retained for a period of 3 years after the last reimbursement of the material.

106.9.1.3.3 Any minor miscellaneous steel or iron items that are not included in the materials specifications shall be certified by the prime contractor as being procured domestically. Examples of these items would be bolts for sign posts, anchorage inserts, etc. The certification shall read "I certify that all steel and iron materials permanently incorporated in this project during all manufacturing processes, including coating, as being completed in the United States and in accordance with CFR Title 23 Section 635.410 Buy America Requirements procured and processed domestically in accordance with CFR Title 23 Section 635.410 Buy America Requirements. Any foreign steel used was submitted and accepted under minor usage". The certification shall be signed by an authorized representative of the prime contractor.

106.9.1.4 When permitted in the contract, alternate bids may be submitted for foreign steel and iron products. The award of the contract when alternate bids are permitted will be based on the lowest total bid of the contract based on furnishing domestic steel or iron products or 125 percent of the lowest total bid based on furnishing foreign steel or iron products. If foreign steel or iron products are awarded in the contract, domestic steel or iron products may be used; however, payment will be at the contract unit price for foreign steel or iron products.

106.9.2 Buy America Requirements for Construction Materials other than iron or steel products.

Construction materials mean articles, materials, or supplies that consist of only one of the items listed. Minor additions of articles, materials, supplies, or binding agents to a construction material do not change the categorization of the construction material. Upon request by the engineer, the contractor shall submit a domestic certification for all construction materials listed that are incorporated into the project.

(a) Non-ferrous metals
(b) Plastic and Polymer-based products (including polyvinylchloride, composite building materials, and polymers used in fiber optic cables)
(c) Glass (including optic glass)
(d) Fiber optic cable (including drop cable)
(e) Optical fiber
(f) Lumber
(g) Engineered wood
(h) Drywall

106.9.3 Buy America Requirements for Manufactured Products.
Manufactured products mean articles, materials or supplies that have been processed into a specific form and shape, or combined with other articles, materials or supplies to create a product with different properties than the individual articles, materials or supplies. If an item is classified as an iron or steel product, an excluded material, or other product category as specified by law or in 2 CFR part 184, then it is not a manufactured product. However, an article, material or supply classified as a manufactured product may include components that are iron or steel products, excluded materials, or other product categories as specified by law or in 2 CFR part 184. Mixtures of excluded materials delivered to a work site without final form for incorporation into a project are not a manufactured product.

106.9.3.1 Produced in the United States, in the case of manufactured products, means:
(A) For projects obligated on or after October 1, 2025, the product was manufactured in the United States; and
(B) For projects obligated on or after October 1, 2026, the product was manufactured in the United States and the cost of the components of the manufactured product that are mined, produced, or manufactured in the United States is greater than 55 percent of the total cost of all components of the manufactured product.

106.9.3.2 (i) With respect to precast concrete products that are classified as manufactured products, components of precast concrete products that consist wholly or predominantly of iron or steel or a combination of both shall meet the requirements of paragraph (b) of this section. The cost of such components shall be included in the applicable calculation for purposes of determining whether the precast concrete product is produced in the United States.
(ii) With respect to intelligent transportation systems and other electronic hardware systems that are installed in the highway right of way or other real property and classified as manufactured products, the cabinets or other enclosures of such systems that consist wholly or predominantly of iron or steel or a combination of both shall meet the requirements of paragraph (b) of this section. The cost of cabinets or other enclosures shall be included in the applicable calculation for purposes of determining whether systems referred to in the preceding sentence are produced in the United States.

106.9.4 Waiver for De Minimis Costs for Manufactured and Construction Materials other than iron or steel products.
"The total value of the non-compliant products is no more than the lesser of $1,000,000 or 5% of total applicable costs for the project." The contractor shall submit to the engineer any non-domestic materials and their total material cost to the engineer. The contractor and the engineer will both track these totals to assure that the minimal usage allowance is not exceeded.

- Third-Party Test Waiver for Concrete Aggregate

1.0 Description. Third party tests may be allowed for determining the durability factor for concrete pavement and concrete masonry aggregate.

2.0 Material. All aggregate for concrete shall be in accordance with Sec 1005.

2.1 MoDOT personnel shall be present at the time of sampling at the quarry. The aggregate sample shall be placed in an approved tamper-evident container (provided by the quarry) for shipment to the third-party testing facility.

2.2 AASHTO T 161 Method B Resistance of Concrete to Rapid Freezing and Thawing, shall be used to determine the aggregate durability factor. All concrete beams for testing shall be 3-inch wide by 4-inch deep by 16-inch long or 3.5-inch wide by 4.5-inch deep by 16-inch long. All beams for testing shall receive a 35-day wet cure fully immersed in saturated lime water prior to initiating the testing process.

2.3 Concrete test beams shall be made using a MoDOT approved concrete pavement mix design.

3.0 Testing Facility Requirements. All third-party test facilities shall meet the requirements outlined in this provision.

3.1 The testing facility shall be AASHTO accredited.

3.1.1 For tests ran after January 1, 2025, accreditation documentation shall be on file with the Construction and Materials Division prior to any tests being performed.

3.1.2 Construction and Materials Division may consider tests completed prior to January 1, 2025, to be acceptable if all sections of this provision are met, with the exception of 3.1.1. Accreditation documentation shall be provided with the test results for tests completed prior to January 1, 2025. No tests completed prior to September 1, 2024, will be accepted.

3.2 The testing facility shall provide their testing process, list of equipment, equipment calibration documentation, and testing certifications or qualifications of technicians performing the AASHTO T 161 Procedure B tests. The testing facility shall provide details on their freezing and thawing apparatus including the time and temperature profile of their freeze-thaw chamber. The profile shall include the temperature set points throughout the entirety of the freeze-thaw cycle. The profile shall show the cycle time at which the apparatus drains/fills with water and the cycle time at which the apparatus begins cooling the specimens.

3.3 Results, no more than five years old, from the third-party test facility shall compare within ±2.0 percent of an independent test from another AASHTO accredited test facility or with MoDOT test records, in order to be approved for use (e.g. test facility results in a durability factor of 79, MoDOT's recent durability test factor is 81; this compared within +2 percent). The independent testing facility shall be in accordance with this provision. The comparison test can be from a different sample of the same ledge combination.

3.4 When there is a dispute between the third party durability test results and MoDOT durability test results, the MoDOT durability test result shall govern.

3.5 Test results shall be submitted to MoDOT's Construction and Materials division electronically for final approval. Test results shall include raw data for all measurements of relative dynamic modulus of elasticity and percent length change for each individual concrete specimen. Raw data shall include initial measurements made at zero cycles and every subsequent measurement of concrete specimens. Raw data shall include the cycle count and date each measurement was taken. Test results shall also include properties of the concrete mixture as required by AASHTO T 161. This shall include the gradation of the coarse aggregate sample. If AASHTO T 152 is used to measure fresh air content, then the aggregate correction factor for the mix determined in accordance with AASHTO T 152 shall also be included.

4.0 Method of Measurement. There is no method of measurement for this provision. The testing requirements and number of specimens shall be in accordance with AASHTO T 161 Procedure B.

5.0 Basis of Payment. No direct payment will be made to the contractor or quarry to recover the cost of aggregate samples, sample shipments, testing equipment, labor to prepare samples or test samples, or developing the durability report.

- *Delete paragraph 15.0 of the General Provision Disadvantaged Business Enterprise (DBE) Program Requirements and substitute the following*:

15.0 Bidder's List Quote Summary. MoDOT is a recipient of federal funds and is required by 49 CFR 26.11 to provide data about its DBE program. All bidders who seek to work on federally assisted contracts must submit data about all DBE and non-DBEs in accordance with Sec 102.7.9. MoDOT will not compare the submitted Bidder's List Quote Summary to any other documents or submittals, pre or post award. All information will be used by MoDOT in accordance with 49 CFR 26.11 for reporting to USDOT and to aid in overall DBE goal setting**.**

- *Add Sec 102.7.9 to include the following:*

102.7.9 Bidder's List Quote Summary. Each bidder shall submit with each bid a summary of all subcontractors, material suppliers, and service providers (e.g. hauling) considered on federally funded projects pursuant to 49 CFR 26.11. The bidder will provide the firm's name, the corresponding North American Industry Classification System (NAICS) code(s) the firm(s) were considered for, and whether or not they were used in the bid. The information submitted should be the most complete information available at the time of bid. The information shall be disclosed on the Bidder's List Quote Summary form provided in the bidding documents and submitted in accordance with Sec 102.10. Failure to disclose this information may result in a bid being declared irregular.

- Revisions to General Conditions of the Contract for Missouri Standard Specifications for Highway Construction

Insert the following definitions into Sec 101.2:

Agent of Contractor. Subcontractors, its employees, assigns, and agents.

Agent of MoDOT. Any private contractors, subcontractors, engineers, or the employees thereof performing work in accordance with the plans and specifications approved by MoDOT.

Commencement of Work. Also defined as the start of construction operations/activities, this is the date the contractor, its employees, agents, and/or assigns first begins performing work pursuant to the terms of the contract, including the furnishing of labor, material, equipment, and other incidentals necessary or convenient to the successful completion of the project and the carrying out of duties and obligations imposed by the contract. For purposes of clarity, this date shall be deemed to occur on the date certified payroll activities on the project commence.

Exceptions. Work items identified by the engineer, as documented on the semi-final inspection, that are allowed to be completed after the contract completion date but prior to the item-specific completion date established by the engineer. Failure to complete any

excepted work item by the item-specific completion date will result in assessment of contract liquidated damages. Designation of exceptions not mandated by the contract is at the sole discretion of the engineer.

Typical exceptions include:

(a) Seasonal items (e.g., sodding, overseeding, establishment of grass for soil stabilization, or tree/shrub plantings)
(b) Tasks that have contractually required or allowed delays (e.g., removal of sediment control devices, waiting periods for signal/lighting systems, pause for retroreflectivity evaluation of pavement markings)
(c) Other tasks in which the engineer determines it is in the best interest of the Commission to allow completion of such task to extend beyond the contract completion date, but within a designated period of time.

Delete Sec 105.10.7, including all subsections and substitute the following:

105.10.7 Final Inspection. Upon apparent completion of the entire project, the engineer will make a Final Inspection of the work to determine acceptance for maintenance in accordance with Sec 105.15.

Delete Sec 105.15, including all subsections and substitute the following:

105.15 Acceptance.

105.15.1 Partial Acceptance. At the discretion of the engineer, portions of the work within a project may be accepted for maintenance prior to the Final Inspection of all work for that project. When a portion of the work or a specific item is partially accepted, the contractor is relieved from maintenance on the identified portion of the work, but this is not the Final Inspection, as defined in Sec 105.15.2, and will not excuse the contractor from liability or responsibility to the Commission for work performed.

105.15.1.1 Acceptance of a Specific Item or Section of Work. Upon completion of any of the items or sections of work listed herein, the contractor may request the engineer's inspection of the work and partial acceptance. If the engineer finds the work to be complete and acceptable, including submittal by the contractor of all required documentation, partial acceptance will be made for that item or section. The following items, complete in place, as determined by the engineer, are eligible for consideration of partial acceptance:

(a) Any section 0.5 mile or more in length.
(b) Any section 0.5 mile or more in length in one direction of a divided highway.
(c) A complete bridge.
(d) An intersection traffic signal system. Partial acceptance may be made for signal equipment prior to the 30-day testing period though any required performance tests and/or guarantees shall remain applicable.
(e) Devices intended to be used for traffic safety and control. Acceptance of traffic safety devices is limited to guardrail, impact attenuation barriers, traffic signal items, signs, delineators, lighting, concrete barrier walls, concrete bridge parapet, bridge railing, guard cable, crash cushions and fence, which are permanently installed in their final position in accordance with the contract documents.

105.15.1.2 Semi-Final Inspection, Corrections and Exceptions. The contractor shall submit a written request for a semi-final inspection at least seven days prior to the anticipated

completion of work, excluding exceptions. If the engineer postpones the inspection beyond the date the contractor completes all work, the period of postponement will be considered an excusable but non-compensable delay.

105.15.1.2.1 Immediately following the semi-final inspection, the engineer will provide the contractor with a list of any remaining items of work, corrections, and exceptions. The count of contract time will continue until all work and corrections are complete. If the engineer determines all work is complete, with no exceptions, the semi-final inspection will be considered the Final Inspection in accordance with Sec 105.15.2.

105.15.1.2.2 Work Complete Date. Upon verification by the engineer that all work, exclusive of exceptions, is complete, the engineer will declare partial acceptance and cease the count of contract time. The count of contract time will resume should the contractor fail to complete one or more exceptions by the required date.

105.15.2 Final Inspection and Acceptance for Maintenance. The contractor shall promptly notify the engineer when all work on a project, including exceptions, is complete. Upon Final Inspection by the engineer and verification that all work on a project is complete, a notice of acceptance for maintenance will be submitted to the contractor. Acceptance for maintenance excludes any items covered by item-specific performance bonds. Final Inspection shall occur not later than ten (10) business days after contractor's notification to the engineer that all corrections and exceptions have been completed. If the Final Inspection has not occurred within the ten (10) business-day time frame, all corrections and exceptions shall be deemed completed and MoDOT will be deemed to have accepted maintenance. If written acceptance for maintenance is not received within twenty (20) business days after the date of the Final Inspection, nor any objections sent to the Agent of MoDOT during this twenty (20) business-day period, the project and the work shall automatically be deemed accepted for maintenance.

105.15.2.1 Following the Final Inspection, the Agent of MoDOT will be relieved of any new or additional liability to third parties for personal injury, death or property damages which may be alleged to result from the design or construction of the work, unless additional work is performed by the Agent of MoDOT on the right of way after Final Inspection.

105.15.2.2 Nothing in these specifications shall be deemed to excuse the contractor of liability or responsibility for any personal injury, death or property damages which may have occurred during the time period from the Commencement of Work through the Final Inspection.

105.15.2.3 Acceptance of a project shall not be construed to relieve the contractor of full responsibility for making good any non-latent defect in work or material found on any section of work prior to final acceptance of the entire project, to alter in any manner the method of payment prescribed in the contract or to constitute a waiver of any claim the Commission might have against the contractor on the entire project.

105.15.2.4 Contracts with Multiple Projects. For contracts that include two or more projects, the contractor may request a separate final inspection and acceptance for maintenance as the work is completed on each project.

105.15.3 Final Acceptance and Payment. Following Final Inspection and acceptance for maintenance, the engineer will prepare the final tabulation of quantities in accordance with Sec 109.8. A final change order, if necessary, and the final tabulation of quantities will be

submitted to the contractor for review. Upon receipt of the final tabulation of quantities, the contractor shall promptly submit to the engineer any remaining project documentation including, but not limited to, those listed in Sec 105.15.3.2.

105.15.3.1 A Final Acceptance report will be submitted to the contractor, and final payment will be made, no later than thirty days following concurrence on tabulation of quantities, receipt by the engineer of all project documentation, and verification by the engineer that all material incorporated into the work has been properly inspected. If the final tabulation of quantities determines the contractor was overpaid, the contractor, or in case of default, the surety, shall return the amount of overpayment to the Commission within thirty days of receiving notice of the overpayment from the engineer.

105.15.3.2 When required by the contract, project documentation shall consist of the following:

(a) Contractor's Affidavit Regarding Settlement of Claims (Form C-242)
(b) Final Change Order
(c) DBE Participation List and Final Verification
(d) Affidavit – Compliance with the Prevailing Wage Law

105.15.3.3 Final acceptance will not excuse the contractor's liability or responsibility to the Commission for any latent defects in the work or material incorporated into the work, or for claims relating to any work or material incorporated into the work, except as barred by Sections 537.600 and 537.610, RSMo.

Delete Sec 107.11, including all subsections, and substitute the following:

107.11 Responsibility for Claims for Damage or Injury. The contractor shall be responsible, to the extent imposed by applicable law, for injury, property damage, damage to the Work, or other loss caused by the negligent, wrongful, intentional, reckless, or contractually noncompliant acts or omissions of the contractor or an Agent of Contractor from Commencement of construction activities through Final Inspection and acceptance for maintenance.

107.11.1 The contractor shall not be responsible for damage relating to personal injury or death, arising from the design, condition, or maintenance of the project area prior to commencement of work and after Final Inspection and acceptance of the work, in accordance with Sec 101.2 and 105.15.2, unless any of the following conditions exist:

(a) The work is so defective that it creates an imminent danger to third parties;
(b) A defect in the work was concealed and not discoverable by a reasonable inspection by the Commission;
(c) The agent of MoDOT knew of the dangerous condition and did not disclose it to the Commission; or
(d) The plans or specifications followed were so imperfect or improper that the agent of MoDOT should have known the work to be done thereunder would result in an unsafe condition.

107.11.2 Neither the Commission nor the contractor, by execution of a contract, shall intend to or create a new or enlarge an existing cause of action in any third party. This provision shall not be interpreted to create any new liability that does not exist under the law, or to

waive or extinguish any defense that either party to this contract or their respective agents and employees may have to an action or suit by a third party.

Delete Sec 107.12, including all subsections, and substitute the following:

107.12 Contractor's Responsibility for Work Damages to any portion of the work occurring after the date of Commencement of Work and before the work is deemed approved and accepted, caused by the action of the elements or from any other reason, shall be repaired or replaced at the contractor's expense. The contractor, at the contractor's option, may insure against any such damages. The Commission may, in its discretion, make such a payment, determined in accordance with Sec 109.4, for damage to the work due to unforeseeable causes beyond the control of, and without fault or negligence on the part of the contractor, unless the contractor has been reimbursed for such damages by the contractor's insurer. Prior to reimbursement, the contractor shall furnish documentary evidence of all efforts to recover such repair costs.

107.12.1 The contractor shall immediately give written notice to the engineer of any pedestrian, worker and/or vehicular accident that occurs in or near the work zone. The contractor may be directed by the engineer to repair permanent Commission facilities that have been damaged by events that are beyond the control of the contractor. Reimbursement will be provided by the Commission, determined in accordance with Sec 109.4, for the actual direct cost of labor, equipment and material, exclusive of overhead, indirect or consequential costs of profit. The Commission may elect to make such repairs in lieu of the contractor.

Delete Sections 107.13, 107.13.1, 107.13.2, 107.13.3, 107.13.3.4, 107.13.5, 107.13.6, 107.13.9, 107.13.10.4, 107.13.10.8, and substitute the following:

107.13 General Insurance Requirements. From the commencement of construction activities through the Final Inspection and acceptance for maintenance of the project by the engineer, the contractor shall procure and maintain at the contractor's expense, insurance for all damages and losses imposed by law and assumed under the contract, of the kinds and in the amounts specified in Secs 107.13.1 through 107.13.8.

107.13.1 Sovereign Immunity Limits for Missouri Public Entities. The contractor shall procure and maintain at least minimum insurance coverages to meet the sovereign immunity limits for Missouri public entities as calculated by the Missouri Department of Insurance and published annually in the Missouri Register pursuant to Section 537.610, RSMo for Sec 107.13.2 through 107.13.5, unless specified otherwise for each type of insurance coverage. Each policy shall provide additional insured status for the Missouri Highways and Transportation Commission, its members, the Missouri Department of Transportation, and its employees up to Missouri's sovereign immunity limits. Provided, however, additional insured coverage applies only to liability caused in whole or in part by the acts or omissions of the named insured or those acting on its behalf and does not provide defense or indemnity for liability that Section 537.600, RSMo. places solely on MoDOT or another public entity. Each policy shall be endorsed to not waive sovereign immunity limits. The naming of the Commission, its members, MoDOT, and its employees as additional insureds under any insurance policy shall not be construed as a waiver of any sovereign, official, or other governmental immunity. The Commission, its members, MoDOT, and its employees reserve the right to assert any sovereign, official, or any other governmental immunities. Nothing in the Section shall be construed to enlarge the liability of the contractor beyond that imposed by applicable law, create a contractual duty to defend or indemnify prohibited by Section 537.600, RSMo, or require insurance coverage for liability that Section 537.600, RSMo

places solely upon MoDOT. Insurance coverage and priority shall otherwise be determined in accordance with the applicable policies and endorsements.

107.13.2 Commercial General Liability Insurance. The contractor shall procure, and maintain during the term of the project, commercial general liability insurance with coverage at least as broad as Insurance Services Office (ISO) policy form CG 00 01. The general aggregate limit shall, by endorsement or otherwise, provide a designated aggregate limit solely for this project using ISO form CG 25 03 05 09 or an equivalent form. General liability policies shall be endorsed to add the Commission, its members, MoDOT, its employees, agents, and assigns as additional insureds (the "Additional Insureds") using Insurance Services Office forms CG 20 10 or the equivalent under such policy. For construction contracts, an endorsement providing completed operations coverage to the Additional Insureds, ISO form CG 20 37 or the equivalent, is also required. This form, CG 20 37, shall be endorsed on each subsequent commercial general liability policy issued to the contractor for three (3) years after final acceptance of the project. Should work on the project be discontinued, the commercial general liability insurance coverage shall remain in effect for three (3) years after the date of discontinuation, when applicable. Coverage shall not be reduced by insured versus insured exclusions or by explosion, collapse and underground (XCU) exclusions.

107.13.3 Commercial Automobile Liability Insurance. The contractor shall procure and maintain automobile liability coverage at least as broad as ISO policy form CA 00 01 covering owned, hired, and non-owned autos. The policy shall be endorsed to Commission, its members, MoDOT, and its employees, agents, and assigns as additional insureds (the "Additional Insureds").

107.13.4 Contractor's Pollution Liability (CPL) Insurance. The contractor shall procure and maintain contractor's pollution liability insurance for liability arising out of sudden, accidental, and gradual pollution and remediation. The policy shall have minimum limits of $1,000,000. The Commission, its members, MoDOT, and its employees, agents, and assigns shall be endorsed as additional insureds under such policy. The policy shall provide coverage for hauling of waste from the project site to the final disposal location including non-owned disposal sites. Completed operations coverage for pollution liability shall extend a minimum of three (3) years after final acceptance of the project. Contractor shall require any subcontractor that performs environmental remediation, hazardous material removal or related work including the transportation, disposal, or environmental engineering work, to provide contractor's pollution liability insurance with limits and scope of coverage appropriate to the exposure. The Commission, its members, MoDOT, and its employees, agents, and assigns shall be endorsed as additional insured under such policy. The policy shall not contain a cross suits exclusion or other provisions that would eliminate additional insured claims against the contractor or subcontractor.

107.13.5 Aircraft Liability Insurance. If aircraft, including unmanned aircraft, will be used on the project, contractor shall provide, or cause to be provided, aircraft liability insurance protecting against claims for damages resulting from such use in all cases where any aircraft that is owned, leased or chartered by any Contractor-Related Entity used on the Project. The policy shall have minimum limits of $1,000,000 and the Commission, its members, MoDOT, and its employees, agents, and assigns shall be additional insureds on the policy by endorsement or policy provision. The use of any aircraft in performance of the Work, the aircraft crew, flight path and altitude, including landing of any aircraft on the Site or on any property owned by the Commission, MoDOT or other parties at interest, shall be subject to review and written acceptance by the Commission prior to any such usage. If any aircraft

are leased or chartered with crew and/or pilot, evidence of non-owned aircraft liability insurance will be acceptable to meet these requirements but must be provided prior to use of the aircraft. For use of unmanned aircraft vehicles, the contractor may provide insurance either through an aircraft liability insurance policy, or by endorsement to the contractor's commercial general liability insurance policy and excess liability policies. Use of unmanned aircraft must comply with all state and federal rules and regulations, including FAA requirements.

107.13.6 Excess or Umbrella Liability Insurance. The contractor may satisfy the required limits for Secs 107.13.2 through 107.13.5 by use of excess or umbrella liability insurance policies in any combination that meets the contract limits requirements. Such policies shall include as additional insureds, the Commission, its members, MoDOT, and its employees, agents, and assigns.

107.13.9 Evidence of Insurance. Required evidence of insurance providing confirmation of compliance with these requirements shall consist of a certificate of insurance and any endorsements adding the Commission, MoDOT and its employees as additional insureds where specified. "Blanket" or "automatic" additional insured endorsements providing additional insured coverage "where required by contract," may be used, provided that such forms provide coverage at least as broad as provided by the specified endorsement forms required. The contractor and any subcontract work shall not commence under the contract until the contractor obtains the applicable insurance coverage required and receives approval for such insurance from the engineer. No later than five (5) business days prior to the Commencement of Work, all evidence of insurance for the prime contractor, including certificates of insurance and required endorsements, and notices shall be submitted electronically by the insurance agent to ContractorSupport@MoDOT.mo.gov. The aforementioned evidence of insurance shall also be submitted in the same manner no fewer than five (5) business days prior to the effective date of any change or renewal of insurance during the term of the project. All evidence of insurance for the prime contractor, including certificates of insurance and required endorsements, and notices shall be submitted electronically by the insurance agent to ContractorSupport@MoDOT.mo.gov. The contractor shall promptly furnish the engineer with a complete copy of its policy upon request. Failure to furnish evidence of proper insurance, or complete insurance policies when requested, may result in the suspension of work as provided in Sec 108, and may result in other claims or actions for breach of contract or otherwise, as may be recognized at law or in equity.

107.13.10.4 Primary and Non-contributory. For any claims related to this contract or insurance requirements herein identified, the contractor's insurance coverage shall be primary insurance with respect to the Commission, its members, MoDOT, and its employees, as the additional insureds. Any other insurance or self-insurance maintained by any of these parties shall be excess of the contractor's insurance and shall not contribute with the contractor's insurance, unless liability caused in whole or in part by the acts or omissions of the named insured or those acting on its behalf and does not provide defense or indemnity for liability that Section 537.600, RSMo places solely upon MoDOT or another public entity. Priority and allocation shall be governed by the applicable policies and endorsements. MoDOT may not unilaterally alter priority among the contractor's, any subcontractor's, or any additional insured's policies.

107.13.10.8 Timely Notice of Claims. Contractor shall give the engineer prompt and timely notice of claims made or suits instituted that arise out of or result from contractor's or agent of contractor's performance under this Agreement, and that involve or may involve coverage

under any of the required liability policies. The Commission and MoDOT will provide timely notice to the contractor of any claims or lawsuits that it receives.

Delete Sec 107.14 and substitute the following:

107.14 Cooperation in Defense. The Agent of MoDOT and MoDOT shall reasonably cooperate in the defense of the other against potential third party claims. This cooperation includes providing reasonable access to relevant records, documents, and personnel. Nothing in this section creates a contractual duty to defend prohibited by RSMo 537.600(5).

Delete Sec 107.18 and substitute the following:

107.18 Basis of Payment. No direct payment will be made for compliance with Sec 107.

- Payment for Excess Piling

Delete Sec 702.6.3 and insert the following:

702.6.3 Pile Cut-Offs. No direct payment will be made for routine pile cut-offs, except as otherwise provided herein.

702.6.3.1 Excess Piling. If the total measured length of installed piling on a given structure, per item, is 85 percent or less of the plan quantity, the difference between plan quantity and installed quantity shall be deemed as excess piling. Reimbursement will be made for excess piling, as determined by the engineer. No reimbursement will be made for piling purchased in excess of plan quantity. The contractor shall provide the engineer with all paid invoices, which may be used to determine an equitable reimbursement. Shipping costs on the invoice will be included in the reimbursement payment, but no handling, overhead or profit will be included. All excess piling shall be removed from the project and retained by the contractor.

- *Delete Sec 102.18.1 and renumber existing Sec 102.18.2 through 102.18.5.4 including all subsections:*

102.18.1 Certification Regarding Disbarment, Eligibility, Indictments, Convictions or Civil Judgments. The president or authorized official of the bidder, under penalty of perjury under the laws of the USA, shall certify that, except as noted in the exceptions, the company or any person associated therewith in the capacity of owner, partner, director, officer, principal investor, project director, manager, auditor or any position involving the administration of federal funds:

(a) Is not currently under suspension, debarment, voluntary exclusion or determination of ineligibility by any federal agency.

(b) Has not been suspended, debarred, voluntarily excluded or determined ineligible by any federal agency within the past three years.

(c) Does not have a proposed debarment or suspension pending.

(d) Has not been indicted, convicted or had a civil judgment rendered against any of the listed parties by a court of competent jurisdiction in any matter involving fraud or official misconduct within the past three years.

102.18.1.1 If there are any exceptions, the bidder shall submit the exceptions on company letterhead, signed by the bidder and inserted inside the bid submitted.

102.18.1.2 Exceptions will not necessarily result in denial of award but will be considered in determining bidder responsibility.

102.18.1.3 For any exception noted, the bidder shall indicate to whom it applies, the initiating agency, and dates of action.

102.18.1.4 Providing false information may result in criminal prosecution or administrative sanctions.

102.18.2 Certification Regarding Anti-Collusion. In accordance with 23 USC 112, the bidder shall certify, under penalty of perjury, that the bidder has not, either directly or indirectly, entered into any agreement, participated in any collusion or otherwise taken any action in restraint of free competitive bidding in connection with this contract.

102.18.3 Certification Regarding Lobbying Activities. In accordance with 31 USC 1352, the bidder shall certify that:

(a) No federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any federal agency, a member of Congress, an officer or employee of Congress or an employee of a member of Congress in connection with the awarding of any federal contract, the making of any federal grant, the making of any federal loan, the entering into of any cooperative agreement and the extension, continuation, renewal, amendment or modification of any federal contract, grant, loan or cooperative agreement.

(b) If any funds other than federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any federal agency, a member of Congress, an officer or employee of Congress or an employee of a member of Congress in connection with this federal contract, grant, loan or cooperative agreement, the bidder shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with the instructions.

102.18.3.1 This certification shall be a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification shall be a prerequisite for making or entering into this transaction imposed by 31 USC 1352. Any person who fails to file the required certification will be subject to a civil penalty of no less than $10,000 and no more than $100,000 for each such failure.

102.18.3.2 The bidder also agrees by submitting a bid that the bidder shall require that the language of this certification be included in all subcontracts that exceed $100,000, and that all such subrecipients shall certify and disclose any lobbying activities accordingly.

102.18.4 Certification Regarding Missouri Domestic Products Procurement Act. This certification will only apply to state-funded projects as noted on the cover of the Request for Bid. The bidder's attention is directed to Sections 34.350 through 34.359 RSMo 2000, which

requires all manufactured goods or commodities used or supplied in the performance of the contract or any subcontract to be manufactured, assembled or produced in the USA. Sections 34.350 through 34.359 RSMo will not apply if the total bid is less than $1,000.00.

102.18.4.1 Section 34.355 RSMo requires the vendor or bidder to certify compliance with Section 34.353 RSMo and, if applicable, Section 34.359 RSMo at the time of bidding and prior to payment. Failure to comply with Section 34.353 RSMo during performance of the contract and to provide certification of compliance prior to payment will result in nonpayment for those goods or commodities.

102.18.4.2 The bidder shall certify that all the specified goods or products for which this bid was solicited are manufactured, assembled or produced in the USA. If there are any exceptions, the bidder shall submit a list of the exceptions on company letterhead, signed by the bidder and attached to the inside of the bid submitted. The list shall include the pay item number and the location where the item is manufactured. The bidder shall identify any of the exceptions in the list that are specified goods or products that are treated as manufactured, assembled or produced in the USA under an existing treaty, law, agreement or regulation of the USA regarding export/import restrictions and international trade.

102.18.4.3 The bidder shall notify the contact listed in the Request for Bid of any specified goods or products that cannot be manufactured, assembled or produced in the USA in sufficient quantities or in time to meet the contract specifications.

102.18.4.4 The bidder shall certify that the bid complies with all provisions of Section 34.350 *et seq* RSMo.

Delete Sec 106.10 and substitute the following:

106.10 Missouri Domestic Products Requirement. For state funded projects, as noted on the cover of the contract, material shall be in accordance with Sec 102.18.4.

H. ADA Compliance and Final Acceptance of Constructed Facilities JSP-10-01C

1.0 Description. The contractor shall comply with all laws pertaining to the Americans with Disabilities Act (ADA) during construction of pedestrian facilities on public rights of way for this project. An ADA Checklist is provided herein to be utilized by the contractor for verifying compliance with the ADA law. The contractor is expected to familiarize himself with the plans involving pedestrian facilities and the ADA Post Construction Checklist prior to performing the work.

2.0 ADA Checklist. The contractor can locate the ADA Checklist form on the Missouri Department of Transportation website:

https://www.modot.org/forms-contractor-use

2.1 The ADA Checklist is not to be considered all-inclusive, nor does it supersede any other contract requirements. The ADA checklist is a required guide for the contractor to use during the construction of the pedestrian facilities and a basis for the commission's acceptance of work. Prior to work being performed, the contractor shall bring to the engineer's attention any planned work that is in conflict with the design or with the requirement shown in the checklist. This notification shall be made in writing. Situations may arise where the checklist may not fully address

all requirements needed to construct a facility to the full requirements of current ADA law. In those situations, the contractor shall propose a solution to the engineer that is compliant with current ADA law using the following hierarchy of resources: 2010 ADA Standards for Accessible Design, Draft Public Rights of Way Accessibility Guidelines (PROWAG) dated November 23, 2005, MoDOT's Engineering Policy Guidelines (EPG), or a solution approved by the U.S. Access Board.

2.2 It is encouraged that the contractor monitor the completed sections of the newly constructed pedestrian facilities in attempts to minimize negative impacts that his equipment, subcontractors or general public may have on the work. Completed facilities must comply with the requirements of ADA and the ADA Checklist or have documented reasons for the non-compliant items to remain.

3.0 Coordination of Construction.

3.1 Prior to construction and/or closure on an existing pedestrian path of travel, the contractor shall submit a schedule of work to be constructed, which includes location of work performed, the duration of time the contractor expects to impact the facility and an accessible signed pedestrian detour compliant with MUTCD Section 6D that will be used during each stage of construction. This plan shall be submitted to the engineer for review and approval at or prior to the pre-construction conference. Accessible signed detours shall be in place prior to any work being performed that has the effect of closing an existing pedestrian travel way.

3.2 When consultant survey is included in the contract, the contractor shall use their survey crews to verify that the intended design can be constructed to the full requirements as established in the 2010 ADA Standards. When 2010 ADA Standards do not give sufficient information to construct the contract work, the contractor shall refer to the PROWAG.

3.3 When consultant survey is not included in the contract, the contractor shall coordinate with the engineer, prior to construction, to determine if additional survey will be required to confirm the designs constructability.

4.0 Final Acceptance of Work. The contractor shall provide the completed ADA Checklist to the engineer at the semi-final inspection. ADA improvements require final inspection and compliance with the ADA requirements and the ADA Checklist. Each item listed in the checklist must receive either a "YES" or an "N/A" score. Any item receiving a "NO" will be deemed non-compliant and shall be corrected at the contractor's expense unless deemed otherwise by the engineer. Documentation must be provided about the location of any non-compliant items that are allowed to remain at the end of the construction project. Specific details of the non-compliant items, the ADA requirement that the work was not able to comply with, and the specific reasons that justify the exception are to be included with the completed ADA Checklist provided to the engineer.

4.1 Slope and grade measurements shall be made using a properly calibrated, 2 foot long, electronic digital level approved by the engineer.

5.0 Basis of Payment. The contractor will receive full pay of the contract unit cost for all sidewalk, ramp, curb ramp, median, island, approach work, cross walk striping, APS buttons, pedestrian heads, detectible warning systems and temporary traffic control measures that are completed during the current estimate period as approved by the engineer. Based upon completion of the ADA Checklist, the contractor shall complete any necessary adjustments to items deemed non-compliant as directed by the engineer.

5.1 No direct payment will be made to the contractor to recover the cost of equipment, labor, materials, or time required to fulfill the above provisions, unless specified elsewhere in the contract documents.

I. Alternates for Pavements

1.0 Description. This work shall consist of a pavement composed of either Portland cement concrete or asphaltic concrete, constructed on a prepared subgrade in accordance with the standard specifications and in conformity with the lines, grades, thickness and typical cross sections shown on the plans or established by the engineer.

1.1 Separate pay items, descriptions and quantities are included in the itemized proposal for each of the alternates. The bidder shall only bid one of the alternates and leave the contract unit price column blank for any pay item listed for any other alternate. If the bidder leaves any value in the unit price column for another alternate other than the one they are bidding, the bid will be rejected.

2.0 Pavements

2.1 Mainline Pavements

2.1.1 A sum of $**533,300** will be added by the Commission to the total bid using an asphalt alternate for the Mainline Route 96 (Alternate A) pavement for bid comparison purposes to factor in life cycle cost analysis of the roadway. The additional amount added will not represent any additional payment to be made to the successful bidder and is used only for determining the low bid.

2.1.2 A sum of $**53,400** will be added by the Commission to the total bid using an asphalt alternate for the Ramp 3 and 4 I-49 (Alternate E) pavement for bid comparison purposes to factor in life cycle cost analysis of the roadway. The additional amount added will not represent any additional payment to be made to the successful bidder and is used only for determining the low bid.

2.2 A2 Shoulders

2.2.1 A sum of $**36,100** will be added by the Commission to the total bid using an asphalt A2 Shoulder alternate for the Mainline Route 96 A2 Shoulders (*Alternate C)* pavement for bid comparison purposes to factor in life cycle cost analysis of the roadway. The additional amount added will not represent any additional payment to be made to the successful bidder and is used only for determining the low bid.

2.3 The quantities shown for each alternate reflect the total square yards of pavement surface designated for alternate pavement types as computed and shown on the plans. No additional payment will be made for asphaltic concrete mix quantities to construct the required 1:1 slope along the edge of the pavement, or for tack applied between lifts of asphalt.

2.4 The grading shown on the plans was designed for the concrete pavement alternate.

2.5 Pavement alternates composed of Portland cement concrete shall have contrast pavements for intermittent markings (skips), dotted lines, and solid intersection lane lines. The pavement

markings shall comply with Sec 620. No additional payment will be for the contrast pavement markings.

3.0 Method of Measurement. The quantities of concrete pavement will be measured in accordance with Sec 502.14. The quantities of asphaltic concrete pavement will be measured in accordance with Sec 403.22.

4.0 Basis of Payment. The accepted quantity of the chosen alternate and other associated items will be paid for at the unit price for each of the appropriate pay items included in the contract.

4.1 For projects with previously graded roadbeds, any additional quantities required to bring the roadway subgrade to the proper elevation will be considered completely covered by the pay item for Subgrading and Shouldering.

4.2 For projects with grading in the contract, there will be no adjustment of the earthwork quantities due to adjusting the roadway subgrade for alternate pavements.

J. Quality Management NJSP-15-22

1.0 Quality Management. The contractor shall provide Quality Management as specified herein to ensure the project work and materials meets or exceeds all contract requirements.

1.1 The contractor shall provide Quality Control (QC) of the work and material, as specified herein, to ensure all work and material is in compliance with contract requirements. QC staff shall perform and document all inspection and testing. The QC inspectors and testers may be employed by the contractor, sub-contractor, or a qualified professional service provided by the contractor.

1.2 The engineer will provide Quality Assurance (QA) inspection. The role of QA is to verify the performance of QC and provide confidence that the product will satisfy given requirements for quality.

1.3 The contractor shall designate a person to serve as the project Quality Manager (QM). The QM shall be knowledgeable of standard testing and inspection procedures for highway and bridge construction, including a thorough understanding of the Missouri Standard Specifications. The QM shall be responsible for the implementation and execution of the Quality Management Plan and shall oversee all QC responsibilities, including all sub-contract work. The QM shall be the primary point of contact for all quality related issues and responsibilities, and shall ensure qualified QC technicians and inspectors are assigned to all work activities. The QM should be separate from the manager of the work activities to effectively manage a QC program.

1.4 Any QC personnel determined in sole discretion of the engineer to be incompetent, derelict in their duties, or dishonest, shall at a minimum be removed from the project. Further investigation will follow with a stop work notification to be issued until the contractor submits a corrective action report that meets the approval of the engineer.

2.0 Quality Management Plan. The contractor shall develop, implement and maintain a Quality Management Plan (QMP) that will ensure the project quality meets or exceeds all contract requirements, and provides a record for acceptance of the work and material. A sample QMP, which shows minimum requirements, is provided on the MoDOT website at: www.modot.org/quality.

2.1 The QMP shall address all QC inspection and testing requirements of the work as described herein. A draft QMP shall be submitted to the Resident Engineer for review at least two weeks prior to the pre-construction conference. An approved QMP is required at least two weeks prior to the start of work, unless otherwise allowed by the engineer. Physical work on the project shall not begin prior to approval of the QMP by the engineer.

2.2 The approved QMP shall be considered a contract document and any revisions to the QMP will require approval from the engineer.

2.3 The following items shall be included in the Quality Management Plan:

a) Organizational structure of the contractor's project management, production staff, and QC staff, specific to this project.

b) Name, qualifications and job duties of the Quality Manager.

c) A list of all certified QC testers who will perform QC duties on the project, including sub-contract work, and the tests in which they are certified.

d) A list of all QC inspectors who will perform QC inspection duties on the project, including sub-contract work, and the areas of inspection that they will be assigned.

e) A procedure for verifying documentation is accurate and complete as outlined in Section 3.

f) A procedure describing QC Inspections as outlined in Section 4.

g) A procedure describing QC Testing, as outlined in Section 5, including a job specific Inspection and Test Plan (ITP).

h) A procedure describing Material Receiving as outlined in Section 6.

i) A list of Hold Points that are not included in the checklist forms, as outlined in Section 8.

j) A procedure for documenting and resolving Non-Conforming work as outlined in Section 9.

k) A procedure for tracking and documenting revisions to the QMP.

l) A list of any approved changes to the Standard Specifications or ITP, including a reference to the corresponding change order.

m) Format for the Weekly Schedule and Work Plans as outlined in Section 10, including a list of activities that will require pre-activity meetings.

3.0 Project Documentation. The contractor shall establish a Document Control Procedure for producing and uploading the required Quality Management documents to a MoDOT-provided server. The document management software used by MoDOT is Microsoft SharePoint®. Contractors do not need to purchase Microsoft SharePoint®, however, it is recommended that new users acquire some basic training to better understand how to use this software. MoDOT

does not provide the software training, but there are several online vendors who do. Contractors are required to use Microsoft Excel® and Microsoft Word® with some documents.

3.1 The contractor shall utilize the file structure and file naming convention provided by MoDOT. A sample file structure is available on the MoDOT website.

3.2 Documents (standard forms, reports, and checklists) referenced throughout this provision are considered the minimum documentation required. They shall be obtained from MoDOT at the following web address: www.modot.org/quality. The documents provided by MoDOT are required to be used in the original format, unless otherwise approved by the engineer. Any alteration to these forms shall be approved by the engineer.

3.3 Timely submittal of the required documents to the MoDOT document storage location is essential to ensure payment can be processed for the completed work. Submittal of the documents is required within 12 hours of the work shift that the work was performed, or on a document-specific schedule approved by the engineer and included in the QMP.

3.4 The contractor shall establish a verification procedure that ensures all required documents are submitted to the engineer within the specified time, and prior to the end of each pay period for the work that was completed during that period. Payment will not be made for work that does not include all required documents. Minimum documents that might be required prior to payment include: Test Reports, Inspection Checklists, Materials Receiving Reports, and Daily Inspection Reports.

3.5 The contractor shall perform an audit at project closeout to ensure the final collection of documents is accurate and complete.

4.0 Quality Control Inspections. The QMP shall identify a procedure for performing QC inspections. QC inspections shall be performed for all project activities to ensure the work is in compliance with the contract, plans and specifications.

4.1 The QM shall identify the QC inspectors assigned to each work activity. The QC inspectors shall inspect the work to ensure the work is completed in accordance with the plans and specifications, and shall document the inspection by completing the required inspection checklists, forms, and reports provided by MoDOT. Depending on the type of work, the checklists may be necessary daily, or they may follow a progressive work process. The frequency of each checklist shall be stated in the QMP. The contractor may propose alternate versions of checklists that are more specific to the work.

4.2 A Daily Inspection Report (DIR) is required to document pertinent activity on the project each day. This report shall include a detailed diary that describes the work performed as well as observations made by the inspection staff regarding quality control. The report shall include other items such as weather conditions, location of work, installed quantities, tests performed, and a list of all subcontractors that performed work on that date. The report shall include the full name of the responsible person who filled out the report and shall be digitally signed by an authorized contractor representative.

4.3 External fabrication of materials does not require further QC inspection if the product is currently under MoDOT inspection or an approved QC/QA program. QC inspection and testing required in the production of concrete for the project shall be the responsibility of the contractor.

4.4 The contractor shall measure, and document on the DIR, the quantity for all items of work that require measurement. Any calculations necessary to support the measurement shall be included with the documentation. The engineer will verify the measurements prior to final payment.

5.0 Quality Control Testing. The QMP shall identify a procedure for QC testing. The contractor shall perform testing of the work at the frequency specified in the Inspection and Test Plan (ITP).

5.1 MoDOT will provide a standard ITP and the contractor shall modify it to include only the items of work in the contract, including adding any Job Special Provision items. The standard ITP is available on the MoDOT website at www.modot.org/quality. The contractor shall not change the specifications, testing procedures, or the testing frequencies, from the standard ITP without approval by the engineer and issuance of a change order.

5.2 Test results shall be recorded on the standard test reports provided by the engineer, or in a format approved by the engineer. Any test data shall be immediately provided to the engineer upon request at any time, including prior to the submission of the test report.

5.3 The contractor shall ensure that all personnel who perform sampling and/or testing are certified by the MoDOT Technician Certification Program or a certification program that has been approved by MoDOT for the sampling and testing they perform.

5.4 If necessary, an independent third party will be used to resolve any significant discrepancies between QC and QA test results. All dispute resolution testing shall be performed by a laboratory that is accredited in the AASHTO Accreditation Program in the area of the test performed. The contractor shall be responsible for the cost to employ the third party laboratory if the third party test verifies that the QA test was accurate. The Commission shall be responsible for the cost if the third party test verifies that the QC test was accurate.

6.0 Material Receiving. The QMP shall identify a procedure for performing material receiving. Standard material receiving forms will be provided by the engineer.

6.1 The procedure shall address inspections for all material delivered to the site (excluding testable material such as concrete, asphalt, aggregate, etc.) for general condition of the material at the time it is delivered. The material receiving procedure shall record markings and accompanying documentation indicating the material is MoDOT accepted material (MoDOT-OK Stamp, PAL tags, material certifications, etc.).

6.2 All required material documentation must be present at the time of delivery. If the material is not MoDOT accepted, the contractor shall notify the engineer immediately and shall not incorporate the material into the work.

7.0 Quality Assurance. The engineer will perform Quality Assurance inspection and testing (QA) to verify the performance of QC inspection and testing. The frequency of the QA testing will be as shown in the ITP, but may be more frequent at the discretion of the engineer. The engineer will record the results of the QA testing and inspection and will inform the contractor of any known discrepancies.

7.1 QA is responsible for verifying the accuracy of the final quantity of all pay items in the contract. This includes taking measurements on items that require measurement and other items that are found to have appreciable errors.

7.2 QA inspection and test results shall not be used as a substitute for QC inspection and testing.

7.3 QA will be available for Hold Point inspections at the times planned in the Weekly Schedule. The inspections may be re-scheduled as needed, but a minimum 24-hour advance notification from the contractor is required unless otherwise approved by the engineer.

8.0 Hold Points. Hold Points are events that require approval by the engineer prior to continuation of work. Hold Points occur at definable stages of work when the succeeding work depends on a QA review of the preceding work before work can continue.

8.1 A list of minimum Hold Points will be provided by the engineer and shall be included in the QMP. The engineer may make changes to the Hold Point list at any time.

8.2 Prior to all Hold Point inspections, QC shall provide the engineer with the Daily Inspection Reports, Inspection Checklists, Test Reports, and Material Receiving Reports for the work performed leading up to the Hold Point. If the engineer identifies any corrective actions needed during a Hold Point inspection, the corrections shall be completed prior to continuing work. The engineer may require a new Hold Point to be scheduled if the corrections require a follow-up inspection.

9.0 Non-Conformance Reporting. Non-conformance reports shall be issued by the contractor for work that does not meet the contract requirements. Non-conforming work includes work, testing, materials and processes that do not meet contract requirements. The contractor shall establish a procedure for identifying and resolving non-conforming work as well as tracking the status of the reports.

9.1 Contractor QC staff or production staff should identify non-conforming work and document the details on the Non-Conformance Report form provided by MoDOT. QA staff may also initiate a non-conformance report.

9.2 In-progress work that does not meet the contract requirements may not require a non-conformance report if production staff is aware of the issue and corrects the problem during production. QC or QA may issue a non-conformance report for in-progress work when documentation of the deficiency is considered beneficial to the project record.

9.3 The contractor shall propose a resolution to the non-conforming work. Acceptance of a resolution by the engineer is required before closure of the non-conformance report.

9.4 For recurring non-conformance work of the same or similar nature, a written Corrective Action Request will be issued by QC or QA. The contractor shall then establish a procedure for tracking the corrective action from issuance of the request to implementation of the solution. Approval from the engineer is required prior to implementation of the proposed corrective action. The contractor shall notify the engineer after the approved corrective action has been implemented.

10.0 Work Planning and Scheduling. The contractor shall include Quality Management in all aspects of the work planning and scheduling. This shall include providing a Weekly Schedule, a Work Plan for each work activity, and holding pre-activity meetings for each new activity.

10.1 A Weekly Schedule shall be provided to the engineer each week that outlines the planned project activities for the following two-week period. This schedule shall include all planned work, identification of all new activities, traffic control events, and requested Hold Point inspections for

the period. Planned quantity of materials, along with delivery dates should also be included in the schedule.

10.2 A Work Plan shall be submitted to the engineer at least one week prior to the pre-activity meeting. The Work Plan shall include the following: a safety plan, list of materials to be used, work sequence, defined responsibilities for QC testing and inspection personnel, and stages of work that will require Hold Point inspections.

10.3 A pre-activity meeting is required prior to the start of each new activity. The purpose of this meeting is to discuss details of the Work Plan and schedule, including all safety precautions. Those present at the meeting shall include: the production supervisor for the activity, the Quality Manager, QC inspection and testing staff, and QA. The Quality Manager will review the defined responsibilities for QC testing and inspection personnel and will address any quality issues with the production staff. Attendees may join the meeting in person or by phone or video conference.

11.0 Basis of Payment. Payment for all costs associated with developing, implementing and maintaining the Quality Management Plan, providing Quality Control inspection and testing, and all other costs associated with this provision, will be considered included in the unit price of each contract item. No direct pay will be made for this provision.

K. Disposition of Existing Signal/Lighting and Network Equipment

1.0 Description. All signal controllers, cabinets, cabinet equipment, network equipment, antennas, radios, modems, battery backup cabinets and all associated battery backup equipment, radar detection sensors, radar wiring pigtails and all associated radar equipment, and wood span wire signal poles shall be removed by the contractor and delivered to the following location. Delivery shall be arranged during normal business hours. All equipment not listed shall remain the property of the contractor.

Shannon Johnson, Traffic Supervisor
Joplin Maintenance Lot
2915 S. Doughboy Drive
Joplin, MO 64804
(417) 621-6567

2.0 Signal Equipment. All equipment noted in Section 1.0 are to be transported to the address listed above. The contractor shall notify the Commission’s representative 24 hours prior to each delivery by calling the phone number listed above and ask for the field traffic supervisor.

3.0 The contractor shall exercise reasonable care in the handling of the equipment during the removal and transportation. Should any of the equipment be damaged by the contractor's negligence, it shall be replaced at the contractor's expense. The contractor shall dispose of any other equipment. Delivery shall be within 2 working days of removal. All items returned shall be tagged with the date removed, project number and location/intersection.

4.0 Basis of Payment. Payment for removal, handling and transportation of all equipment specified shall be considered completely covered by the contract unit price for 202-20.10, Removal of Improvements, per lump sum.

L. Notice to Bidders of Funding by Third Party

1.0 Bidders are advised that Carthage Water & Electric Plant is required to provide substantial funds for construction of Job No. J7SR0060.

2.0 Bidders acknowledge that their bids are made with knowledge of and subject to the condition of Carthage Water & Electric Plant providing substantial funds prior to authorization of any award of a contract for this job by the Commission.

3.0 Bidders agree that they shall be estopped, both in law and equity, to assert any right to award of a contract for this job by the Commission should Carthage Water & Electric Plant not provide substantial funds for any reason.

M. Truck Mounted Attenuator (TMA) for Stationary Activities

1.0 Description. Provide and maintain Truck Mounted Attenuators (TMAs) in accordance with Sec 612 and as specified herein.

2.0 Construction Requirements. TMAs shall be used for the work activities indicated in the plans or specified herein.

2.1 Temporary Signal for a Two-Lane Closure.
(a) Baker Street Intersection.
(b) Francis Avenue Intersection.
(c) Garrison Avenue Intersection.

2.2 Stationary Lane Closure.
(a) Stationary lane closure to excavate, remove pavement, install waterline, install conduit or install new pavement as represented in Stages 1-5 in the Temporary Traffic Control Plan.

2.3 Stationary Interior Lane Closure.
(a) As necessary to work on the interior lanes as indicated in Stage 1 of the Temporary Traffic Control Plan or as needed in other locations.

2.4 Stationary Right Lane Closure.
(a) As indicated in the plans or as needed in other locations.

3.0 Method of Measurement. No measurement will be made for TMAs.

4.0 Basis of Payment. Delete Sec 612.5.1 and substitute with the following:

5.0 No payment will be made for TMAs used in mobile operations or for any TMAs designated as optional.

5.1 Payment for TMAs required for stationary work activities will be paid for at the contract unit price for 612-30.01, Truck Mounted Attenuator (TMA), per lump sum. The lump sum payment includes all work activities that require a TMA, regardless of the number of deployments, relocations, or length of time utilized. No payment will be made for repair or replacement of damaged TMAs.

N. Utilities

1.0 For informational purposes only, the following is a list of names, addresses, and telephone numbers of the known utility companies in the area of the construction work for this improvement:

Utility Name	**Known Required Adjustment**	**Type**
Carthage Water and Electric Company Richard Graves 627 W Centennial Ave. Carthage, MO 64836 Phone: 417-237-7300	Yes Section 2.0	Power, Water, Sewer and Fiber
AT&T Distribution Gene Lollis Joplin, MO Phone: 417-499-7819	None	Communications
Spire Energy Baylee Godat Joplin, MO Phone: 816-334-8075	None	Natural Gas
Optimum Internet Jeffery Hicks Joplin, MO Phone: 417-771-1139	None	Fiber/Internet
AT&T Distribution Gene Lollis Joplin, MO Phone: 417-499-7819	None	Communications

1.1 The existence and approximate location of utility facilities known to exist, as shown on the plans, are based upon the best information available to the Commission at this time. This information is provided by the Commission "as-is" and the Commission expressly disclaims any representation or warranty as to the completeness, accuracy, or suitability of the information for any use. Reliance upon this information is done at the risk and peril of the user, and the Commission shall not be liable for any damages that may arise from any error in the information. It is, therefore, the responsibility of the contractor to verify the above listing information indicating existence, location and status of any facility. Such verification includes direct contact with the listed utilities.

1.2 Overhead Primary Electric: Various utilities listed above have overhead lines within the project limits near the contractor's work. The contractor shall comply with the Missouri Overhead Powerline Safety Act, which makes it illegal for an unauthorized person or entity to work or bring equipment within 10 feet of a high-voltage line that has not been covered or de-energized. If the contractor requires line cover when working near a primary power line, the contractor shall notify

the utility owner a minimum of 14 days prior. Most power providers perform this service free of charge for municipally driven projects. The contractor is responsible for any damage to overhead lines caused by their operations. There will be no direct payment for compliance with this specification.

2.0 Project Specific Provisions:

2.1 A crossing of sanitary sewer near Sta. 492+18.40 by proposed storm sewer has limited clearance on the left and right curb lines. A quantity of flowable fill is included in the plans to provide bedding between the bottom of the storm sewer pipe and the top of the sanitary sewer clay tile pipe. The sanitary sewer should be excavated to the middle of the pipe for 18 inches outside of the clay tile pipe walls for eight feet centered under the crossing. The storm sewer pipe should be centered between joints over the crossing and the trench filled to the middle to the lower third of the storm sewer diameter.

O. Curved Vane Grate with Curb Box and Frame

1.0 Description. This work shall consist of furnishing and installing curved vane grates with curb boxes and frames of the size and design shown on the plans.

2.0 Material. Curved vane grates and frames shall be constructed of cast gray iron, meeting the requirements of AASHTO M 306 and shall be fabricated as shown on the plans. All bolt, nuts, and washers unless otherwise specified in the plans shall be galvanized in accordance with AASHTO M 232 or shall be mechanically galvanized. If mechanically galvanized, the coating thickness, adherence and quality requirements shall be in accordance with ASTM B695, Class 55. Damaged spelter coating shall be repaired in accordance with Sec 1081. Stainless bolts, nuts, and washers as specified in the plans shall be in accordance with Sec 901.3.

3.0 Manufacturer Example Model. The curved vane grate with curb box and frame as shown in the plans is similar in dimensions to Neenah Model # R-3246-AL. An equivalent curved vane grate with curb box and frame may be provided as approved by the engineer.

4.0 Construction Requirements. Curved vane grates shall be properly oriented to the direction of water flow. Curved vane grates installed at low points shall be oriented as directed by the engineer.

5.0 Basis of Payment. The accepted quantity of curved vane grate with curb box and frames will be paid for at the contract unit price for the following:

Item No. 614-99.02, 2 FT X 3 FT COMBO CURVE VANE GRATE AND CURB BOX, per each.

P. Non-Tracking Tack JSP-24-02A

1.0 Description. This work requires application of tack in accordance with Sec 407 and prevention of tack loss from the surface as specified herein. Tack loss prevention shall be accomplished with successful usage of a MoDOT-approved non-tracking tack, or other acceptable non-tracking means, as approved by the engineer.

2.0 MoDOT-Approved Non-Tracking Tack. A list of MoDOT-approved non-tracking tack products is available at MoDOT.org under the Materials Qualified List. Upon request from the contractor, the MoDOT Division of Construction & Materials will consider allowance of other non-tracking products. To be approved, the contractor must successfully demonstrate that the proposed product meets the non-tracking requirements specified in Section 3.0. The location of a contractor demonstration will only be allowed in areas approved by the engineer. The engineer will make final determination of product acceptance based on observation of the results of the contractor's demonstration.

2.1 Products on the Qualified List have demonstrated successful non-tracking performance on previous projects; however, the Commission does not endorse nor guarantee success of any of the listed products. Success is dependent on the contractor choosing a product that can achieve the desired results while also taking into consideration all factors, including, but not limited to, cure time, weather conditions, surface prep, surface type, material properties, and adherence to manufacturer's instructions. The contractor is responsible for monitoring adherence of the tack to the pavement surface and shall cease operations when tack first begins to show signs of not meeting the requirements of Section 3.0. Corrective action shall be made prior to resuming tacking operations.

3.0 Non-Tracking Requirements. Non-tracking tack shall remain adhered to the pavement surface when exposed to any wheeled or tracked vehicles. The tack shall not track off the surface within 30 minutes of being applied, and shall not stick to the tires, tracks or other parts of paving equipment or vehicles such that the underlying surface becomes visible or void of tack prior to the placement of the hot mix asphalt. The tack shall not track onto any adjacent lanes, pavement markings, driveways, sideroads, etc.

3.1 The contractor shall be responsible for cleaning all tracked tack from adjacent lanes, driveways, sideroads, etc., and shall replace all pavement markings that become coated with tracked tack. This cleaning and replacement requirement applies to both approved and proposed non-tracking products.

4.0 Basis of Payment. Measurement and payment shall be in accordance with Sec 407. The accepted quantity of non-tracking tack coat will be paid for per gallon at the contract unit price for 407-10.07, Tack Coat – Non-Tracking, per gallon. No additional payment will be made for the cost to demonstrate proposed products, for cleaning surfaces due to tracking of tack, or for replacement of pavement marking damaged by tracked tack.

Q. Access to Commercial Properties

1.0 Description. This improvement is located within a commercial and residential area. While working on entrances or adjacent to properties, the contractor shall make every reasonable effort to minimize any interference to the properties and to pursue the work diligently. Under no circumstances shall the contractor completely block ingress/egress to and from businesses during the normal business hours of each business unless approved in advance by the property owner and the engineer.

1.1 The contractor shall notify the engineer seven (7) calendar days prior to any area of sidewalk or entrance construction. After notification to the engineer, the contractor shall contact each property owner at least one week prior to any sidewalk or entrance construction within their property limits to advise them of the work that will take place and the timeframe of the work.

2.0 Construction Requirements. If there exists more than one entrance to the property, the contractor shall keep a minimum of one entrance to that property completely open at all times unless approved in advance by the property owner and the engineer. If there is only one entrance, the contractor shall only construct one half of the entrance at a time. The minimum compressive strength of the concrete shall be 2,500 psi for light traffic (residential) and 3,000 psi for commercial traffic before allowing access.

3.0 Liquidated Damages Specified. If the entire entrance is not complete and open to traffic within **seven (7) calendar days**, the Commission, the traveling public, and state and local police and governmental authorities will be damaged in various ways, including but not limited to, increased construction administration cost, potential liability, traffic and traffic flow regulation cost, traffic congestion and motorist delay, with its resulting cost to the traveling public. These damages are not reasonably capable of being computed or quantified. Therefore, the contractor will be charged with liquidated damages specified in the amount of **$500 per day** for each full day that an entrance is not complete and open to traffic in excess of the limitation as specified elsewhere in the special provision.

4.0 Basis of Payment. No direct payment will be made to the contractor to recover the cost of equipment, labor, materials or time required to fulfill the above provisions, unless specified elsewhere in the contract documents.

R. Temporary Construction Easements

1.0 Description. MODOT has obtained temporary construction easements from property owners to construct improvements for the project. Businesses within the project limits will continue utilizing those construction easements to conduct their day-to-day business. The contractor shall coordinate with the business owners to minimize the amount of time and space needed to construct the improvements located inside each temporary construction easement.

2.0 Construction Requirements. The contractor shall not disturb any business improvements, besides the entrance or parking lot, located inside each temporary construction easement, unless shown as such on the plans. Business improvements include such things as, but not limited to, business signs and their electrical connections, landscaping, or sprinkler systems. The Contractor will be solely responsible to repair or replace any improvements disturbed that are not specifically marked on the plans for removal or adjustment, at the Contractor's cost.

3.0 Basis of Payment. No direct payment will be made for compliance with this provision.

S. Work Within Proximity of Drive-Throughs

1.0 Description. The contractor shall be aware of work within the proximity of drive-throughs. The Contractor shall work with businesses to complete work during non-business hours or when the drive-through is not in operation.

Known businesses with drive-throughs are:

Business	Address
Arvest Bank	425 W. Central Ave.
Burger King	1011 W. Central Ave.
Subway	1032 W. Central Ave.

Sonic Drive-In	1106 W. Central Ave.
McDonald's	1111 W. Central Ave.
Boomer Sooners BBQ (Boomers BBQ)	1123 W. Central Ave.
Scooter's Coffee	1306 W. Central Ave.

2.0 Basis of Payment. No direct payment will be made for compliance with this provision.

T. Pavement Edge Treatment for Drop Off Conditions – SW

1.0 Description. The contractor shall conduct construction operations so that there will be no drop off exceeding 2 inches adjacent to traffic.

2.0 Treatment of any drop off greater than 2 inches shall be considered incidental to and completely covered by the other items in the contract. There will be no direct payment for Pavement Edge Treatment on this project.

U. Contractor Furnished Surveying and Staking – SW

In addition to the requirements of Section 627 of the Missouri Standard Specifications for Highway Construction, the following shall apply:

1.0 Description. The contractor will be responsible for all layout required on the project. Any and all staking required to ensure that improvements installed on this project meet the ADA requirements is the sole responsibility of the contractor. This responsibility will include, but not limited to the following: Construction signs, curb ramp, landing, and sidewalk construction, truncated dome installation, quantity verification, curb construction, pavement marking, pedestrian signal modifications, median strip/island construction and modifications, etc.

1.1 The above list is not all inclusive. The contractor shall have the primary responsibility for these operations. The contractor shall provide the Resident Engineer with a staking plan layout for approval prior to the installation of signs. The RE will also provide assistance during this layout provided a request is submitted to the RE or Construction Project Manager 48 hours in advance. This will ensure that all permanently mounted traffic control devices remain consistent with District policy and avoid re-staking. If the contractor installs any signs without engineer approval, all costs associated with re-staking and/or relocation will be at the contractor's expense.

1.2 The intent of this provision is to increase the quality of our work zones and minimize negative impacts to the contractor's schedule that can result from delays in staking.

1.3 Any adjustments to the plan quantities or line numbers established in the contract shall be approved by the Engineer.

2.0 Basis of Payment. No direct payment will be made to cover the costs associated with these additional requirements. All costs will be considered completely covered by the unit bid price submitted for Contractor Furnished Surveying and Staking.

V. Curb Ramps and Sidewalk – SW

1.0 Description. Construction of concrete curbs, aprons, curb ramps, transition areas, sidewalk and landings shall be in accordance with applicable portions of Sections 608 & 609 of the Standard Specification and Standard Plans for Highway Construction 608.10, as shown on the plans, and meet ADA requirements.

2.0 Construction Requirements. This work shall include, but is not limited to, sidewalk construction including landings, joint construction, aggregate base, compaction, apron modifications, transition area, curb ramp construction, Type S Curb or Type A Curb installation (as required), tie bars or dowel bars (as required), clean-up, etc. for each location shown on the plans.

The following requirements shall be applicable to construction of this project:

- Existing curb, curb and gutter, sidewalk, shoulders, etc. that are adjacent to a designated curb ramp and/or sidewalk improvement area that is damaged during construction shall be replaced/repaired to match existing materials and condition.

- Variable height curb along the roadside may be constructed monolithic or separate depending on construction operations. Integral curb shall be doweled to the existing gutter or pavement.

- Integral or Type S-curb shall be used along the existing right-of-way when constructing curb ramps as shown on the plans. The cost of the curb is included in pay limits of the curb ramp.

- The transition area shall be 8” thick and tied to the existing roadway pavement and existing paved approach or sidewalk it is matching.

- Curing compound for all concrete construction shall be a clear or translucent color. The white pigmented option or other colored compound will not be allowed.

- Adjacent grass areas, landscaping, irrigation lines, pavement, etc. disturbed by curb ramp or sidewalk construction shall be repaired or replaced to match or exceed existing conditions. Sod quantities are included for adjacent areas. More or less sod may be required depending on actual field conditions.

3.0 Method of Measurement. Curb ramps and concrete sidewalk will be measured to the nearest 1/10 square yard. Measurement of incidental items required to complete all aspects of construction for the above noted items at each new curb ramp and sidewalk location will not be made individually unless specified elsewhere in the contract.

4.0 Basis of Payment. All costs incurred by the contractor by reason of compliance to satisfy the above requirements shall be considered incidental to and completely covered by the contract unit price for each of the pay items within the contract.

W. Permanent Pavement Marking – SW

1.0 Description. This work shall consist of furnishing and placing permanent centerline, edge line, lane line markings, and preformed thermoplastic pavement marking, as specified, at locations shown on the plans or as approved by the engineer. The preformed thermoplastic

pavement marking includes, but not limited to, 24" White (Stop Bars) and 24" Yellow (Hash Mark), 6" White for Crosswalks, Turn Arrows, Railroad Crossings, Yield Markings, and the word "ONLY". This work shall be in accordance with Section 620 and specifically as follows.

2.0 Construction Requirements. On roadways open to traffic, permanent centerline, edge line, and lane line markings shall be in place no later than five days after the final paving operations. This requirement applies per individual route if multiple routes are included in a contract or if a 15-mile section of an individual route is open to traffic within a contract. This requirement also applies to divided highways, once a directional segment of 15 mile, or the entire directional segment if less than 15 miles, is paved and open to traffic within a contract. To fulfill this requirement, the contractor may have to mobilize more than once for the installation of permanent centerline, edge line, and lane line markings. The contractor will also need to coordinate the permanent pavement marking with the installation of rumble strips. The contractor shall place the preformed thermoplastic pavement marking after the permanent centerline, edge line, and lane line marking is installed by the contractor or by others. The contractor will have 5 five days after the permanent centerline, edge line, and lane line markings are placed to start the preformed thermoplastic pavement marking installation and shall be placed in accordance with manufacturer's recommendations or as approved by the engineer.

3.0 Basis of Payment. The accepted quantity of permanent pavement marking paint and preformed thermoplastic pavement marking will be paid for at the contract unit price for each of the pay items include in the contract. Payment will be considered full compensation for all labor, equipment, material, or time necessary to complete the described work including any other incidental items.

X. Temporary Traffic Signals

1.0 Description. This work involves the furnishing, installation, maintenance, relocations, and removal of temporary traffic signal through all phases of construction.

2.0 Materials. Temporary signals conform to Sec 902.

2.1 At a minimum, installation of these temporary signals and lighting shall require connection to a power source and the following items:

- Vehicle Detection System
- Signal Heads, Type 3C (3-section head with Type I bracket)
- Controller Assembly Housing (see requirements below)
- Cable, 1 Conductor, Power (8 AWG minimum)
- Cable, 12 AWG 5 or 7 conductor (for signal heads)
- Power Supply Assembly

This list is not intended to be all-inclusive and other items may be necessary for the proper installation and operation of these signals.

3.0 Construction Requirements. Temporary signals shall be furnished, installed, relocated, and maintained to properly handle traffic, as required, along Route 96 to facilitate traffic flow at currently signalized intersections during construction. Signals shall be installed per typical, and as described in this special provision or as directed by the engineer. Exact placement of

temporary signals should be configured in the field, per MUTCD recommendations, and signal heads be adjusted as required to improve visibility or operations, with approval of the engineer.

3.1 The temporary signal installation and relocation during different phases of construction shall be maintained in operational condition until the new permanent signals and street lights are installed and operational.

3.1.1 If the temporary signal installations become inoperable due to alterations, malfunctions or periods of shutdown for required maintenance or when one-way traffic control is required, the contractor shall provide adequate traffic control, including flaggers. In addition, adequate traffic control, including flaggers, shall be provided during the startup and shut down of this installation. Sign WO20-7b, Flagger (Symbol), shall be displayed in advance of the flaggers. The contractor shall submit traffic control plans to the engineer for approval at least five (5) business days prior to implementation.

3.2 The temporary signals shall be removed after the new signals are up and operational. All equipment shall remain the property of the contractor.

3.3 The contractor shall be responsible for arranging the electrical power needs required for the installation and operation of the temporary traffic signals with Carthage Water & Electric.

4.0 Basis of Payment. Payment for furnishing, installation, operation, relocation, maintenance, and removal of this temporary traffic signal installation, including all items required for proper operation of this installation will be completely covered by the contract unit price for Pay Item No. 902-94.00, Temporary Traffic Signals, per lump sum.

Y. Temporary Signal Timing

1.0 Description. The contractor is responsible for developing and inputting the timing for the temporary signals. Traffic signals shall include non-intrusive detection for all approaches and be capable of running in time-base coordination (if required). All movements will be provided with protected phasing as currently in place. Signal timings for temporary traffic signals shall be developed by the Contractor and submitted to MoDOT for approval at least ten (10) business days prior to implementation. Signal timings shall be monitored and adjusted as required throughout construction.

2.0 Basis of Payment. All expenses incurred by the contractor by reason of their compliance with this provision shall be considered as completely covered by the unit prices bid for Pay Item No. 902-94.00 Temporary Traffic Signals, per lump sum.

Z. ADA Transition Plan Commitment

1.0 The Missouri Highways and Transportation Commission has committed to the completion of MoDOT's ADA Transition Plan in 2027.

2.0 The contractor is hereby advised that all ADA work on these projects shall be completed by **July 1, 2027**. The contractor shall make every effort to schedule and phase the work so that all ADA work outlined in this contract is completed by this date.

3.0 The following line items shall be considered as ADA work. This list is not all inclusive. Additional items of work needed to complete the ADA items such as earthwork, aggregate base, entrances, signal conduit and cable, traffic control, erosion control, etc. will be required in addition to the items listed below.

- 608-10.10 – Concrete Curb Ramp
- 608-10.12 – Truncated Domes
- 608-60.04 – Concrete Sidewalk, 4 in.
- 902-08.11 – Signal Head, Type 1S, Pedestrian
- 902-27.04 – Post, Signal 4 ft.
- 902-27.08 – Post, Signal 8 ft.
- 902-49.21 – Accessible Pedestrian Signal
- 902-99.02 – Push Button Extension

4.0 This Job Special Provision only applies to MoDOT owned sidewalk segments. Segments shown as city owned in the plans, except for perpendicular crossings of Route 96, may be omitted from these requirements.

5.0 Liquidated Damages. If the ADA Transition Plan work is not complete and open to pedestrian traffic on or before **July 1, 2027**, the contractor will be charged liquidated damages in the amount of **$1,500 per calendar day** for each calendar day, or partial day thereof, that the ADA Transition Plan work is not complete and open to pedestrian traffic in excess of the limitation as specified elsewhere in this special provision. It shall be the responsibility of the engineer to determine the quantity of excess closure time.

5.1 The said liquidated damages specified will be assessed regardless of whether it would otherwise be charged as liquidated damages under the Missouri Standard Specifications for Highway Construction, as amended elsewhere in this contract.

6.0 The Commission acknowledges that certain items of work beyond the contractor's control (such as delayed right of way acquisitions and utility relocations) may impact the contractor's ability to perform ADA Transition Plan work in certain locations. The contractor shall schedule its work to avoid these locations until they are cleared for construction.

6.1 The contractor shall have no claim for damage, delay, disruption, interference or otherwise as a result of the unavailability of certain locations due to delayed right of way acquisitions, utility relocations, or other factors beyond the contractor's control. The contractor may be given an extension of time upon proof of actual delay caused by the unavailability of ADA Transition Plan work locations as approved by the engineer.

AA. Sodding and Fertilizing – SW

1.0 Description. This work shall consist of installing sod and fertilizer in accordance with Sections 801 and 803 of the Standard Specifications.

2.0 Construction Requirements. Sod shall be installed at all locations as shown on the plans, or where the contractor's operations have disturbed adjacent existing grass landscapes, or as

approved by the engineer. Fertilizer shall be applied to all sodded locations per manufacturer's recommendations. The type of sod and fertilizer shall be as noted below.

Fertilizer
Starter Fertilizer 12-12-12 or 10-10-10

Sod
Turf Type Tall Fescue

3.0 Method of Measurement. Measurement of sodded areas shall be made to the nearest square yard. The area required for fertilizer shall match the final area for sod. Plan quantities were estimated from sidewalk locations with adjacent grassy areas. More or less quantity of said materials may be needed depending upon construction requirements at each location. The Engineer shall verify and approve the contractor's location and quantity of newly sodded areas.

4.0 Basis of Payment. All costs incurred by the Contractor by reason of compliance to satisfy the above requirements shall be considered as completely covered by bid item 803-10.00A, Turf Type Tall Fescue Sodding, per square yard. There shall be no direct payment for fertilizing.

BB. ADA Compliant Moveable Barricade

1.0 Description. This work shall consist of providing moveable barricades to satisfy the requirements of the pedestrian traffic control plans as shown in the bidding documents. The contractor will be responsible for moving the pedestrian barricades to coincide with their planned order of work.

2.0 Construction Requirements. The contractor shall use a movable barricade that meets the requirements as established by the ADA. The pedestrian barricades shall be of self-supporting type having a minimum length of 6 feet per unit. The face of the barricade shall not extend into adjacent sidewalk considered open for pedestrian use. The contractor will be responsible for setting and maintaining the pedestrian barricades until all of the proposed improvements have been constructed.

3.0 Method of Measurement. Measurement for ADA Compliant Moveable Barricades will be made per each for each 6 feet (min.) unit provided.

4.0 Basis of Payment. Payment for all work necessary to fulfill the requirements noted above shall be considered completely covered in the contract unit price for Pay Item No. 616-99.02, "ADA COMPLIANT MOVEABLE BARRICADE", per each. No direct payment will be made for any necessary relocation of the ADA compliant moveable barricades.

CC. Linear Grading for ADA Facilities

1.0 Description. This work shall consist of altering the existing roadside features to the required grade and cross sections shown in the plans (if applicable), or to comply with typical sections, running slopes, drop-off and side-slope standards, consistent with the guidelines set forth in the Americans with Disabilities Act (ADA). This work shall be in accordance with Sections 202 and 207 and accompanying provisions except as modified herein.

2.0 Construction Requirements. The roadside shall be brought to the required grade and cross section as established in Section 1.0 of this provision, to a uniform appearance, free of sharp breaks or humps. Minor deviations will be allowed, to take advantage of favorable topography, as approved by the engineer.

2.1 The contractor shall remove all existing roadside improvements necessary to facilitate the new sidewalk and curb ramp construction, along with any other roadside removal items at, or adjacent to the pedestrian pathway, as noted in the plans or as approved by the engineer. This shall include the removal and/or saw cutting at existing raised islands or median strips to construct the pedestrian pathway. The contractor shall pay special care to existing utility facilities to be used in place or relocated by others.

2.2 The contractor shall be responsible for all excavation and embankment work necessary to facilitate construction of new ADA compliant facilities; normally consisting of subgrade and subsequent finished grading for sidewalks, curbs, curb ramps; and may include miscellaneous grading work for items such as ditches, entrances, paved approaches, driveways and pipes, at or adjacent to proposed new sidewalk facilities.

2.3 By this provision, it may be necessary to excavate, stockpile, and haul some material within the project limits. Due to staging and/or Right-of-Way constraints, it may be necessary to waste unusable material off of Right-of-Way, and/or haul a replacement volume of material back to achieve the desired grades.

2.4 All removals of Portland or Asphaltic Concrete performed under this provision will require saw cutting a neat/clean edge along the removal lines at no direct pay, unless otherwise provided for in the contract.

3.0 Method of Measurement. Measurement of Linear Grading for ADA Facilities will be made along the length of the new sidewalk and/or curb ramp installed, along each side of the roadway where sidewalk work is to be performed. Measurement will be made to the nearest 1-foot for each sidewalk work area, totaled, and paid to the nearest 1-foot for final pay. Final field measurement will not be required except where appreciable errors are found, or authorized changes have been made.

4.0 Basis of Payment. The accepted quantities of Linear Grading for ADA Facilities will be paid for at the contract unit price for item 207-99.03, Linear Grading for ADA Facilities, per linear foot, and will be considered as full compensation for all labor, equipment, material, waste fees, disposal agreements, material acquisition, or other construction costs involved to complete the described work.

4.1 No direct payment will be made for “REMOVAL OF IMPROVEMENTS” associated with the removal and disposal of sidewalks, curbs, curb ramps, entrances, and other incidentals required for construction of the new sidewalk and/or curb ramps.

DD. Installation of Pole Foundation (30-ft or 9.0 m Mounting Height)

1.0 Description.

1.1 This work shall consist of installing an owner-furnished steel pile foundation base and contractor-furnished 2-inch conduit sweeps in accordance with the project plans, manufacturer details, and standard MoDOT specifications.

1.2 The pole foundation assembly will be furnished by Carthage Water and Electric (CWE) and installed by the Contractor. Light poles, luminaires, conductors/wiring, and final electrical power connections are excluded from this contract and will be installed by CWE following project completion.

2.0 Materials.

- Owner-Furnished Pile Foundation Base (Provided by CWE): Standard steel pile foundation assembly manufactured per drawing Q042782:
- Shaft Steel Pipe (sp1): 8 5/8" REF. O.D. steel pipe shaft, 7'-0" overall length.
- Top Plate (tp1): 1" thickness top plate featuring (4) 1 1/8" diameter bolt holes on an 11" Bolt Circle (B.C.) with 1/2" x 1/4" V-notches indicating internal slot alignment.
- Cable Slots: (2) 3" x 1'-0" side cable slots located 180° apart, centered 1'-6" below the top plate.
- Hardware: Field bolts, heavy hex nuts, and medium lock washers as furnished with the assembly.
- Contractor-Furnished Conduit.

3.0 Construction Requirements.

3.1 Material Handling & Inspection. Pick up owner-furnished pile foundations from CWE's designated storage facility. Inspect units upon pickup and report any damage prior to installation.

3.2 Excavation & Foundation Installation.

3.2.1 Installation shall conform to with Missouri Standard Specifications Section 901 and Missouri Standard Plans Section 901 or as directed by the engineer.

3.2.2 Verify underground utility locations prior to excavating or drilling.

3.2.3 Excavate and backfill the pile foundation vertically and plumb.

3.2.4 Install the shaft until the top of Top Plate (tp1) sits exactly 1 inch above finished grade (1" REF.) or as indicated in the plans.

3.2.5 Align the 1/2" x 1/4" V-Notches on the top plate with the trench path to ensure internal side cable slots align with incoming/outgoing conduit runs.

3.3 Conduit Routing & Backfill.

3.3.1 Route 2-inch conduit through the side cable slots, sweeping upward 90° inside the shaft pipe to extend out through the center of the top plate.

3.3.2 Cap or plug the top of the 2-inch conduit stub and temporarily seal top plate openings to prevent water, concrete, or debris entry prior to CWE wiring operations.

3.3.3 Backfill around the foundation shaft and conduit in uniform, compacted layers in accordance with Sec 203.

3.4 Handover.

3.4.1 Ensure all (4) 1 1/8" diameter bolt holes remain clean, undamaged, and free of debris.

3.4.2 Leave the completed base clean and accessible for CWE forces to pull conductors and set the 30-ft mounting height poles.

4.0 Method of Measurement. Measurement for installing the owner-furnished pole foundation and contractor-furnished 2-inch conduit sweeps will be made per each unit complete in place.

5.0 Basis of Payment.

5.1 Payment for the accepted quantity of installed pole foundations will be made at the contract unit price for:

- Item 901-99.02, “INSTALLATION OF POLE FOUNDATION (30-FT OR 9.0 M MOUNTING HEIGHT)”, per Each.

5.2 Payment shall constitute full compensation for picking up owner-furnished foundation units, excavation, driving/placing the pile, furnishing and installing 2-inch conduit sweeps, backfilling, compaction, temporary capping, and all labor, tools, equipment, and incidentals necessary to complete the work.

EE. Temporary Surfacing

1.0 Description. This work shall consist of furnishing, placing, maintaining, and removing temporary surfacing material required to maintain continuous, safe vehicular access to all adjacent commercial businesses and private residences located along Central Avenue within the project limits during construction operations, or as otherwise directed by the Engineer.

2.0 Access Requirements and Site Constraints.

2.1 Critical Access Properties. The Contractor is explicitly advised that the commercial properties identified below have **no rear or side road access**. Their sole ingress and egress is directly via their primary entrances on Central Avenue:

- **McDonald's:** 1111 W. Central Avenue, Carthage, MO 64836
- **Pennzoil Quick Lube:** Central Avenue, Carthage, MO 64836

2.2 Business Continuity. The Contractor shall maintain uninterrupted access to all commercial businesses and private residences within the project limits during established normal operating or residential access hours, with specific attention to the critical properties listed in Section 2.1.

2.3 Contractor Coordination. This provision applies to all businesses and residences located within the project limits. The Contractor shall designate a primary representative to communicate directly with all affected property owners, tenants, and managers – specifically including the management of McDonald's (1111 W. Central Ave.) and Pennzoil Quick Lube – at least **48 hours**

in advance of any planned construction activities, traffic shifts, lane closures, or surface disruptions that will impact or restrict access to their entrances. The Contractor shall provide these entities with updated schedule details to minimize disruption to commercial and private operations.

3.0 Material Requirements. Temporary surfacing material shall conform to Bid Item No. 401-12.09 (Bituminous Pavement Mixture PG64-22, BP-1). The material must be capable of supporting expected traffic loads without severe rutting, washboarding, or deterioration during the temporary access period.

4.0 Construction Requirements.

4.1 Maintenance. The Contractor shall regularly monitor and maintain temporary surfacing to provide a smooth, safe transit surface for public vehicles. Any potholes, drop-offs, or structural failures in the temporary surfacing shall be repaired immediately by the Contractor at no additional cost to the Commission.

4.2 Removal. Upon completion of permanent driveway/entrance construction and when temporary access is no longer required, the Contractor shall remove and properly dispose of all temporary surfacing materials off the right-of-way, unless otherwise approved by the Engineer.

5.0 Method of Measurement. Temporary surfacing will be measured to the nearest 0.1 ton of Bituminous Pavement Mixture PG64-22 (BP-1) actually placed and accepted by the Engineer.

6.0 Basis of Payment. The accepted quantity of temporary surfacing material will be paid for at the contract unit price for Item 401-12.09, "Bituminous Pavement Mixture PG64-22 (BP-1)". This price shall be full compensation for all labor, equipment, materials, coordination with property owners, placing, maintaining, removing, and disposing of temporary surfacing material as specified herein.

FF. 8 Inch Minimum Reinforced Concrete Pavement and Sleeper Slab

1.0 Description. This work shall consist of placing a reinforced concrete pavement as shown on the plans or as directed by the engineer. The reinforced concrete pavement shall be in accordance with Sec 502, except as modified herein. The minimum pavement thickness shall be 8 inches. The reinforced concrete pavement is placed over a 12 foot by 4 foot reinforced concrete box culvert and extended to bear on sleeper slabs each side of the reinforced concrete box culvert. The pavement thickness shall vary in depth depending on culvert depth and crown of the roadway. The pavement shall be unbonded to the culvert top slab and sleeper slab. The pavement shall be placed on an interlayer over the reinforced concrete box culvert and sleeper slab as defined in Sec 506.

1.1 Depth of Pavement. The reinforced concrete pavement shall be a minimum of 8” thick from top surface to the elevation of the selected material used to un-bond the pavement to the top slab of the culvert. The cross slope of the pavement over the reinforced concrete box culvert is to be a minimum of 0.30 percent fall from the profile grade elevation to the edge of pavement. The elevation of the existing culvert top slab is near the bottom surface of the existing pavement. The exterior wall width is unknown. The contractor shall expose the top of the reinforced concrete box culvert behind the existing curbs on each side of the roadway prior to removal of the existing curbs and pavement to confirm depth, slope and width of the reinforced concrete box culvert top slab. The crown of the pavement shall be adjusted based upon the selected interlayer material plus the

minimum 8 inch pavement thickness at the edge of pavement. The engineer may by written order use a minimum 4 inches of Type 1 aggregate base over the box culvert if a minimum of 12 inches depth can be maintained between the top of the proposed pavement and the existing top slab of the reinforced concrete box. The sleeper slab may be eliminated if aggregate base of a minimum 4" thickness is placed between the bottom of 8" reinforced concrete pavement and top slab of the existing reinforced box culvert.

1.2 Width of Sleeper Slab. The sleeper slab width included in the plans is based upon 1 foot thick sidewalls for the existing reinforced concrete box culvert. The contractor shall adjust the width of the sleeper slab to pour against the outside dimensions of the reinforced concrete box culvert. The planned reinforcing steel shall be placed as shown in the plans referenced to the end of the reinforced concrete pavement.

2.0 Materials. All materials shall be in accordance with Division 1000, Materials Details, unless otherwise noted.

2.1 Interlayer. The interlayer material shall be a minimum one-inch thick new bituminous or a geotextile fabric in accordance with Section 1011.3.7.

2.2 Concrete. All procedures and material for the reinforced Portland Cement Pavement shall be in accordance with Sec 502, including QC/QA and PWL provisions for non-reinforced concrete pavement, except the strength and thickness pay factor will account for 100 percent of the total pay factor. All coring samples used for strength and thickness determination are not required.

2.3 Reinforcing Steel. All reinforcing steel used in reinforced concrete pavement and sleeper slab as shown in the plans or as directed by the engineer shall be epoxy coated. Reinforcing steel shall be in accordance with Sec 1036.

3.0 Construction Requirements.

3.1 The construction requirements are in accordance with Sec 502 and Sec 506 for the items included in the contract.

3.2 Opening to Traffic. The concrete base and pavement shall not be opened to traffic until the concrete has attained a minimum compressive strength of 3,200 psi and all sawed joints that have opened more than ¼ inch are sealed. Compressive strength will be determined by tests conducted in accordance with MoDOT test methods. Pavement shall be cleaned prior to opening to traffic.

3.3 Quality Level Analysis from Sec 501.10 and 506.20 will not be used in developing a pay factor. All procedures and material for the reinforced concrete pavement shall be in accordance with Sec 502, including QC/QA and PWL provisions for non-reinforced concrete pavement, except the strength and thickness pay factor will account for 100 percent of the total pay factor. Compressive specimens for strength determination shall use cast cylinders.

3.4 Tied Curbs and Gutter. Curb and gutter and mountable curb tied to the pavement over the existing reinforced concrete box shall be placed on interlayer matching the interlayer placed on the top slab of the existing reinforced concrete box.

4.0 Method of Measurement.

4.1 Placing Reinforced Concrete Pavement. Measurement for reinforced concrete pavement - 8 inch minimum thickness will be computed to the nearest 0.1 square yard. Final measurement of the completed pavement will not be made except for authorized changes during construction, or where appreciable errors are found in the contract quantity. The revision or correction will be computed and added to or deducted from the contract quantity.

4.2 Interlayer. Measurement for the interlayer will be made to the nearest square yard.

5.0 Basis of Payment.

5.1 Placement of the reinforced concrete pavement - 8 inch minimum thickness will be paid for at the contract unit price for placing reinforced concrete pavement - 8 inch minimum thickness per square yard. No direct payment will be made for furnishing labor, equipment, dowels, tie bars, reinforcement and other materials to place, finish, texture and cure the pavement including sawing and sealing, if necessary, the joints, in accordance with the plans and specifications. Payment will be made at 100 percent of the contract unit price if the compressive strength of sample cylinders is equal to or greater than 3,500 psi and the pavement thickness is not less than 8 inches minimum.

5.2 Payment for the interlayer will be paid at the contract unit price per square yard.

5.3 No direct payment will be made for furnishing labor, equipment, excavation, compaction, forms, reinforcement, curing and other materials to place and finish sleeper slabs in accordance with the plans and specifications.

5.4 The accepted quantity of 8 Inch Minimum Reinforced Concrete Pavement will be paid for at the contract unit price for the following:

> Item No. 502-99.05, “REINFORCED CONCRETE PAVEMENT (8 INCH MINIMUM THICKNESS)”, per square yard.

5.5 The accepted quantity of interlayer will be paid for at the contract unit price for the following:

> Item No. 506-99.05, “REINFORCED CONCRETE PAVEMENT INTERLAYER”, per square yard.

GG. Relocate Existing Street Name Sign

1.0 This work shall consist of relocating existing street name signs to the top of an existing PSST or pipe post, as identified on the plans.

1.1 Relocation of the existing street name signs may require the use of brackets and attachments as necessary. The relocation shall conform to Missouri Standard Specifications for Highway Construction.

2.0 Method of Measurement. Measurement of the relocation of existing street name signs shall be made per each.

2.1 Street name signs damaged by construction activity shall be replaced by the contractor at the contractor’s expense.

3.0 Basis of Payment. All costs associated with this work shall be considered completely covered by the following Item:

903-99.02, “RELOCATE SIGN TO EXIST. PSST ABOVE STOP SIGN”, per each.

HH. Radar Detection System, Contractor Furnished, Contractor Installed

1.0 General. Radar stop bar detection shall be installed per the Signal Plan Sheets. Additionally, count detection is to be set up for each lane of travel. Radar detection system shall be capable of collecting data on all approaches to the intersection.

2.0 Equipment. Radar equipment must meet or exceed all the following requirements.

(a) Equipment must be FCC certified.

(b) Equipment must meet all NEMA TS2-2003 specifications for traffic control equipment.

(c) Each radar unit must be composed of multiple sensors to establish two-dimensional coverage.

(d) Radar Detection must be compatible with SDLC inputs.

(e) Radar cable installed shall be appropriate for the radar devices installed at the designated intersection.

3.0 Construction Requirements. The contractor shall be responsible for providing and installing all necessary items, including all necessary cables, to make the new radar detection system operational with stop bar presence detection and count detection for all lanes of travel. Input BIU 9 shall be used for presence detector inputs according to the following chart.

Vehicle Detection Assignments					
	BIU	IO	Detector	Call Phase	Mvmt
PRESENCE DETECTION	BIU 9	1	1	1	SBL
		2	2	2	NBT
		3	3	3	EBL
		4	4	4	WBT
		5	5	5	NBL
		6	6	6	SBT
		7	7	7	WBL
		8	8	8	EBT
		9	9		
		10	10	2	NBR*
		11	11		
		12	12	4	WBR*
		13	13		
		14	14	6	SBR*
		15	15		
		16	16	8	EBR*

*Right turn presence detection only used if the RT lane is signalized

BIU 10 and 11 shall be used for count detector inputs according to the following chart.

Vehicle Detection Assignments					
	BIU	IO	Detector	Call Phase	Lane
COUNT DETECTION	BIU 10	1	17	1	SBL 1
		2	18	1	SBL 2
		3	19	1	SBL 3
		4	20	2	NBT 1
		5	21	2	NBT 2
		6	22	2	NBT 3
		7	23	2	NBT 4
		8	24	2	NBR 1
		9	25	3	EBL 1
		10	26	3	EBL 2
		11	27	3	EBL 3
		12	28	4	WBT 1
		13	29	4	WBT 2
		14	30	4	WBT 3
		15	31	4	WBT 4

		16	32	4	WBR 1
	BIU11	1	33	5	NBL 1
		2	34	5	NBL 2
		3	35	5	NBL 3
		4	36	6	SBT 1
		5	37	6	SBT 2
		6	38	6	SBT 3
		7	39	6	SBT 4
		8	40	6	SBR 1
		9	41	7	WBL 1
		10	42	7	WBL 2
		11	43	7	WBL 3
		12	44	8	EBT 1
		13	45	8	EBT 2
		14	46	8	EBT 3
		15	47	8	EBT 4
		16	48	8	EBR 1

4.0 Method of Measurement. Method of measurement will be made per each complete radar detection system installed by the contractor and acceptable by the engineer.

5.0 Basis of Payment. Payment for installation of the detection system will be completely covered by the contract unit price for the pay item as follows:

Item No.	Unit	Description
902-99.02	Each	Radar Detection System

II. Signal Controller and Cabinet, Type 2070

1.0 Description. This work shall consist of providing and installing a new 2070 controller with 332 cabinet at the intersections of Route 96 with I-49 Ramps 1 & 2, I-49 Ramps 3 & 4, Baker Boulevard, Francis Street and Garrison Avenue.

2.0 Material Requirements. The new controllers installed with this project shall consist of ATC eX 2070 controllers with OMNI-eX software as manufactured by McCain, Inc., placed inside a 332 cabinet.

2.1 A MMU Conflict Monitor shall be provided at no direct pay.

3.0 Construction Requirements. The contractor shall be responsible for providing and installing all necessary items to make the new signal controllers operational. This includes but is not limited to the 2070 controller, the OMNI-eX software, and the 332 cabinet. The engineer will provide the existing cycle lengths, but the contractor shall ultimately be responsible for programming the timings into the new controllers.

4.0 Method of Measurement. Measurement will be made per each controller installed by the contractor and acceptable by the engineer.

5.0 Basis of Payment. Accepted signal controllers will be paid for at the contract unit price for the pay item as follows:

Item No.	Unit	Description
902-99.02	Each	Signal Controller and Cabinet, Type 2070

JJ. Radar Cable, Sensor 6c

1.0 Description. This work shall consist of installing new radar cable as indicated on the plans.

1.1 The radar cable installed shall be appropriate for the radar devices installed at the designated intersections between the radar sensors and equipment in the cabinet. Miscellaneous cabling shall be supplied and installed per the plans and manufacturer's recommendations.

2.0 Method of Measurement. Measurement of radar cable shall be made per linear foot.

3.0 Basis of Payment. All costs associated with this work shall be considered completely covered by the contract unit price for the pay item as follows:

Item No.	Unit	Description
902-99.03	LF	Radar Cable

KK. Modified Linear Grading

1.0 Description. Modified Linear Grading shall consist of all excavation, contractor furnished fill, disposal of excess excavation, embankment construction, grading of ditches and slopes, and final shaping necessary to conform to the lines and grades show in the plans, and shall conform to all applicable portions of Sec 207 and specifically as follows.

2.0 Construction Requirements.

2.1 It will be necessary to go outside the limits of the right of way to obtain additional material or to dispose of excess excavation. All contractor furnished material shall be approved by the Engineer prior to being incorporated into the project.

2.2 The Engineer shall have sole discretion in determining whether excess material may be incorporated within right-of-way or must be disposed of outside of right-of-way.

2.3 All areas to be graded shall be cleared and grubbed in accordance with Sec 201 or as directed by the Engineer. No measurement or direct payment will be made for clearing and grubbing.

2.4 Roadside ditches shall be graded to match the existing flowline unless shown otherwise in the plans. Grading for pipe extensions shall match the projected flowline of the existing pipe unless shown otherwise in the plans.

2.5 Any damage to existing drainage structures or existing pavement, resulting from the Contractor's operations, shall be repaired at the Contractor's expense and to the satisfaction of the Engineer.

2.6 Any subgrade upon which a paved surface is to be placed shall be compacted in accordance with Sec 203.5.

3.0 Method of Measurement. Measurement will be made to the nearest 1/10 station for the length of grading measured along the centerline of the roadbed.

4.0 Basis of Payment. All costs incurred by the Contractor to comply with this provision shall be considered completely covered by the contract unit price for the following item:

Item 207-99.09, "MODIFIED LINEAR GRADING", per STA.

4.1 No direct payment will be made for contractor furnished material or disposal of excess material.

4.2 No direct payment will be made for hauling or stockpiling excavated material.

LL. Horizontal Elliptical Pipes

1.0 Description. This work shall consist of providing Horizontal Elliptical Pipe of the size designated, laid upon a firm bed and backfilled as specified.

1.1 The Horizontal Elliptical Pipe used in this project shall be of Group A type in conformance with Sec 724 and as shown on the plans.

2.0 Materials. Materials shall be in accordance with Sec 1034 and 1026 for reinforced concrete materials.

3.0 Construction Requirements. Construction requirement shall be in accordance with Sec 724, 725, and 726.

4.0 Measurement. Measurement shall be in accordance with Sec 724.

5.0 Basis of Payment. Basis of Payment shall be in accordance with Sec 724.

5.1 The accepted quantity of Horizontal Elliptical Pipe in size specified will be paid for at the contract unit price for the following items:

Item No. 726-99.03, "18 IN. HORIZONTAL ELLIPTICAL GROUP A", per LF

Item No. 726-99.03, "24 IN. HORIZONTAL ELLIPTICAL GROUP A", per LF

Item No. 726-99.03, "30 IN. HORIZONTAL ELLIPTICAL GROUP A", per LF

MM. Truck Apron

1.0 Description. This work shall consist of constructing a Truck Apron with a height 1.5 inches higher than the adjacent edge of pavement as shown on the plans, or as directed by the engineer.

1.1 The minimum depth of the Truck Apron over the aggregate base or subgrade shall be the depth of the adjacent pavement plus 1.5 inches.

2.0 Materials. Materials shall be in accordance with Division 1000 as detailed in Sec 608.

2.1 The contractor may use the same material as the adjacent pavement if PCCP is used. The truck apron shall not be constructed with asphaltic concrete materials.

3.0 Construction Requirements. Construction requirements shall be in accordance with Sec 608.

4.0 Measurement. Measurement shall be in accordance with Sec 608.

5.0 Basis of Payment. Basis of Payment shall be in accordance with Sec 608.

5.1 The accepted quantity of Truck Apron will be paid for at the contract unit price for the following:

Item No. 608-99.05, “1.5 INCH TRUCK APRON”, per SY

NN. Precast Concrete Drop Inlet 5 Ft X 3 FT – 6 IN

1.0 Description. This work shall consist of providing Precast Concrete Drop Inlet 5 Ft X 3 Ft – 6 In of the size designated, laid upon a firm bed and backfilled as specified.

2.0 Materials. Materials shall be in accordance with Division 1000 as detailed in Sec 731.

3.0 Construction Requirements. Construction requirements shall be in accordance with Sec 731. The reinforcing steel shall be of the same number and size as shown in Standard Plan 731.10 with bars extended in length to cover the additional width of the box and cover.

4.0 Measurement. Measurement shall be in accordance with Sec 731.

5.0 Basis of Payment. Basis of Payment shall be in accordance with Sec 731.

5.1 The accepted quantity of Precast Concrete Drop Inlet 5 Ft X 3 Ft – 6 In will be paid for at the contract unit price for the following:

Item No. 731-99.03, “PRECAST CONCRETE DROP INLET 5 FT X 3 FT-6 IN.”, per LF

OO. Overhead Sign Truss

1.0 Description. This work shall consist of providing all costs for all labor and materials associated with the overhead span truss for signs, as illustrated in the Standard Plans, plans, signing details, and signing cross-sections. Removal of existing sign truss is included as a separate item.

2.0 Prior to ordering the overhead structures, the Contractor shall verify the dimensions with the Engineer.

2.1 Removal Requirements. The entire structure, including foundations, shall be removed to an elevation 2 feet below the finished ground line. Any portion of an existing structure below the ground line that interferes with the construction of the new structure shall be completely removed. Notification of demolition shall be made in accordance with Sec 202.40.1.1.

3.0 Basis of Payment. Payment for furnishing all labor, equipment, materials, and incidentals will be paid for at the contract unit price per each as follows:

Item No. 903-99.02, "REMOVE EXISTING 75 FOOT OVERHEAD SIGN TRUSS", per EA

Item No. 903-99.02, "75 FOOT OVERHEAD SIGN TRUSS", per EA

PP. Adjustment Sanitary Sewer Manhole, Water Valve and Meter Holes

1.0 Description: This work shall consist of adjustment of water valve and meter holes and sanitary manholes to match the grade of replaced sidewalk or paving as shown on the plans and in accordance with Sec 603 and 604 of the Standard Specifications, and specifically as follows:

2.0 Construction Requirements: The Contractor shall provide and install rings to raise the lid or reset the top hardware of existing sanitary sewer manholes, water valves and meter holes in areas with new pavement or sidewalk construction. Coordination with the gas and water utilities by the contractor will be required to confirm the method of adjustment.

3.0 Method of Measurement: Adjustment of Sanitary Sewer Manholes, Water Valves and Meter Holes will be measured per each.

4.0 Basis of Payment: All labor, equipment and materials required for Adjustment of Sanitary Sewer Manholes, Water Valves and Meter Holes to match grade as designated on the plans and by this specification, complete in place with all incident costs included, shall be included in the unit bid price for the pay items:

Item No. 603-99.02, "ADJUSTMENT WATER VALVE AND METER COVERS", per EA

Item No. 603-99.22, "ADJUSTMENT RING SANITARY SEWER", per EA

QQ. Removal of Continuous Lighting System (Carthage Water and Electric)

1.0 Description. This work shall consist of the complete removal, salvage, and disposal of the existing continuous highway lighting system at the locations shown on the plans or as directed by the Engineer. The existing system consists of approximately 24 light assemblies served by overhead aerial electrical connections. The system is owned and operated in coordination with Carthage Water and Electric Company.

2.0 Material and Salvage Requirements.

2.1 Salvage to Carthage Water and Electric Company (CW&E). The Contractor shall carefully remove and salvage all existing luminaires (approximately 24 units). Luminaires shall be removed without damage, cleaned of surface debris, and securely packaged or palletized for transport.

The Contractor shall contact the Carthage Water and Electric Company contact person at least 48 hours prior to removal to coordinate delivery or pickup of the salvaged luminaires:

> **Carthage Water & Electric Company**
> Attn: Richard Graves
> 627 W Centennial Ave.
> Carthage, MO 64836
> Phone: (417) 237-7300

Delivery shall be made to the CW&E facility address above, unless CW&E elects to accept delivery on-site.

Any luminaire damaged during removal, handling, or transport due to the Contractor's negligence shall be replaced in-kind at the Contractor's sole expense.

2.2 Contractor Ownership and Disposal. All remaining non-salvaged lighting components – including wood/steel poles, mast arms, guy wires, span wires, aerial line conductors, pole hardware, line transformers, drop connections, and concrete bases/foundations (where applicable) – shall become the property of the Contractor and shall be properly removed and disposed of off the right-of-way in accordance with Sec 202.

3.0 Construction Requirements.

3.1 Electrical De-energization and Clearance. Prior to commencing any removal work, the Contractor shall coordinate directly with Carthage Water and Electric Company (Richard Graves at 417-237-7300) to ensure that electrical service to all aerial circuit feeds and transformers has been disconnected, locked out, and tagged out.

The Contractor shall verify that all overhead conductors are completely de-energized before bringing any elevated work platforms, bucket trucks, or cranes within proximity of the overhead lines.

The Contractor shall adhere to all OSHA safety clearances regarding overhead power lines until CW&E confirms in writing that the circuits are dead and grounded.

3.2 Aerial Line and Pole Removal. Overhead conductor wires, guy cables, and span wires shall be detached systematically under tension control to prevent sagging onto live traffic lanes or adjacent utility lines. All overhead conductors, triplex/duplex drops, and associated aerial hardware shall be removed completely from the project limits.

Poles shall be dismantled systematically. For embedment or concrete foundations, pole butts/bases shall be removed to a depth of at least 2 feet below the final ground surface or finished slope.

Voids left by pole removal shall be backfilled with suitable material matching Sec 203, placed and compacted in lifts to match the surrounding ground density.

Any disturbed turf area shall be restored, seeded, and mulched in accordance with Sec 805.

4.0 Method of Measurement. Removal of the existing continuous lighting system will be measured on a **Lump Sum** basis for the complete de-energization coordination, aerial wire/conductor removal, pole removal, salvage delivery, site restoration, and cleanup of the specified system (approximately 24 lighting assemblies).

5.0 Basis of Payment. The accepted quantity of lighting system removal will be paid for at the contract unit price for:

- Item 901-99.01, "REMOVAL OF CONTINUOUS LIGHTING SYSTEM", lump sum

Payment shall constitute full compensation for all labor, equipment, tools, traffic control coordination, salvage handling and transport, aerial line drop/disposal, excavation, backfilling, site restoration, and all incidentals necessary to complete the work as specified.

RR. 4 Inch White Class 2 Pavement Marking Paint

1.0 Description. This work shall consist of furnishing and installing 4 Inch White Class 2 Pavement Marking Paint as specified, shown on the plans, or as directed by the engineer.

2.0 Materials. Materials shall be in accordance with Division 1000 as detailed in Sec 620.

3.0 General Requirements. General requirements shall be in accordance with Sec 620.20.

4.0 Measurement. Measurement shall be in accordance with Sec 620.20.

5.0 Basis of Payment. Basis of Payment shall be in accordance with Sec 620.20.

5.1 The accepted quantity of 4 Inch White Class 2 Pavement Marking Paint In will be paid for at the contract unit price for the following:

Item No. 620-99.03, "4 IN. WHITE CLASS 2 PAVEMENT MARKING PAINT (25-MIL, TYPE L BEADS", per LF

SS. 12 Inch Yellow Class 2 Pavement Marking Paint

1.0 Description. This work shall consist of furnishing and installing 12 Inch Yellow Class 2 Pavement Marking Paint as specified, shown on the plans, or as directed by the engineer.

1.1 The 12 Inch Yellow Class 2 Pavement Marking Paint used in this project shall be used to mark the face of median island curbs as shown on the plans.

2.0 Materials. Materials shall be in accordance with Division 1000 as detailed in Sec 620.

3.0 General Requirements. General requirements shall be in accordance with Sec 620.20.

4.0 Measurement. Measurement shall be in accordance with Sec 620.20.

5.0 Basis of Payment. Basis of Payment shall be in accordance with Sec 620.20.

5.1 The accepted quantity of 12 Inch Yellow Class 2 Pavement Marking Paint In will be paid for at the contract unit price for the following:

Item No. 620-99.03, "12 IN. YELLOW CLASS 2 PAVEMENT MARKING PAINT (25-MIL, TYPE L BEADS", per LF

TT. Battery Backup System on Type II Power Supply

1.0 Description. This work shall consist of furnishing and installing a complete Battery Backup System (BBS) for the traffic signal installations at the Route 96 and I-49 Southbound Ramps, and Route 96 and I-49 Northbound Ramps, as shown on the plans or as directed by the engineer. The BBS shall be compatible with the proposed Type 2 power supply arrangement, 2070 traffic signal controller, and 332 cabinet.

1.1 The BBS shall be specifically designed for traffic signal operation. The system shall include all batteries, inverter/charger equipment, transfer and bypass equipment, enclosure, mounting hardware, cables, connectors, surge protection, control wiring, and other incidental components required for a complete and operational installation.

2.0 Performance Requirements. The BBS shall be capable of operating the connected traffic signal load for a minimum of two (2) hours in steady (stop-and-go) operation and a minimum of two (2) additional hours in flashing operation.

2.1 The BBS shall automatically transfer the traffic signal load to battery power upon loss or unacceptable degradation of utility power and shall automatically return the load to utility power when acceptable utility power is restored. Transfer between utility and battery power shall not interrupt normal operation of the traffic signal controller or conflict monitor.

2.2 A generator connection and transfer provision shall be provided for extended signal operation. The generator connection shall be compatible with the power supply and BBS installation and shall permit connection of a portable generator without exposing personnel to energized conductors.

2.3 The BBS shall provide local indication of utility power, battery operation, low battery, and system fault conditions. Batteries shall be maintenance-free, sealed units suitable for outdoor traffic signal service and the environmental conditions of the installation.

3.0 Installation. The BBS shall be installed in accordance with the manufacturer's recommendations and the project plans. The BBS enclosure shall be mounted at the Type 2 power supply or at the location shown on the plans. The BBS shall be sized for the connected signal load served by the installation.

3.1 A two-conductor No. 22 AWG control cable shall be installed from a programmable BBS output to the applicable signal cabinet terminals for the BBU FLASH input. A contractor-furnished Model 242 DC isolator module, or approved equivalent compatible with the cabinet, shall be installed in the I-file Slot 11 upper channel to utilize the BBU FLASH input shown on the signal plans.

3.2 The BBS shall be configured so the traffic signal remains in steady operation during the initial battery-backup period and is capable of transitioning to the programmed flashing operation while

on battery power. Final BBS operating parameters, including the transition to flash, shall be coordinated with and approved by the engineer.

3.3 The contractor shall verify all BBS control wiring and interface requirements with the traffic signal cabinet manufacturer before installation. Wiring shall be arranged so that BBS operation does not interfere with normal cabinet malfunction monitoring, startup from dark, or flash operation.

4.0 Testing and Acceptance. Prior to acceptance, the contractor shall demonstrate proper automatic transfer to battery power, return to utility power, BBU FLASH input operation, manual bypass/transfer operation, and generator connection operation. The contractor shall correct any wiring, programming, or equipment deficiencies before the BBS is accepted.

5.0 Method of Measurement. Measurement of the Battery Backup System on Type II Power Supply will be made for payment per each complete and operational system installed and accepted by the engineer.

6.0 Basis of Payment. Payment for furnishing and installing the complete BBS, including enclosure, batteries, inverter/charger equipment, transfer and bypass equipment, generator connection, control wiring, isolator module, cables, mounting hardware, testing, and all other incidentals necessary for a complete and operational installation, will be considered completely covered by the contract unit price for the following item:

Item No. 902-99.02, “BATTERY BACKUP SYSTEM ON TYPE II POWER SUPPLY”, per each

UU. Missouri & Northern Arkansas Railroad Requirements (J7S3506B)

Description of Work: Full-depth sidewalk reconstruction of ADA pedestrian facilities under railroad bridge.

1.0 Introduction.

1.1 These Railroad Requirements set forth terms and conditions agreed between the Missouri & Northern Arkansas Railroad Company, Inc**.** (Railroad) and the Missouri Highways and Transportation Commission (Commission), under which Railroad will allow the Commission’s contractors to enter in and upon Railroad's real property, right of way, tracks and other facilities (Railroad's Property) to perform the contractor’s work relating to this project.

1.2 To report an emergency on the Railroad, call: 866-527-3499

1.3 The project is located on the MNA Web City Subdivision, at Mile Post 528.43, DOT # 434917U in Carthage, MO.

1.4 Definitions of terms set forth in the current edition of the Missouri Standard Specifications for Highway Construction shall be applicable to those terms as used in these Railroad Requirements.

1.5 Contractor may not access, at any time, any property of the Railroad outside the State’s permanent and temporary easements without Railroad’s prior, written approval.

2.0 Authority of Railroad Representative and Engineer.

2.1 The authorized representative of the Railroad, herein called "Railroad Representative", shall have final authority in all matters affecting the safe maintenance and operation of railroad traffic including the adequacy of the foundations and structures supporting the railroad tracks.

2.1.1 The Railroad designates the following individual as the Railroad Representative for this project. Except as otherwise provided in these Railroad Requirements, the contractor shall address all notices concerning this project to the Railroad Representative, as follows:

Mr. Greg Feyerabend
General Manager
Missouri & Northern Arkansas Railroad Company, Inc.
514 North Orner
Carthage, MO 64836
Email: Greg.Feyerabend@gwrr.com
TEL: (918) 289-4861 [mobile]

2.1.2 The Railroad, or the individual identified above, may designate a different individual to act as the Railroad Representative for this project, and may change the address information stated above, by giving written notice of the changes to the contractor and to the Engineer, as provided in these Railroad Requirements.

2.2 The authorized representative of the Commission (Engineer) shall have authority over all other matters as prescribed herein and in the project specifications.

3.0 Contractor's Indemnity Obligations to the Railroad. The contractor agrees to indemnify, defend and hold harmless the Railroad from and against any injury or death of persons whomsoever, or from any loss or damage to the Railroad's Property, caused by acts or omissions of the contractor in performing work on this project, whether on, over, under or in the vicinity of the Railroad's Property as more specifically detailed in the Right of Entry Agreement referenced in Section 4.5 below. In the event the contractor shall fail to restore the Railroad's Property immediately to a condition acceptable to the Railroad when any such loss or damage to the Railroad's Property is called to the contractor's attention by the Railroad, then the Railroad may perform such corrective work at the cost of the contractor. In addition to such remedies of the Railroad, the Commission will withhold from final payment due to the contractor the amount reasonably necessary to reimburse the Railroad for such loss or damage or for performing such work. The term "loss or damage" as used herein shall include, but not be limited to, the erosion and silting of, water damage to, and the accidental or intentional placing or dropping of objects on the Railroad's Property.

4.0 Notice of Starting Work. The contractor shall not commence any work on the Railroad's right of way until contractor has complied with the following conditions:

4.1. At least thirty (30) days in advance of the date the contractor proposes to begin work on the Railroad's Property, the contractor has given written notice of the contractor's proposed start date and time to the Railroad Representative, and Railroad's Manager of Track Maintenance (see paragraph 12.2.3 below), with a copy to the Engineer.

4.2 The Commission has obtained written approval from the Railroad's Representative for the contractor's insurance coverage as required by Section 17 of these Railroad Requirements, and authorization for the contractor to begin work on the Railroad's Property.

4.3 The contractor has determined whether fiber optic cable systems are buried on the Railroad's Property. If fiber optic cable systems are buried on the Railroad's Property, then the contractor

has contacted the Railroad at the 24 hour number, 800-336-9193, has contacted the telecommunications company involved, has arranged for a cable locator, and has made arrangements for relocation or other protection of the fiber optic cable system on the Railroad's Property.

4.4 The contractor's employees, representatives or agents who are regularly assigned to perform work on the Railroad's Property have been certified as having completed the Internet Safety Orientation available at https://railpros.com/training/ where contractor needs to complete the course. This certification shall be renewed annually. In addition the contractor shall require that every employee, representative or agent who is not regularly assigned to perform work on the Railroad's Property has received appropriate safety training before performing any work on the Railroad's property. The cost of the Internet Safety Orientation, which is subject to change, is currently $75 per person per year.

4.5 Right of Entry. At least forty-five (45) days in advance of the date the contractor proposes to begin work on the Railroad's Property, the contractor shall enter into a Right of Entry Agreement with Railroad prior to working on Railroad property. The application for Right of Entry Agreement can be found at the following address:

http://www.gwrr.com/real-estate/accessing-property/

4.5.1 The applicant must submit the completed application to the Real Estate Department including a check or money order, to cover the non-refundable fee of $1,750 made payable to the Railroad. The application must include railroad milepost, railroad subdivision, and scope of work.

4.5.2 Upon approval of the application, the Real Estate Department will draft an agreement and forward to the applicant for signature. **Application does not guarantee approval**. The applicant must then return the signed document to the Real Estate Department along with the pertinent certificate of insurance outlined in the agreement. Once in receipt of these documents, the agreement will then be executed on behalf of the Railroad.

5.0 Interference with Railroad's Operations.

5.1 The Railroad's right of way is located within the limits of this project. The contractor shall take care to insure that it will not drop any debris or material on the Railroad's Property.

5.2 The contractor shall arrange and conduct all of the contractor's work so that it causes no interference with the Railroad's operations, including train, signal, telephone, telegraphic services, damage to the Railroad's Property, poles, wires and other facilities of tenants on the Railroad's Property. Whenever the contractor's work may directly affect the operations or safety of trains, the contractor shall submit a written description of the method of doing such work to the Railroad Representative for approval, but such approval shall not relieve the contractor from liability resulting from the contractor's work. Any work to be performed by the contractor that requires flagging service shall be deferred by the contractor until the flagging services are available at the job site.

5.3 Whenever the contractor's work upon the Railroad's Property will unavoidably cause an impediment to the Railroad's operations, such as requiring the use of runaround tracks or reduced train speed, the contractor should schedule and conduct these operations so that this impediment is reduced to the absolute minimum.

5.4 If conditions arising from, or in connection with the work require immediate and unusual provisions to protect the Railroad's operations and property, the contractor shall make such provisions. If in the judgment of the Railroad Representative, or the Engineer if the Railroad

Representative is absent, such provision is insufficient, then the Railroad Representative or Engineer may require or provide such provisions as he/she deems necessary. In any event, the contractor shall make such provisions at the contractor's expense, and without cost to the Railroad or the Commission.

6.0 Track Clearances. During construction, the contractor shall maintain not less than the minimum track clearances as shown on the project plans. However, before undertaking any work within the Railroad's Property and before placing any obstruction over any track, the contractor shall:

6.1 Notify the Railroad Representative at least ten (10) days in advance of the proposed work.

6.2 Receive assurance from the Railroad Representative that arrangements have been made for flagging service as may be necessary.

6.3. Receive permission from the Railroad Representative to proceed with the work, as provided in section 4.0.

6.4. Confirm that the Engineer has received copies of the contractor's notice to the Railroad, and of the Railroad's response.

7.0 Construction Procedures.

7.1. General. The contractor's work on the Railroad's property shall be performed in accordance with these Railroad Requirements and shall be subject to the Railroad's inspection and review. The contractor shall submit plans that shall be signed, sealed, and stamped in accordance with the laws relating to Architects and Professional Engineers, Chapter 327, RSMo, for the demolition of any structure over Railroad right of way, and for temporary shoring and falsework that may affect the Railroad's facilities or traffic.

7.2 Excavation. The contractor shall maintain the subgrade of an operated track with the beam edge at least 12 feet from centerline of track and not more than 26 inches below top of rail, unless the existing section fails to meet this specification, in which case the contractor shall maintain the existing section.

7.3 Protection of railroad structure. Close clearance conditions (heights under 8ft) exist under bridge. Flagging is required should equipment exceeding this height be used within 25' of railroad bridge, and equipment type and size must be approved by railroad prior to its use under railroad bridge.

8.0 Maintenance of Railroad Facilities. Within the project limits, the contractor shall maintain Railroad's Property, including all ditches and drainage structures, free of silt or other obstructions that may result from contractor's operations. The contractor shall promptly repair eroded areas within the Railroad's Property and repair any other damage to the Railroad's Property or the Railroad's tenants. The contractor shall perform all such maintenance and repair of damages due to the contractor's operations at the contractor's expense.

9.0 Storage of Materials and Equipment.

9.1 The contractor shall obtain permission from the Railroad Representative before storing any materials or equipment anywhere on Railroad's Property. The Railroad will not ordinarily permit storage within twenty-five feet (25') from the centerline of any track, or within three hundred feet (300') from any grade crossing. The Railroad will not be liable for damage to such material and

equipment from any cause, and the Railroad Representative may move such material and equipment or require the contractor to move it, at the contractor's expense.

9.2 The contractor shall not leave unattended any grading or construction machinery parked upon Railroad's Property, unless it is effectively immobilized so that unauthorized persons cannot move such machinery.

10.0 Cleanup. Upon completion of the work, the contractor shall remove from within the limits of the Railroad's Property all machinery, equipment, surplus materials, falsework, rubbish or temporary buildings of the contractor's and shall leave Railroad's Property in a neat condition satisfactory to the Railroad Representative.

11.0 Damages. The Railroad shall not assume liability for any damages to the contractor, contractor's work, employees, servants, equipment and materials caused by the Railroad's traffic. However, the preceding sentence shall not exempt the Railroad from liability for any loss, damage or injury proximately caused by the Railroad's intentional misconduct or sole or gross negligence. The contractor shall directly reimburse the Railroad for any cost the Railroad reasonably incurs for repairing damages to the Railroad's Property or to property of the Railroad's tenants, caused by or resulting from the operations of the contractor relating to this project.

12.0 Flagging Services.

12.1 When Flagging is Required. The Railroad has sole authority to determine the need for flagging to protect the Railroad's operations. Whenever the Railroad requires flagging services with reference to any of the contractor's work on this project, the contractor shall not perform any such work until all required flaggers are present at the job site.

12.1.1 In general, the Railroad may require flagging services whenever the contractor's personnel or equipment are, or are likely to be, working on the Railroad's Property, or across, over, adjacent to, or under a track, or when such work has disturbed or is likely to disturb a railroad structure or the railroad roadbed or surface and alignment of any track to such extent that the movement of trains must be controlled by flagging, to prevent unreasonable risks of accidental hazard to the Railroad's operations or personnel.

12.1.2 Normally the Railroad will assign one flagger to a project; but in some cases, more than one may be necessary, such as yard limits where the Railroad may assign up to three flaggers. However, if the contractor works within the distances that violate instructions given by the Railroad Representative, or performs work upon or adjacent to Railroad's Property that has not been scheduled with the Railroad Representative, the Railroad may require flagging services full time until the project is completed.

12.2 Scheduling and Notification of Flagging Services.

12.2.1 The contractor shall arrange with the Railroad all flagging services required by the Railroad to accomplish the contractor's work on this project.

12.2.2 Before the contractor begins work on the Railroad's Property, the contractor shall furnish to the Railroad Representative and the Engineer a schedule for all work required to complete the contractor's portion of the project within the Railroad's Property, and shall arrange for a job site meeting between the contractor, the Engineer, and the Railroad Representative. Until the contractor has provided its work schedule and met on-site with the Railroad Representative and the Engineer, the Railroad may withhold all flagging services from the contractor's proposed job site. Before the flagger(s) begin each day's work, the flagger(s) and the contractor shall meet to conduct a job briefing.

12.2.3 Before the contractor first begins any work upon or adjacent to the Railroad's Property, the contractor shall give not less than thirty (30) days' advance notice to the Railroad, and to the Engineer, of its intent to begin such work. The contractor shall address all notices relating to flagging to the Railroad as follows:

Mr. Greg Feyerabend
General Manager
Missouri & Northern Arkansas Railroad Company, Inc.
514 North Orner
Carthage, MO 64836
Email: Greg.Feyerabend@gwrr.com
TEL: (918) 289-4861 [mobile]

12.2.4 The Railroad usually assigns one flagger to work at the job site on a continuous basis until the contractor no longer needs flagging services. The contractor shall not call for flagging services on a spot basis. The Railroad's assigned flagger shall notify the Engineer when flagging services have begun and ended. The flagger shall give these notices immediately upon arrival at the job site on the first day, and before departing from the job site on the last day of each separate period when the Railroad provides flagging services, or as soon as possible thereafter. The Engineer shall document these notifications in the project records.

12.2.5 After the contractor has begun work that requires flagging services, the contractor shall give not less than five (5) day's advance written notice to the Railroad before discontinuing flagging services and terminating the obligation to pay for flagging services. The contractor shall simultaneously provide a copy of this notice to the Engineer. If the contractor's work on or adjacent to the Railroad's Property is suspended at any time, or for any reason, then before the contractor resumes any work on or adjacent to the Railroad's Property, the contractor shall give advance, written notice to the Railroad and to the Engineer of its intent to resume such work. This notice shall provide sufficient details of the contractor's proposed work to enable the Railroad Representative to determine whether flagging services will be required before the contractor resumes its work on or adjacent to the Railroad's Property. The contractor shall give this required notice at least three (3) working days' before it intends to resume such work; however, the Railroad may take up to thirty (30) days after the contractor has given this notice before resuming flagging services at the job site. The requirements of this paragraph 12.2.5 shall not apply if the suspension and resumption of the contractor's work were previously scheduled with the Railroad pursuant to paragraph 12.2.2 of these Railroad Requirements, or the suspension was caused by an emergency as provided in paragraph 12.2.6 of these Railroad Requirements.

12.2.6 If, after the Railroad has assigned a flagger to the project site in accordance with section 12.0, any emergency requires the flagger's presence elsewhere, then the contractor shall suspend work on the Railroad's Property until the flagger is again available. Any additional costs to the contractor resulting from such delay shall be borne by the contractor and not by the Railroad.

12.3 Payment for Flagging Services.

12.3.1 The Commission will pay the Railroad directly for the cost of flagging services associated with this project by deducting the amount from the Commission's payments to the contractor.

12.3.2 The estimated cost of flagging services is approximately $1,450 per day, based on an 10-hour work day and a 40-hour work week. The Railroad shall charge not more than its actual cost of providing these flagging services, which includes the base pay for the flagger or flaggers who

actually performed the required flagging services, the Railroad's reasonable overhead costs, and the reasonable costs actually incurred for the flagger's travel expenses, meals and lodging if required. The Railroad may charge a maximum of one-hour travel time each way per day per flagger, for travel to and from the job site. A flagger's work in excess of 10 hours per day or 40 hours per week, but not more than 12 hours per day, will result in a pay rate of $250 per hour after 10 hours. If a flagger performs required flagging services on a holiday, then the pay rate shall be $250 per hour for all hours worked on the holiday. The Commission also shall reimburse the Railroad for its actual expenses reasonably incurred in preparing and handling invoices to the Commission for the cost of these flagging services. The Railroad's charges to the Commission shall be in accordance with applicable provisions of the Federal Aid Policy Guide issued by the Federal Highway Administration, including all current amendments.

12.3.3 The Railroad shall submit progress invoices to the Engineer during the time the Railroad requires flagging services. The Railroad shall submit its final invoice for flagging services to the Engineer within one hundred eighty (180) days after the contractor has notified the Railroad and the Commission that all its work over the Railroad's Property is complete, in accordance with section 18.0 below. If the Commission does not receive the Railroad's final flagging invoice within this time period, then the Railroad shall obtain payment directly from the contractor.

12.3.4 If a dispute arises between the Railroad, the Commission and the contractor concerning the amount charged for flagging service, then the Commission may deduct the full amount of the Railroad's invoice from the contractor's payment, until the dispute is resolved.

12.4 Flagging Complaints. The contractor and the Railroad shall attempt to resolve any complaints concerning flagging services in a timely manner. If the contractor disputes the need for a flagger, the contractor shall notify the Railroad Engineer and the Engineer. The contractor shall confirm any verbal complaints in writing within five (5) working days, by sending a copy to the Railroad Representative and to the Engineer.

13.0 Temporary Construction Grade Crossing.

13.1 When the contractor has no reasonable alternate method of transporting construction materials and personnel across the Railroad's track, the contractor shall make all necessary arrangements with the Railroad for the installation, maintenance and removal of one temporary grade crossing for a construction haul road including, without limitation, entering into Railroad's then current form of Temporary Private Grade Crossing Agreement. The contractor shall bear all costs incidental to such crossings, including flagging, whether services are performed by contractor's own forces or by the Railroad's personnel. The contractor shall execute the Railroad's standard Road Crossing Agreement covering terms and conditions for the temporary crossing.

13.2 Neither the contractor nor the Railroad shall construct any crossing for use by the contractor for transporting materials or equipment across the tracks of the Railroad until the Railroad Representative specifically authorizes the installation, maintenance, necessary watching and flagging thereof and removal, which shall be done at the contractor's expense.

14.0 Work for the Benefit of the Contractors. The project plans show all temporary or permanent changes in wire lines or other facilities that are necessary to complete the project, or these changes will be covered by appropriate plan revisions approved by the Commission and the Railroad. If the contractor desires any further changes, the contractor shall make separate arrangements with the Railroad for those changes, at the contractor's expense.

15.0 Cooperation and Delays. The contractor shall arrange a schedule with the Railroad for accomplishing staged construction involving work by the Railroad or tenants of the Railroad. In arranging a schedule, the contractor shall request information from the Railroad, and the Railroad shall promptly provide information, concerning the minimum lead-time required for assembling crews and materials. The contractor shall schedule adequate time for those activities. The contractor shall not make any claim against the Railroad for hindrance or delay on account of railway traffic for:

15.1 Any work the Railroad performs.

15.2 Other delay incident to or necessary for the safe maintenance of railway traffic.

15.3 Any delays due to compliance with these Railroad Requirements.

16.0 Trainman's Walkways. The contractor shall maintain along the outer side of each exterior track of multiple operated tracks, and on each side of single operated track, an unobstructed continuous space suitable for trainman's use in walking along trains, extending to a line not less than 12 feet from the centerline of the track. Before the close of each workday, the contractor shall remove all temporary impediments to walkways and track drainage encroachments or obstructions that were allowed during work hours when flagging services were available. Whenever the contractor excavates or maintains any excavation near the walkway, the contractor shall install a handrail with 12 feet minimum clearance from the centerline of the track.

17.0 Insurance.

17.1 General Insurance Provisions. The contractor shall, at its sole cost and expense, procure and continuously maintain in force during this project, the insurance coverage required under this section 17 until the contractor has completed all project work on the Railroad's Property, has removed all equipment and materials from the Railroad's Property, and has cleaned and restored the Railroad's Property to the satisfaction of the Engineer and the Railroad Representative. The amount of work to be performed upon, over or under the Railroad's Property is estimated to be one percent (1%) of the contractor's total bid for the project.

17.2 Commercial General Liability Insurance. The contractor shall maintain commercial general liability ("CGL") insurance with a limit of not less than $2,000,000 for each occurrence and an aggregate limit of not less than $6,000,000. CGL insurance must be written on ISO occurrence form CG 00 01 12 04 (or a substitute form providing equivalent coverage). The policy must contain the following endorsement, which must be stated on the certificate of insurance: **"**Contractual Liability Railroads" ISO form CG 24 17 10 01 (or a substitute form providing equivalent coverage) showing "**Missouri & Northern Arkansas Railroad Company** Property" as the Designated Job Site.

17.3 Business Automobile Coverage Insurance. The contractor shall maintain business auto coverage written on ISO form CA 00 01 (or a substitute form providing equivalent liability coverage) with a combined single limit of not less than $5,000,000 for each accident. The policy must contain the following endorsements, which must be stated on the certificate of insurance: "Coverage For Certain Operations In Connection With Railroads" ISO form CA 20 70 10 01 (or a substitute form providing equivalent coverage) showing "Missouri & Northern Arkansas Railroad Company Property" as the Designated Job Site; and Motor Carrier Act Endorsement - Hazardous Materials Clean Up (MCS-90) if required by law.

17.4 Workers' Compensation and Employers' Liability Insurance. The contractor shall maintain workers' compensation insurance coverage, with not less than the minimum statutory

liability required under the workers' compensation laws of the State of Missouri. The contractor shall maintain Employers' Liability (Part B) insurance coverage with limits of at least $500,000 for each accident, a $500,000 disease policy limit, and $500,000 for each employee. If the contractor is self-insured, then the contractor shall provide evidence of state approval and excess workers' compensation coverage, which must include coverage for liability arising out of the U. S. Longshoremen's and Harbor Workers' Act, the Jones Act, and the Outer Continental Shelf Land Act, if applicable. The policy must contain the following endorsement, which must be stated on the certificate of insurance: "Alternate Employer Endorsement" ISO form WC 00 03 01 A (or a substitute form providing equivalent coverage) showing the Railroad in the schedule as the alternate employer (or a substitute form providing equivalent coverage).

17.6 Railroad Protective Liability Insurance. The contractor must maintain Railroad Protective Liability insurance written on ISO occurrence form CG 00 35 12 04 (or a substitute form providing equivalent coverage) on behalf of the Railroad as named insured, with a limit of not less than $2,000,000 per occurrence and an aggregate limit of $6,000,000. Before commencing any work on the Railroad's Property, the contractor shall submit the original insurance policy to the Railroad, or may submit a binder stating that the required Railroad Protective Liability policy is in place until the contractor delivers the original policy to the Railroad. The contractor shall cause the Railroad Protective Liability Insurance policy to include a description of the named insured, the work, and the job site, as follows:

17.6.1 Named Insured. The Named Insured on the Railroad Protective Liability Insurance policy shall be Missouri & Northern Arkansas Railroad Company, Inc.

17.6.2 Description and Designation. The description of the work and designation of the job site to be shown on the Railroad Protective Liability Insurance policy are as follows:

> Full-depth sidewalk reconstruction of ADA pedestrian facilities under railroad bridge.
> Job No. J7S3506B in Carthage on MO - 96
> DOT# 434917U MNA Web City Sub, Mile Post 528.43 in Carthage, MO.

17.7 Umbrella or Excess Insurance. If the contractor utilizes umbrella or excess insurance policies, these policies must "follow form" and afford no less coverage than the primary policy.

17.8 Pollution Liability Insurance. The contractor shall maintain pollution liability insurance coverage, which must be written on ISO form Pollution Liability Coverage Form Designated Sites CG 00 39 12 04 (or a substitute form providing equivalent liability coverage), with limits of at least $5,000,000 per occurrence and an aggregate limit of $10,000,000. If the scope of work as defined in this Project includes the disposal of any hazardous or non-hazardous materials from the job site, the contractor must furnish to the Railroad evidence of pollution legal liability insurance maintained by the disposal site operator for losses arising from the insured facility accepting the materials, with coverage in minimum amounts of $1,000,000 per loss, and an annual aggregate of $2,000,000.

17.9 Other Insurance Requirements.

17.9.1. Each policy required above (except workers' compensation and employers' liability) must include the Railroad and its affiliated companies, including but not limited to Genesee & Wyoming, Inc. as "Additional Insured" using ISO Additional Insured Endorsements CG 20 26, and CA 20 48 (or substitute forms providing equivalent coverage). The coverage provided to the Railroad as an additional insured shall, to the extent provided under ISO Additional Insured Endorsement CG 20 26 and CA 20 48, provide coverage for the Railroad's negligence whether sole or partial, active or passive.

17.9.2 Where allowable by law, the punitive damage exclusion shall be deleted, and the deletion shall be indicated on the certificate of insurance.

17.9.3 The contractor waives all rights of recovery, and its insurers also waive all rights of subrogation of damages against the Railroad and its agents, officers, directors and employees, except that these waivers shall not apply to punitive damages, nor to any loss, damage or injury proximately caused by the Railroad's intentional misconduct or sole or gross negligence. The certificate of insurance shall acknowledge these waivers.

17.9.4 Prior to commencing any work on the Railroad's Property, the contractor shall furnish the Railroad with one or more certificates of insurance, executed by a duly authorized representative of each insurer, showing compliance with the insurance requirements set forth in this Section 17.

17.9.5 The contractor shall only obtain insurance policies written by a reputable insurance company acceptable to the Railroad, or which currently has a Best's Insurance Guide Rating of "A–" and Class VII or better, and which is authorized to do business in the State of Missouri.

17.9.6 The fact that insurance is obtained by the contractor or by the Railroad on behalf of the contractor will not be deemed to release or diminish the liability of the contractor, including, without limitation, liability under the indemnity provisions contained in Section 3.0 of these Railroad Requirements. Damages recoverable by the Railroad from the contractor or any third party will not be limited by the amount of the required insurance coverage, except to the extent of any payments the Railroad has received pursuant to insurance coverage obtained and paid for by the contractor.

17.10 Evidence of Insurance. The contractor shall provide evidence of insurance as required above to the addresses shown below, for review by the Commission and approval by the Railroad.

Railroad
Mr. Michael R. Morningstar
Director of Risk Management and Claims
Genesee & Wyoming Railroad Services, Inc.
13901 Sutton Park Drive South
Suite 150
Jacksonville, FL 32224
Phone: (904) 900-6258
Fax: (904)223-4618

Commission
Ms. Brandi Baldwin
State Construction & Materials Engineer
MoDOT
P.O. Box 270
Jefferson City, MO 65102

17.11 Except as otherwise specifically provided in these Railroad Requirements, the Railroad will not accept binders as evidence of insurance, and the contractor shall provide the Railroad with the original insurance policy.

17.12 Insurance Required of Subcontractors. If any part of the work is sublet, the contractor shall maintain and provide evidence of similar insurance, in the same amounts as required of the prime contractor, to cover the subcontractor's operations. The Railroad will accept endorsements to the prime contractor's policies specifically naming subcontractors and describing the subcontractor's operations, for this purpose.

17.13 Cancellation of Insurance. The contractor and its insurers shall not cancel any of the required insurance coverage, except by permission of the Commission and the Railroad, or after

thirty (30) days' written notice to the Commission and the Railroad at the addresses shown in subsection 17.10.

18.0 Completion of Work on Railroad's Property. The contractor shall notify Engineer and Railroad's Representative when the contractor has completed its work on Railroad's Property.

19.0 Failure to Comply. If the contractor violates or fails to comply with any of these Railroad Requirements, then the Railroad Engineer may require that the contractor vacate the Railroad's property and the Engineer may withhold all monies due to the contractor until the contractor has remedied the situation to the satisfaction of the Railroad Engineer and the Engineer.

20.0 Payment for Cost of Compliance. The contractor is not entitled to any separate payment for any extra cost it may incur on account of compliance with these Railroad Requirements. The contractor shall include all such costs in the contract unit price for items properly authorized in the contract.

VV. Missouri & Northern Arkansas Railroad Requirements (JSR0060)

Description of Work: Full-depth pavement reconstruction resulting in increased clearance under railroad bridge.

1.0 Introduction.

1.1 These Railroad Requirements set forth terms and conditions agreed between the Missouri & Northern Arkansas Railroad Company, Inc**.** (Railroad) and the Missouri Highways and Transportation Commission (Commission), under which Railroad will allow the Commission's contractors to enter in and upon Railroad's real property, right of way, tracks and other facilities (Railroad's Property) to perform the contractor's work relating to this project.

1.2 To report an emergency on the Railroad, call: 866-527-3499

1.3 The project is located on the MNA Web City Subdivision, at Mile Post 528.43, DOT # 434917U in Carthage, MO.

1.4 Definitions of terms set forth in the current edition of the Missouri Standard Specifications for Highway Construction shall be applicable to those terms as used in these Railroad Requirements.

1.5 Contractor may not access, at any time, any property of the Railroad outside the State's permanent and temporary easements without Railroad's prior, written approval.

2.0 Authority of Railroad Representative and Engineer.

2.1 The authorized representative of the Railroad, herein called "Railroad Representative", shall have final authority in all matters affecting the safe maintenance and operation of railroad traffic including the adequacy of the foundations and structures supporting the railroad tracks.

2.1.1 The Railroad designates the following individual as the Railroad Representative for this project. Except as otherwise provided in these Railroad Requirements, the contractor shall address all notices concerning this project to the Railroad Representative, as follows:

Mr. Greg Feyerabend
General Manager
Missouri & Northern Arkansas Railroad Company, Inc.

514 North Orner
Carthage, MO 64836
Email: Greg.Feyerabend@gwrr.com
TEL: (918) 289-4861 [mobile]

2.1.2 The Railroad, or the individual identified above, may designate a different individual to act as the Railroad Representative for this project, and may change the address information stated above, by giving written notice of the changes to the contractor and to the Engineer, as provided in these Railroad Requirements.

2.2 The authorized representative of the Commission (Engineer) shall have authority over all other matters as prescribed herein and in the project specifications.

3.0 Contractor's Indemnity Obligations to the Railroad. The contractor agrees to indemnify, defend and hold harmless the Railroad from and against any injury or death of persons whomsoever, or from any loss or damage to the Railroad's Property, caused by acts or omissions of the contractor in performing work on this project, whether on, over, under or in the vicinity of the Railroad's Property as more specifically detailed in the Right of Entry Agreement referenced in Section 4.5 below. In the event the contractor shall fail to restore the Railroad's Property immediately to a condition acceptable to the Railroad when any such loss or damage to the Railroad's Property is called to the contractor's attention by the Railroad, then the Railroad may perform such corrective work at the cost of the contractor. In addition to such remedies of the Railroad, the Commission will withhold from final payment due to the contractor the amount reasonably necessary to reimburse the Railroad for such loss or damage or for performing such work. The term "loss or damage" as used herein shall include, but not be limited to, the erosion and silting of, water damage to, and the accidental or intentional placing or dropping of objects on the Railroad's Property.

4.0 Notice of Starting Work. The contractor shall not commence any work on the Railroad's right of way until contractor has complied with the following conditions:

4.1. At least thirty (30) days in advance of the date the contractor proposes to begin work on the Railroad's Property, the contractor has given written notice of the contractor's proposed start date and time to the Railroad Representative, and Railroad's Manager of Track Maintenance (see paragraph 12.2.3 below), with a copy to the Engineer.

4.2 The Commission has obtained written approval from the Railroad's Representative for the contractor's insurance coverage as required by Section 17 of these Railroad Requirements, and authorization for the contractor to begin work on the Railroad's Property.

4.3 The contractor has determined whether fiber optic cable systems are buried on the Railroad's Property. If fiber optic cable systems are buried on the Railroad's Property, then the contractor has contacted the Railroad at the 24 hour number, 800-336-9193, has contacted the telecommunications company involved, has arranged for a cable locator, and has made arrangements for relocation or other protection of the fiber optic cable system on the Railroad's Property.

4.4 The contractor's employees, representatives or agents who are regularly assigned to perform work on the Railroad's Property have been certified as having completed the Internet Safety Orientation available at https://railpros.com/training/ where contractor needs to complete the course. This certification shall be renewed annually. In addition the contractor shall require that every employee, representative or agent who is not regularly assigned to perform work on the Railroad's Property has received appropriate safety training before performing any work on the

Railroad's property. The cost of the Internet Safety Orientation, which is subject to change, is currently $75 per person per year.

4.5 Right of Entry. At least forty-five (45) days in advance of the date the contractor proposes to begin work on the Railroad's Property, the contractor shall enter into a Right of Entry Agreement with Railroad prior to working on Railroad property. The application for Right of Entry Agreement can be found at the following address:

http://www.gwrr.com/real-estate/accessing-property/

4.5.1 The applicant must submit the completed application to the Real Estate Department including a check or money order, to cover the non-refundable fee of $1,750 made payable to the Railroad. The application must include railroad milepost, railroad subdivision, and scope of work.

4.5.2 Upon approval of the application, the Real Estate Department will draft an agreement and forward to the applicant for signature. **Application does not guarantee approval**. The applicant must then return the signed document to the Real Estate Department along with the pertinent certificate of insurance outlined in the agreement. Once in receipt of these documents, the agreement will then be executed on behalf of the Railroad.

5.0 Interference with Railroad's Operations.

5.1 The Railroad's right of way is located within the limits of this project. The contractor shall take care to insure that it will not drop any debris or material on the Railroad's Property.

5.2 The contractor shall arrange and conduct all of the contractor's work so that it causes no interference with the Railroad's operations, including train, signal, telephone, telegraphic services, damage to the Railroad's Property, poles, wires and other facilities of tenants on the Railroad's Property. Whenever the contractor's work may directly affect the operations or safety of trains, the contractor shall submit a written description of the method of doing such work to the Railroad Representative for approval, but such approval shall not relieve the contractor from liability resulting from the contractor's work. Any work to be performed by the contractor that requires flagging service shall be deferred by the contractor until the flagging services are available at the job site.

5.3 Whenever the contractor's work upon the Railroad's Property will unavoidably cause an impediment to the Railroad's operations, such as requiring the use of runaround tracks or reduced train speed, the contractor should schedule and conduct these operations so that this impediment is reduced to the absolute minimum.

5.4 If conditions arising from, or in connection with the work require immediate and unusual provisions to protect the Railroad's operations and property, the contractor shall make such provisions. If in the judgment of the Railroad Representative, or the Engineer if the Railroad Representative is absent, such provision is insufficient, then the Railroad Representative or Engineer may require or provide such provisions as he/she deems necessary. In any event, the contractor shall make such provisions at the contractor's expense, and without cost to the Railroad or the Commission.

6.0 Track Clearances. During construction, the contractor shall maintain not less than the minimum track clearances as shown on the project plans. However, before undertaking any work within the Railroad's Property and before placing any obstruction over any track, the contractor shall:

6.1 Notify the Railroad Representative at least ten (10) days in advance of the proposed work.

6.2 Receive assurance from the Railroad Representative that arrangements have been made for flagging service as may be necessary.

6.3. Receive permission from the Railroad Representative to proceed with the work, as provided in section 4.0.

6.4. Confirm that the Engineer has received copies of the contractor's notice to the Railroad, and of the Railroad's response.

7.0 Construction Procedures.

7.1. General. The contractor's work on the Railroad's property shall be performed in accordance with these Railroad Requirements and shall be subject to the Railroad's inspection and review. The contractor shall submit plans that shall be signed, sealed, and stamped in accordance with the laws relating to Architects and Professional Engineers, Chapter 327, RSMo, for the demolition of any structure over Railroad right of way, and for temporary shoring and falsework that may affect the Railroad's facilities or traffic.

7.2 Excavation. The contractor shall maintain the subgrade of an operated track with the beam edge at least 12 feet from centerline of track and not more than 26 inches below top of rail, unless the existing section fails to meet this specification, in which case the contractor shall maintain the existing section.

8.0 Maintenance of Railroad Facilities. Within the project limits, the contractor shall maintain Railroad's Property, including all ditches and drainage structures, free of silt or other obstructions that may result from contractor's operations. The contractor shall promptly repair eroded areas within the Railroad's Property and repair any other damage to the Railroad's Property or the Railroad's tenants. The contractor shall perform all such maintenance and repair of damages due to the contractor's operations at the contractor's expense.

9.0 Storage of Materials and Equipment.

9.1 The contractor shall obtain permission from the Railroad Representative before storing any materials or equipment anywhere on Railroad's Property. The Railroad will not ordinarily permit storage within twenty-five feet (25') from the centerline of any track, or within three hundred feet (300') from any grade crossing. The Railroad will not be liable for damage to such material and equipment from any cause, and the Railroad Representative may move such material and equipment or require the contractor to move it, at the contractor's expense.

9.2 The contractor shall not leave unattended any grading or construction machinery parked upon Railroad's Property, unless it is effectively immobilized so that unauthorized persons cannot move such machinery.

10.0 Cleanup. Upon completion of the work, the contractor shall remove from within the limits of the Railroad's Property all machinery, equipment, surplus materials, falsework, rubbish or temporary buildings of the contractor's and shall leave Railroad's Property in a neat condition satisfactory to the Railroad Representative.

11.0 Damages. The Railroad shall not assume liability for any damages to the contractor, contractor's work, employees, servants, equipment and materials caused by the Railroad's traffic. However, the preceding sentence shall not exempt the Railroad from liability for any loss, damage or injury proximately caused by the Railroad's intentional misconduct or sole or gross negligence. The contractor shall directly reimburse the Railroad for any cost the Railroad reasonably incurs

for repairing damages to the Railroad's Property or to property of the Railroad's tenants, caused by or resulting from the operations of the contractor relating to this project.

12.0 Flagging Services.

12.1 When Flagging is Required. The Railroad has sole authority to determine the need for flagging to protect the Railroad's operations. Whenever the Railroad requires flagging services with reference to any of the contractor's work on this project, the contractor shall not perform any such work until all required flaggers are present at the job site.

12.1.1 In general, the Railroad may require flagging services whenever the contractor's personnel or equipment are, or are likely to be, working on the Railroad's Property, or across, over, adjacent to, or under a track, or when such work has disturbed or is likely to disturb a railroad structure or the railroad roadbed or surface and alignment of any track to such extent that the movement of trains must be controlled by flagging, to prevent unreasonable risks of accidental hazard to the Railroad's operations or personnel.

12.1.2 Normally the Railroad will assign one flagger to a project; but in some cases, more than one may be necessary, such as yard limits where the Railroad may assign up to three flaggers. However, if the contractor works within the distances that violate instructions given by the Railroad Representative, or performs work upon or adjacent to Railroad's Property that has not been scheduled with the Railroad Representative, the Railroad may require flagging services full time until the project is completed.

12.2 Scheduling and Notification of Flagging Services.

12.2.1 The contractor shall arrange with the Railroad all flagging services required by the Railroad to accomplish the contractor's work on this project.

12.2.2 Before the contractor begins work on the Railroad's Property, the contractor shall furnish to the Railroad Representative and the Engineer a schedule for all work required to complete the contractor's portion of the project within the Railroad's Property, and shall arrange for a job site meeting between the contractor, the Engineer, and the Railroad Representative. Until the contractor has provided its work schedule and met on-site with the Railroad Representative and the Engineer, the Railroad may withhold all flagging services from the contractor's proposed job site. Before the flagger(s) begin each day's work, the flagger(s) and the contractor shall meet to conduct a job briefing.

12.2.3 Before the contractor first begins any work upon or adjacent to the Railroad's Property, the contractor shall give not less than thirty (30) days' advance notice to the Railroad, and to the Engineer, of its intent to begin such work. The contractor shall address all notices relating to flagging to the Railroad as follows:

Mr. Greg Feyerabend
General Manager
Missouri & Northern Arkansas Railroad Company, Inc.
514 North Orner
Carthage, MO 64836
Email: Greg.Feyerabend@gwrr.com
TEL: (918) 289-4861 [mobile]

12.2.4 The Railroad usually assigns one flagger to work at the job site on a continuous basis until the contractor no longer needs flagging services. The contractor shall not call for flagging services on a spot basis. The Railroad's assigned flagger shall notify the Engineer when flagging services

have begun and ended. The flagger shall give these notices immediately upon arrival at the job site on the first day, and before departing from the job site on the last day of each separate period when the Railroad provides flagging services, or as soon as possible thereafter. The Engineer shall document these notifications in the project records.

12.2.5 After the contractor has begun work that requires flagging services, the contractor shall give not less than five (5) day's advance written notice to the Railroad before discontinuing flagging services and terminating the obligation to pay for flagging services. The contractor shall simultaneously provide a copy of this notice to the Engineer. If the contractor's work on or adjacent to the Railroad's Property is suspended at any time, or for any reason, then before the contractor resumes any work on or adjacent to the Railroad's Property, the contractor shall give advance, written notice to the Railroad and to the Engineer of its intent to resume such work. This notice shall provide sufficient details of the contractor's proposed work to enable the Railroad Representative to determine whether flagging services will be required before the contractor resumes its work on or adjacent to the Railroad's Property. The contractor shall give this required notice at least three (3) working days' before it intends to resume such work; however, the Railroad may take up to thirty (30) days after the contractor has given this notice before resuming flagging services at the job site. The requirements of this paragraph 12.2.5 shall not apply if the suspension and resumption of the contractor's work were previously scheduled with the Railroad pursuant to paragraph 12.2.2 of these Railroad Requirements, or the suspension was caused by an emergency as provided in paragraph 12.2.6 of these Railroad Requirements.

12.2.6 If, after the Railroad has assigned a flagger to the project site in accordance with section 12.0, any emergency requires the flagger's presence elsewhere, then the contractor shall suspend work on the Railroad's Property until the flagger is again available. Any additional costs to the contractor resulting from such delay shall be borne by the contractor and not by the Railroad.

12.3 Payment for Flagging Services.

12.3.1 The Commission will pay the Railroad directly for the cost of flagging services associated with this project by deducting the amount from the Commission's payments to the contractor.

12.3.2 The estimated cost of flagging services is approximately $1,450 per day, based on an 10-hour work day and a 40-hour work week. The Railroad shall charge not more than its actual cost of providing these flagging services, which includes the base pay for the flagger or flaggers who actually performed the required flagging services, the Railroad's reasonable overhead costs, and the reasonable costs actually incurred for the flagger's travel expenses, meals and lodging if required. The Railroad may charge a maximum of one-hour travel time each way per day per flagger, for travel to and from the job site. A flagger's work in excess of 10 hours per day or 40 hours per week, but not more than 12 hours per day, will result in a pay rate of $250 per hour after 10 hours. If a flagger performs required flagging services on a holiday, then the pay rate shall be $250 per hour for all hours worked on the holiday. The Commission also shall reimburse the Railroad for its actual expenses reasonably incurred in preparing and handling invoices to the Commission for the cost of these flagging services. The Railroad's charges to the Commission shall be in accordance with applicable provisions of the Federal Aid Policy Guide issued by the Federal Highway Administration, including all current amendments.

12.3.3 The Railroad shall submit progress invoices to the Engineer during the time the Railroad requires flagging services. The Railroad shall submit its final invoice for flagging services to the Engineer within one hundred eighty (180) days after the contractor has notified the Railroad and the Commission that all its work over the Railroad's Property is complete, in accordance with

section 18.0 below. If the Commission does not receive the Railroad's final flagging invoice within this time period, then the Railroad shall obtain payment directly from the contractor.

12.3.4 If a dispute arises between the Railroad, the Commission and the contractor concerning the amount charged for flagging service, then the Commission may deduct the full amount of the Railroad's invoice from the contractor's payment, until the dispute is resolved.

12.4 Flagging Complaints. The contractor and the Railroad shall attempt to resolve any complaints concerning flagging services in a timely manner. If the contractor disputes the need for a flagger, the contractor shall notify the Railroad Engineer and the Engineer. The contractor shall confirm any verbal complaints in writing within five (5) working days, by sending a copy to the Railroad Representative and to the Engineer.

13.0 Temporary Construction Grade Crossing.

13.1 When the contractor has no reasonable alternate method of transporting construction materials and personnel across the Railroad's track, the contractor shall make all necessary arrangements with the Railroad for the installation, maintenance and removal of one temporary grade crossing for a construction haul road including, without limitation, entering into Railroad's then current form of Temporary Private Grade Crossing Agreement. The contractor shall bear all costs incidental to such crossings, including flagging, whether services are performed by contractor's own forces or by the Railroad's personnel. The contractor shall execute the Railroad's standard Road Crossing Agreement covering terms and conditions for the temporary crossing.

13.2 Neither the contractor nor the Railroad shall construct any crossing for use by the contractor for transporting materials or equipment across the tracks of the Railroad until the Railroad Representative specifically authorizes the installation, maintenance, necessary watching and flagging thereof and removal, which shall be done at the contractor's expense.

14.0 Work for the Benefit of the Contractors. The project plans show all temporary or permanent changes in wire lines or other facilities that are necessary to complete the project, or these changes will be covered by appropriate plan revisions approved by the Commission and the Railroad. If the contractor desires any further changes, the contractor shall make separate arrangements with the Railroad for those changes, at the contractor's expense.

15.0 Cooperation and Delays. The contractor shall arrange a schedule with the Railroad for accomplishing staged construction involving work by the Railroad or tenants of the Railroad. In arranging a schedule, the contractor shall request information from the Railroad, and the Railroad shall promptly provide information, concerning the minimum lead-time required for assembling crews and materials. The contractor shall schedule adequate time for those activities. The contractor shall not make any claim against the Railroad for hindrance or delay on account of railway traffic for:

15.1 Any work the Railroad performs.

15.2 Other delay incident to or necessary for the safe maintenance of railway traffic.

15.3 Any delays due to compliance with these Railroad Requirements.

16.0 Trainman's Walkways. The contractor shall maintain along the outer side of each exterior track of multiple operated tracks, and on each side of single operated track, an unobstructed continuous space suitable for trainman's use in walking along trains, extending to a line not less than 12 feet from the centerline of the track. Before the close of each workday, the contractor

shall remove all temporary impediments to walkways and track drainage encroachments or obstructions that were allowed during work hours when flagging services were available. Whenever the contractor excavates or maintains any excavation near the walkway, the contractor shall install a handrail with 12 feet minimum clearance from the centerline of the track.

17.0 Insurance.

17.1 General Insurance Provisions. The contractor shall, at its sole cost and expense, procure and continuously maintain in force during this project, the insurance coverage required under this section 17 until the contractor has completed all project work on the Railroad's Property, has removed all equipment and materials from the Railroad's Property, and has cleaned and restored the Railroad's Property to the satisfaction of the Engineer and the Railroad Representative. The amount of work to be performed upon, over or under the Railroad's Property is estimated to be one percent (1%) of the contractor's total bid for the project.

17.2 Commercial General Liability Insurance. The contractor shall maintain commercial general liability ("CGL") insurance with a limit of not less than $2,000,000 for each occurrence and an aggregate limit of not less than $6,000,000. CGL insurance must be written on ISO occurrence form CG 00 01 12 04 (or a substitute form providing equivalent coverage). The policy must contain the following endorsement, which must be stated on the certificate of insurance: **"**Contractual Liability Railroads" ISO form CG 24 17 10 01 (or a substitute form providing equivalent coverage) showing "**Missouri & Northern Arkansas Railroad Company** Property" as the Designated Job Site.

17.3 Business Automobile Coverage Insurance. The contractor shall maintain business auto coverage written on ISO form CA 00 01 (or a substitute form providing equivalent liability coverage) with a combined single limit of not less than $5,000,000 for each accident. The policy must contain the following endorsements, which must be stated on the certificate of insurance: "Coverage For Certain Operations In Connection With Railroads" ISO form CA 20 70 10 01 (or a substitute form providing equivalent coverage) showing "Missouri & Northern Arkansas Railroad Company Property" as the Designated Job Site; and Motor Carrier Act Endorsement - Hazardous Materials Clean Up (MCS-90) if required by law.

17.4 Workers' Compensation and Employers' Liability Insurance. The contractor shall maintain workers' compensation insurance coverage, with not less than the minimum statutory liability required under the workers' compensation laws of the State of Missouri. The contractor shall maintain Employers' Liability (Part B) insurance coverage with limits of at least $500,000 for each accident, a $500,000 disease policy limit, and $500,000 for each employee. If the contractor is self-insured, then the contractor shall provide evidence of state approval and excess workers' compensation coverage, which must include coverage for liability arising out of the U. S. Longshoremen's and Harbor Workers' Act, the Jones Act, and the Outer Continental Shelf Land Act, if applicable. The policy must contain the following endorsement, which must be stated on the certificate of insurance: "Alternate Employer Endorsement" ISO form WC 00 03 01 A (or a substitute form providing equivalent coverage) showing the Railroad in the schedule as the alternate employer (or a substitute form providing equivalent coverage).

17.6 Railroad Protective Liability Insurance. The contractor must maintain Railroad Protective Liability insurance written on ISO occurrence form CG 00 35 12 04 (or a substitute form providing equivalent coverage) on behalf of the Railroad as named insured, with a limit of not less than $2,000,000 per occurrence and an aggregate limit of $6,000,000. Before commencing any work on the Railroad's Property, the contractor shall submit the original insurance policy to the Railroad, or may submit a binder stating that the required Railroad Protective Liability policy is in place until the contractor delivers the original policy to the Railroad. The contractor shall cause the Railroad

Protective Liability Insurance policy to include a description of the named insured, the work, and the job site, as follows:

17.6.1 Named Insured. The Named Insured on the Railroad Protective Liability Insurance policy shall be Missouri & Northern Arkansas Railroad Company, Inc.

17.6.2 Description and Designation. The description of the work and designation of the job site to be shown on the Railroad Protective Liability Insurance policy are as follows:

> Full-depth pavement reconstruction resulting in increased clearance under railroad bridge.
> Job No. JSR0060 in Carthage on MO - 96
> DOT# 434917U MNA Web City Sub, Mile Post 528.43 in Carthage, MO.

17.7 Umbrella or Excess Insurance. If the contractor utilizes umbrella or excess insurance policies, these policies must "follow form" and afford no less coverage than the primary policy.

17.8 Pollution Liability Insurance. The contractor shall maintain pollution liability insurance coverage, which must be written on ISO form Pollution Liability Coverage Form Designated Sites CG 00 39 12 04 (or a substitute form providing equivalent liability coverage), with limits of at least $5,000,000 per occurrence and an aggregate limit of $10,000,000. If the scope of work as defined in this Project includes the disposal of any hazardous or non-hazardous materials from the job site, the contractor must furnish to the Railroad evidence of pollution legal liability insurance maintained by the disposal site operator for losses arising from the insured facility accepting the materials, with coverage in minimum amounts of $1,000,000 per loss, and an annual aggregate of $2,000,000.

17.9 Other Insurance Requirements.

17.9.1. Each policy required above (except workers' compensation and employers' liability) must include the Railroad and its affiliated companies, including but not limited to Genesee & Wyoming, Inc. as "Additional Insured" using ISO Additional Insured Endorsements CG 20 26, and CA 20 48 (or substitute forms providing equivalent coverage). The coverage provided to the Railroad as an additional insured shall, to the extent provided under ISO Additional Insured Endorsement CG 20 26 and CA 20 48, provide coverage for the Railroad's negligence whether sole or partial, active or passive.

17.9.2 Where allowable by law, the punitive damage exclusion shall be deleted, and the deletion shall be indicated on the certificate of insurance.

17.9.3 The contractor waives all rights of recovery, and its insurers also waive all rights of subrogation of damages against the Railroad and its agents, officers, directors and employees, except that these waivers shall not apply to punitive damages, nor to any loss, damage or injury proximately caused by the Railroad's intentional misconduct or sole or gross negligence. The certificate of insurance shall acknowledge these waivers.

17.9.4 Prior to commencing any work on the Railroad's Property, the contractor shall furnish the Railroad with one or more certificates of insurance, executed by a duly authorized representative of each insurer, showing compliance with the insurance requirements set forth in this Section 17.

17.9.5 The contractor shall only obtain insurance policies written by a reputable insurance company acceptable to the Railroad, or which currently has a Best's Insurance Guide Rating of "A–" and Class VII or better, and which is authorized to do business in the State of Missouri.

17.9.6 The fact that insurance is obtained by the contractor or by the Railroad on behalf of the contractor will not be deemed to release or diminish the liability of the contractor, including, without limitation, liability under the indemnity provisions contained in Section 3.0 of these Railroad Requirements. Damages recoverable by the Railroad from the contractor or any third party will not be limited by the amount of the required insurance coverage, except to the extent of any payments the Railroad has received pursuant to insurance coverage obtained and paid for by the contractor.

17.10 Evidence of Insurance. The contractor shall provide evidence of insurance as required above to the addresses shown below, for review by the Commission and approval by the Railroad.

Railroad
Mr. Michael R. Morningstar
Director of Risk Management and Claims
Genesee & Wyoming Railroad Services, Inc.
13901 Sutton Park Drive South
Suite 150
Jacksonville, FL 32224
Phone: (904) 900-6258
Fax: (904)223-4618

Commission
Ms. Brandi Baldwin
State Construction & Materials Engineer
MoDOT
P.O. Box 270
Jefferson City, MO 65102

17.11 Except as otherwise specifically provided in these Railroad Requirements, the Railroad will not accept binders as evidence of insurance, and the contractor shall provide the Railroad with the original insurance policy.

17.12 Insurance Required of Subcontractors. If any part of the work is sublet, the contractor shall maintain and provide evidence of similar insurance, in the same amounts as required of the prime contractor, to cover the subcontractor's operations. The Railroad will accept endorsements to the prime contractor's policies specifically naming subcontractors and describing the subcontractor's operations, for this purpose.

17.13 Cancellation of Insurance. The contractor and its insurers shall not cancel any of the required insurance coverage, except by permission of the Commission and the Railroad, or after thirty (30) days' written notice to the Commission and the Railroad at the addresses shown in subsection 17.10.

18.0 Completion of Work on Railroad's Property. The contractor shall notify Engineer and Railroad's Representative when the contractor has completed its work on Railroad's Property.

19.0 Failure to Comply. If the contractor violates or fails to comply with any of these Railroad Requirements, then the Railroad Engineer may require that the contractor vacate the Railroad's property and the Engineer may withhold all monies due to the contractor until the contractor has remedied the situation to the satisfaction of the Railroad Engineer and the Engineer.

20.0 Payment for Cost of Compliance. The contractor is not entitled to any separate payment for any extra cost it may incur on account of compliance with these Railroad Requirements. The contractor shall include all such costs in the contract unit price for items properly authorized in the contract.

WW. Right-of-Way Clearance – Delayed Possession (J7S3506B)

1.0 Description. The right of way for this project has been acquired except for:

Parcel 008 - CJ Property Invest – TCE
Parcel 013 - Ninety 4 Eighty LLC – TCE
Parcel 016 - Union Pacific RR – PE and TCE
Parcel 017 - Roy & Jennifer Schrader III – TCE
Parcel 018 - Kenton C Cowgill II – TCE
Parcel 020 - Arvest Bank – TCE
Parcel 021 - Arvest Bank – TCE

1.1 The contractor shall inform itself of the location of these tracts. No encroachment, storage of equipment and materials or construction on these tracts shall be permitted until notification by the engineer is given that these tracts have been acquired.

1.2 The contractor shall schedule its work utilizing the available right of way until these tracts are cleared for construction, which is estimated to be January 19, 2027. However, this date expressly is not a warranty by or contractually binding on the Commission as the date the twelve Tracts will be clear for construction. No encroachment, storage of equipment and materials or construction on these tracts shall be permitted until the contractor is notified by the engineer that these tracts have been acquired.

1.3 The contractor shall have no claim for damage for delay, disruption, interference or otherwise as a result of the unavailability of **Parcels listed above in Item 1.0.** The contractor may be given an extension of time upon proof of actual delay caused by the unavailability of these tracts as approved by the engineer.

XX. Right-of-Way Clearance – Delayed Possession (JSR0060)

1.0 Description. The right of way for this project has been acquired except for:

Parcel 005 - Republic Shopping Center – RW and TCE
Parcel 010 - Wayne House – RW and TCE
Parcel 011 - EYM Realty of Missouri – RW
Parcel 012 - Paul R & Joann Toney – RW and TCE
Parcel 014 - Casey's Marketing Co – RW and TCE
Parcel 025 - McDonald Gary D & K Kring Trust – RW

1.1 The contractor shall inform itself of the location of these tracts. No encroachment, storage of equipment and materials or construction on these tracts shall be permitted until notification by the engineer is given that these tracts have been acquired.

1.2 The contractor shall schedule its work utilizing the available right of way until these tracts are cleared for construction, which is estimated to be January 19, 2027. However, this date expressly is not a warranty by or contractually binding on the Commission as the date the nine Tracts will be clear for construction. No encroachment, storage of equipment and materials or construction on these tracts shall be permitted until the contractor is notified by the engineer that these tracts have been acquired.

1.3 The contractor shall have no claim for damage for delay, disruption, interference or otherwise as a result of the unavailability of **Parcels listed above in Item 1.0.** The contractor may be given an extension of time upon proof of actual delay caused by the unavailability of these tracts as approved by the engineer.

YY. Water Main Construction and Specifications

1.0 Description. All work, materials, testing, and equipment required for the installation of the water pipe, main extensions, service taps, meters, hydrants, valves, and associated utility appurtenances shall be in strict accordance with the document entitled *"Standard Specifications for Water Main Construction, Carthage Water & Electric Plant, Carthage, Missouri"* (dated July 2025, prepared by Allgeier, Martin and Associates, Inc.), which is included in the contract documents for reference.

2.0 Reference Document. The Contractor shall execute all water main and water system improvement items in compliance with the referenced Carthage Water & Electric Plant (CW&EP) standard specifications, including but not limited to:

- Division 01 – General Requirements and Unit Prices
- Division 02 – Removal of Existing Improvements
- Division 03 – Concrete Requirements (Formwork, Reinforcement, Cast-in-Place, Admixtures)
- Division 31 – Earthwork, Aggregates, Trenching, Dewatering, and Backfilling
- Division 32 – Exterior Improvements (Roadway Surface/Sidewalk Replacement and Paving)
- Division 33 – Utilities (Ductile Iron Pipe, PEX Utility Pipe, Boring/Jacking, Joint Restraint, Meters, and Vaults)
- Division 40 – Process Interconnections (Gate Valves, Double Check Valve Assemblies, Hydrants)
- Typical Water Detail Drawings WTR-2 through WTR-14

3.0 Order of Precedence and Governing Specifications.

3.1 The CW&EP Standard Specifications document is included in the contract documents as a project reference for water pipe installation items.

3.2 In the event of any conflict, discrepancy, or inconsistency between the referenced CW&EP Standard Specifications document and the Missouri Department of Transportation (MoDOT) Standard Specifications, Standard Plans, or Contract Documents, **MoDOT documents shall prevail**, or the conflict shall be resolved as directed by the Engineer.

3.3 Any work performed within MoDOT right-of-way shall strictly adhere to all MoDOT permit requirements, traffic control standards, and engineering directions as overseen by the Engineer.

STANDARD SPECIFICATIONS
for
WATER MAIN CONSTRUCTION
CARTHAGE WATER & ELECTRIC PLANT
CARTHAGE, MISSOURI

Carthage Water & Electric Plant

July 2025

Prepared by

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Consulting Engineers ● Surveyors
Joplin • Rolla • Springfield • Kansas City, MO • Tulsa, OK• Bentonville, AR

CARTHAGE WATER & ELECTRIC PLANT
CARTHAGE, MISSOURI

Standard Specifications for Water Main Construction

Section	Title	Pages
SPECIFICATIONS		
DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS		
00 90 00	Revisions, Clarifications, and Modifications	1
DIVISION 01 – GENERAL REQUIREMENTS		
01 00 00	General	2
01 22 00	Unit Prices	2
01 74 00	Cleaning	1
DIVISION 02 – EXISTING CONDITIONS		
02 41 00	Removal of Existing Improvements	2
DIVISION 03 – CONCRETE		
03 11 13	Structural Cast-In-Place Concrete Forming	2
03 20 00	Concrete Reinforcement	1
03 30 00	Cast-In-Place Concrete	9
03 31 10	Concrete Admixtures	1
DIVISION 31 – EARTHWORK		
31 05 16	Aggregates for Earthwork	1
31 11 00	Clearing and Grubbing	1
31 22 19	Finish Grading	1
31 23 16.26	Explosives	2
31 23 19	Dewatering	1
31 23 23.23	Compaction Control and Testing	3
31 23 33	Trenching and Backfilling	3
31 41 00	Shoring	1
DIVISION 32 – EXTERIOR IMPROVEMENTS		
32 01 10	Roadway Surface and Sidewalk Replacement	2
32 11 23	Aggregate Base Courses	2
32 12 16	Asphalt Paving	5
32 92 19	Surface Restoration	3
DIVISION 33 - UTILITIES		
33 05 07.23	Utility Boring and Jacking	2
33 05 09.33	Joint Restraint	1

33 05 19	Ductile Iron Pipe and Fittings	2
33 05 33	Polyethylene Utility Pipe	1
33 10 00	Water Supply Systems	5
33 19 16.23	Turbine Water Meter and Vault	1

DIVISION 40 – PROCESS INTERCONNECTIONS

40 05 61	Gate Valves and Boxes	1
40 05 67.16	Double Check Valve Assembly Backflow Preventer	1
40 05 81.13	Fire Hydrants and Appurtenances	1

TYPICAL WATER DETAIL DRAWINGS

Trench & Bedding	WTR-2
Street Crossing	WTR-3
Concrete Encasement	WTR-4
Encasement Pipe and Bore	WTR-5
Sewer Crossing	WTR-6
Gate Valve Installation	WTR-7
Fire Hydrant	WTR-8
Flush Hydrant	WTR-9
Service Tap	WTR-10
Water Meter Installation	WTR-11
Thrust Block	WTR-12
Meter Vault	WTR-13
FDC/DCA Vault	WTR-14

With regard to this project, and pursuit to RSMO 327.411, Allgeier, Martin and Associates, Inc. and the Professional whose personal seal and signature appear below assume responsibility only for the specifications and other documents bearing the personal seal of the undersigned Professional, and hereby disclaim any responsibility for all other drawings, specifications, or other documents which do not contain the personal seal of the undersigned Professional.

END OF SECTION 00 01 10

DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS

REVISIONS, CLARIFICATIONS, AND MODIFICATIONS..... 00 90 00

1. GENERAL

1.1 April 2025: The following modifications, changes, or revisions to the previously approved March 2020 Standard Specifications for Water main Construction have been incorporated into these specifications.

1.1.1 Specification Section 01 22 00 – UNIT PRICES has been revised to accurately describe measurement and payment of various items.

1.1.2 All water main shall be ductile iron pipe as specified in Section 33 05 19 – DUCTILE IRON PIPE AND FITTINGS.

1.1.3 Provide all buried ductile iron pipe, fittings, and specials with at least one wrap of polyethylene encasement. Refer to Specification Section 33 05 19 – DUCTILE IRON PIPE AND FITTINGS.

1.1.4 Water service line shall be crosslinked polyethylene (PEX) pipe or tubing, SDR 9 as specified in Section 33 05 33 – POLYETHYLENE UTILITY PIPE.

1.1.5 Specification Section 33 10 00 – WATER SUPPLY SYSTEMS has been revised to require protection from introduction of contaminants by backflow in accordance with 10 CSR 60-11.010. This includes the required installation of double check backflow prevention devices on all irrigation and lawn watering connections.

1.1.6 Specification Section 33 10 00 – WATER SUPPLY SYSTEMS has been revised to require all fire protection services, no matter the size, to be metered as specified in Section 33 19 16.23 – TURBINE WATER METER AND VAULT.

1.1.7 Specification Section 33 19 16.23 – TURBINE WATER METER AND VAULT has been revised to allow for 4” meter assemblies or larger.

1.1.8 Specification Section 33 19.16.23 TURBINE WATER METER AND VAULT has been revised to require all fire protection services, no matter the size, to be metered.

1.1.9 Specification Section 40 05 67.16 – DOUBLE CHECK VALVE ASSEMBLY has been revised to allow for 4” assemblies or larger.

1.1.10 Fire hydrants shall be manufactured by AVK as specified in Section 40 05 81.13 – FIRE HYDRANTS AND APPURTENANCES.

1.2 July 2025: The following modifications, changes, or revisions to the previously approved April 2025 Standard Specifications for Water main Construction have been incorporated into these specifications.

1.2.1 Typical Water Detail Drawings WTR-2 through WTR-14 have been individual stamped/signed/sealed by the Engineer of Record.

1.2.2 Typical Water Detail Drawing WTR-13 has been revised to a watertight precast concrete vault structure as required by the Missouri Department of Natural Resources (MDNR).

1.2.3 Typical Water Detail Drawing WTR-14 has been revised to a watertight precast concrete vault structure as required by the Missouri Department of Natural Resources (MDNR).

END OF SECTION

DIVISION 01 – GENERAL REQUIREMENTS

GENERAL 01 00 00

1. GENERAL

1.1 Standard specifications for the work shall consist of the "Standard Specifications for Water Main Construction" of the Carthage Water and Electric Plant, City of Carthage, and specific sections from the "Standard Specifications for Highway Construction" of the Missouri Highway and Transportation Commission.

1.2 A Performance and Maintenance Bond shall be on file with the Carthage Water and Electric Plant (CW&EP) prior to the start of the public improvement construction.

1.2.1 The Performance and Maintenance Bonds shall be for the cost of the public improvement construction.

1.2.2 The Performance Bond shall be in effect until project completion. The Maintenance Bond shall be effective for a 12-month period following project completion and acceptance by the Carthage Water and Electric Plant and the City of Carthage.

1.3 No public improvement project construction shall begin until a set of engineering drawings of the proposed construction sealed by a licensed professional engineer registered in the State of Missouri, is received by the approved by signature of the Carthage Water and Electric Plant General Manager or his designee.

1.4 Any public improvement which will be located in a State of Missouri right-of-way shall be permitted first by the Missouri Department of Transportation (MoDOT) before being considered by the Carthage Water and Electric Plant. A copy of the MoDOT permit shall be supplied to the City of Carthage and to the Carthage Water and Electric Plant.

1.5 All public improvement construction shall be performed in accordance with specifications listed herein and shall be inspected and documented by the Carthage Water and Electric Plant.

1.6 If the public improvement construction is required to be done after normal working hours, or on weekends or holidays, all overtime pay for inspector(s) shall be paid for by the Contractor. Failure to pay overtime fees shall result in a claim against the project Performance Bond.

1.7 The Contractor or Owner will be responsible for the repair/replacement of any City facilities damaged during construction. Failure to repair/replace damaged City facilities will result in a claim against the Contractor/owner's liability insurance policy.

1.8 For new construction projects, an emergency contact with a 24-hour telephone number must be on file in case of emergency.

2. WATER MAIN IMPROVEMENTS

2.1 Water lines shall be improved to comply with the standards contained herein, with the requirements of the Missouri Department of Natural Resources, and all design standards and specifications now or hereafter promulgated by the Carthage Water and Electric Plant or adopted by the Carthage City Council, in accordance with the final construction plans required to be approved prior to formal plat approval.

2.2 Responsibility for Improvements Costs: All costs for water line construction including testing and certification shall be the responsibility of the Owner/Developer.

3. TRAFFIC CONTROL

3.1 General. Materials, placement, maintenance, and removal of Traffic Control Devices shall be governed by Part 6 of the "Manual of Uniform Traffic Control Devices," published by the U.S. Department of Transportation of the Federal Highway Administration.

3.2 Maintenance of Access: Construction Sequence. The Contractor shall strictly adhere to the construction sequence outlined on the Construction Phasing Plans.

3.3 Placement of Devices: Approximate Quantities. In order to maintain safe work and travel in the construction zone, the Contractor shall provide and install signs, barriers, and lane channelization for vehicles as shown on the Traffic Control Plan.

4. QUALITY ASSURANCE

4.1 Developer/Contractor shall provide to the Carthage Water and Electric Plant test reports from an independent testing laboratory confirming that lines, valves, sub-grade, granular stone base, granular stone bedding, and pavement have been constructed in conformance with the appropriate City Specifications. The Carthage Water and Electric Plant and/or designated inspector shall be notified at least 24 hours prior to a scheduled inspection or test. Costs for independent testing of all components shall be the responsibility of the Developer. Trench backfill and pipe bedding under streets shall be tested and inspected prior to construction of streets. Following construction, the project engineer shall provide signed approval stating to City that water lines have been constructed in accordance with approved plans and specifications.

4.2 During the course of construction, the Developer/Contractor shall record the location of all valves, fittings, service corporations stops, and lengths of pipe installed, as well as the nominal size of each element. The location of valves and fittings shall be measured from permanent surface reference markers and witness marks, and by survey grade GPS coordinates. This data shall be legibly recorded on a complete set of project drawings along with all changes made during construction and labeled "Record Drawings". These "Record Drawings" shall be submitted to the Owner following the Owners acceptance of the Project and with the Developer/Contractors request for final payment.

END OF SECTION

UNIT PRICES 01 22 00

1. GENERAL

1.1 This section describes the methods of measurement and payment for the various items required by the specifications pertaining to contracts with the City of Carthage or the Carthage Water and Electric Plant. There shall be no measurement or separate payment for any items not listed in the proposal and all costs pertaining thereto shall be included in the contract unit prices for other items listed in the proposal.

2. MEASURED ITEMS

2.1 The following denotes items which will be measured and paid for separately for water line construction. All other items as required by the specifications shall NOT be measured and paid for separately but shall be considered incidental to construction. The cost for these items shall be included in the unit price of the item of which they are a part.

2.2 Clearing and Grubbing: Measurement and payment will be per acre and shall include all labor, materials, equipment, and supervision necessary to clear and grub the site.

2.3 Potable Water Line:

2.3.1 Open Trenched: Measurement of various sizes and types will be in linear feet and based on the horizontal length of pipe measured along the centerline of the pipe and center to center of the various fittings or if a dead-end line, to the outside face of the plug. Payment will be made at the contract unit price per linear foot for the applicable size and type of water pipe, as listed in the proposal. Such payment and price shall constitute full compensation for all the labor, materials, equipment, and for the performance of all work necessary to complete the water line, including excavation, sheeting and shoring, dewatering, preparation of stone subgrade, installation of pipe, stone and earth backfilling, and disposal of excess material.

2.3.2 Bored and Jacked: Underground excavation accomplished by tunneling, boring or jacking shall be measured and paid for on a per foot basis for the applicable size of casing pipe and carrier pipe. Total length of bore shall be as denoted on the plans or in the bid schedule based on the horizontal length of pipe measured from end to end of tunnel liner or casing pipe along centerline of pipe. Such payment and price shall constitute full compensation for all labor, material, equipment, and for the performance of all work necessary to complete the water line, including all excavation, sheeting and shoring, dewatering, installation of casing pipe or tunnel liner plates, grouting, installation of carrier pipe, casing spacers, casing end seals, and disposal of excess material.

2.4 Fire Hydrant: Measurement and payment for fire hydrants shall be on a "per each" basis and shall include all labor, materials, equipment, and supervision necessary to complete the fire hydrant installation. Installation shall include excavation, thrust blocking, stone drain pit, lead pipe, valve, incidentals and testing required for a complete working installation.

2.5 Flush Hydrant: Measurement and payment for flush hydrants shall be on a "per each" basis and shall include all labor, materials, equipment, and supervision necessary to complete the flush hydrant installation. Installation shall include excavation, thrust blocking, stone drain pit, incidentals and testing required for a complete working installation.

2.6 Gate Valves: Measurement and payment for gate valves shall be on a "per each" basis and shall include all labor, materials, equipment, and supervision necessary to complete the valve installation. Installation shall include excavation, thrust blocking, valve box, incidentals and testing required for a complete working installation.

2.7 Service Tap: Measurement and payment for service taps shall be on a "per each" basis and shall include all labor, materials, equipment, and supervision necessary to complete the service tap. The tap shall include excavation, service saddle, corporation stop, adequate length of service line, testing and incidentals required for a complete working installation.

2.8 Water Meter: Measurement and payment for water meters shall be on a “per each” basis and shall include all labor, materials, equipment, and supervision necessary to complete the installation. The installation shall include excavation,

meter setter, meter, meter tile with lid, and incidentals required for a complete working meter installation.

2.9 Potable Water Line Fittings: Fittings, including but not limited to tees, elbows, reducers, and plugs, shall not be measured and paid for separately but shall be considered incidental to construction and included in the unit price for the pipeline of which they are a part.

2.10 Thrust Blocking and Joint Restraint: Concrete thrust blocking or mechanical joint restraint shall not be measured and paid for separately but shall be considered incidental to construction and included in the unit price for the pipeline of which they are a part.

2.11 Surface Restoration: Shall be measured and paid for on a per linear foot basis for the type of restoration required. The width of the area to be restored shall be determined by each individual installation with all disturbed areas being restored. The bid price shall constitute full compensation for all materials, equipment, labor, supervision and incidentals necessary to complete the required restoration.

2.12 Roadway and Sidewalk Replacement:

2.12.1 Roadway surface replacement shall be measured and paid for on a linear foot basis as noted in the bid schedule. Stated bid price shall include all materials, equipment, labor and supervision required to complete roadway surface replacement.

2.12.2 Sidewalk replacement shall be measured and paid for on a linear foot basis as noted in the bid schedule. Stated bid price shall include all materials, equipment, labor and supervision required to complete sidewalk replacement.

2.13 Encasement: Concrete encasement will be measured in linear feet for the applicable size pipe, as listed in the proposal, based on true length of encasement measured along the centerline of pipe. Concrete collars placed with adjacent encasement will be measured as one (1) linear foot of concrete encasement. Where concrete collars only are required, measurement will be made on a per each basis.

2.14 Connection to Existing Lines: Shall be measured and paid for as a "per each" lump sum. The lump sum bid price shall include all materials, equipment, labor and supervision required to complete the connection to the existing water line.

2.15 Testing: Hydrostatic testing of completed water lines shall be measured and paid for on linear foot basis as listed in the proposal, based on the horizontal length of pipe measured from center to center of fittings or if a dead-end line, to the outside face of the plug. Such payment and price shall constitute full compensation for all the materials, equipment, labor, and supervision for the performance of all work necessary to complete hydrostatic testing of the water lines. Carthage Water and Electric will provide water for the initial water line testing. Water for any additional testing shall be purchased by the Contractor from Carthage Water and Electric.

2.16 Flushing and Disinfection: Shall be measured and paid for on linear foot basis as listed in the proposal, based on the horizontal length of pipe measured from center to center of fittings or if a dead-end line, to the outside face of the plug. Such payment and price shall constitute full compensation for all the materials, equipment, labor, and supervision for the performance of all work necessary to complete flushing and disinfection of the water lines. Carthage Water and Electric will provide water for the initial flushing and disinfection. Water for any additional flushing or disinfection (in the event of a failed test) shall be purchased by the Contractor from Carthage Water and Electric.

END OF SECTION

*Revised April 2025.

CLEANING 01 74 00

1. GENERAL

1.1 The work of this section consists of the periodic removal of construction debris from the job site(s) and associated public streets, roads, easements, and rights of way used during construction. In addition, the final detailed cleaning of the site prior to the Owner's acceptance of the project is included.

2. MATERIALS

2.1 None.

3. EXECUTION

3.1 General; The Contractor shall keep the construction site sufficiently clean so as to allow a safe and expeditious construction operation to be implemented. Periodically and upon completion of the work and before acceptance and final payment is made, the Contractor shall clean and then remove from the road rights- of-way, easements, public and private property, all surplus, discarded materials, perishable matter, rubbish and temporary structures. The Contractor shall restore in an acceptable manner all property, both public and private, which may have been damaged on account of the prosecution of the work, and shall leave the roadway, easements, public and private property neat and presentable.

3.2 Open-Burning: During each construction project phase, efforts shall be taken to prohibit the open burning of refuse in accordance with laws and regulations of the applicable municipal and state agencies.

3.3 Dust Control: Construction operations may require control measures to prevent the creation of excessive dust, which will be the responsibility of the Contractor.

3.4 Water Pollution Control: The Contractor shall exercise caution to guard against the degradation of the waters of the State of Missouri due to construction related pollutants (silt, debris, and petroleum products), and shall prevent the discharge of pollutants involved with this contract into the waters of the State of Missouri.

END OF SECTION

REMOVAL OF EXISTING IMPROVEMENTS..... 02 41 00

1. GENERAL:

1.1 This work shall consist of the removal and disposal of all existing improvements, except those designated or permitted to be left in place or to be removed under other items of work, from the right-of-way and within the limits of the project.

1.2 Removal of existing improvements shall include removing all buildings, drainage structures, pavements, surfacing and base courses of all types, curb, curb and gutter, sidewalks and house walls, steps, retaining walls, foundation walls, columns, footings, floors and any other types of building appurtenances, cisterns, catch basins, manholes, drainage and sewer pipes, water and gas main pipes, other objects or structures including scattered or piled bricks, stones, broken masonry, rubbish, debris, etc., from building demolition work, and other existing improvements. This item shall also include the salvaging of materials as designated in the contract, and the backfilling of the resulting trenches, holes, and pits, and any grading work required to shape, smooth, and finish the disturbed areas.

2. MATERIALS

2.1 None.

3. EXECUTION

3.1 All buildings, disused structures, old pavements, abandoned sewers or pipelines, or other obstructions to the construction of the roadway or within the limits of the right-of-way and not designated or permitted to remain shall be removed or disposed of by the Contractor as required. Existing structures used for handling temporary traffic shall not be removed until the replacement structures are open to traffic. The Contractor may make use of existing structures or portions of them during construction, but all material designated for use elsewhere shall be removed from the project, cut, bent, broken, or otherwise damaged.

3.2 Material designated in the contract to be salvaged from existing structures shall be removed without damage in sections which may be readily handled or transported and shall be piled neatly at an accessible point. Material not designated for salvage will be considered the property of the Contractor unless owned and claimed by any political subdivision or utility company. Salvaged materials becoming the property of the Contractor shall not be stored within the right-of-way, nor shall any portion of the right-of-way be used by the Contractor as a sales yard. All discarded materials or debris shall be disposed of at locations furnished by the Contractor, or at locations on the right-of-way approved by the Engineer.

3.3 In removing pavement, curb, curb and gutter, gutters, sidewalk, and other similar improvements, and where a portion of such improvements are to be left in place, they shall be removed to an existing joint or to a joint sawed to a minimum depth of one inch with a true line and vertical face. Sufficient removal shall be made to provide for proper grades and connections in the new work regardless of any limits which may be indicated on the plans.

3.4 Removal of concrete pavement or base course and concrete sidewalk may consist either of breaking up and disposing of the broken concrete in embankments or in disposal areas furnished at the Contractor's expense, or of breaking the slab into pieces not exceeding 4 square feet where new embankment over 24 inches high is to be placed over the slab. Existing improvements not removed in their entirety shall be removed to a minimum depth of 12 inches below the finished grading section or natural ground.

3.5 All sewer or drainage pipes which have been, or are to be, abandoned shall be permanently sealed at the ends with bulkheads constructed of Class B Concrete, concrete of a commercial mixture or brick masonry, having a minimum thickness of 8 inches. The use of salvaged brick will be permitted for constructing bulkheads provided the bricks are clean and sound. No direct payment will be made for blocking abandoned sewers, drainage pipes, or floor drains.

3.6 All trenches, holes, and pits resulting from the removal of existing improvements shall be filled with earth. The material shall be placed in the same manner and compacted to approximately the same density as that required in adjoining areas.

3.7 Removing and disposing of abandoned fences will be considered as included in final cleanup of the right-of-way and no direct payment will be made for such work.

END OF SECTION

STRUCTURAL CAST-IN-PLACE CONCRETE FORMING 03 11 13

1. GENERAL

1.1 Description: The work of this section consists of furnishing all materials, labor, tools and equipment necessary to construct all required form work to the lines and grades shown on the plans.

2. MATERIALS

2.1 All forms for exposed surfaces shall be built of sound plywood or other materials approved by the Engineer, closely fitted to provide the best surface possible without special lining.

2.2 Forms for surfaces not exposed may be built of sound lumber free from loose knots.

2.3 Form accessories to be partially or wholly embedded in the concrete, such as ties and hangers, shall be commercially manufactured type. The portion remaining within the concrete shall leave no metal within one inch of any surface which will be exposed to view.

3. EXECUTION

3.1 Forms: Forms shall conform to the shape, lines and dimensions of the concrete as shown on the Plans. Forms shall be provided for all vertical surfaces. The materials, design, and construction of formwork shall conform to the applicable portions of the American Concrete Institute Standard "Recommended Practice for Concrete Formwork" (ACI 347) and to these specifications.

3.2 Design: The design of the formwork shall be the responsibility of the Contractor.

3.3 Construction: Forms shall be built true to line and shall be mortar-tight and sufficiently rigid to prevent displacement or bulging between supports. Bends, chamfers and other offsets shall be provided when the forms are built. Joints shall be kept to a minimum and all joints shall be solidly backed by framing.

3.4 Preparation of Surfaces: Before forms are placed, material to form exposed surfaces shall be oiled thoroughly, and for unexposed concrete, forms may be oiled at the Contractor's option. All forms not oiled shall be wetted immediately before placing concrete. All formwork shall be cleaned free of dirt and construction debris before placing concrete and points at which water has gathered within the forms due to wetting shall be drained.

3.5 Removal of Forms: Formwork for walls, sides of slabs and other parts not supporting the weight of the concrete may be removed as soon as the concrete has hardened sufficiently to resist damage from removal operations.

3.6 Embedded Items, Opening, and Recesses:

3.6.1 General: All sleeves, inserts, grooves, anchors, recesses, and other items required for adjoining work or for its support shall be placed or formed prior to placing the concrete.

3.6.2 Related Trades: All of the various trades shall be given ample opportunity to furnish for installation all hangers, anchors, inserts, sleeves, frames and other items to be built into the concrete as shown on the Plans or the various manufacturers' drawings or specified herein.

3.6.3 Placing Embedded Items: Expansion joint material, waterstops and all other embedded items shall be positioned accurately and supported securely against displacement before placing concrete.

3.6.4 Formed Holes: Formed holes shall be formed with non-ferrous material which shall be removed after the concrete has hardened.

3.7 Formwork for beams, slabs and other parts that support the weight of concrete and construction live loads shall remain in place until the concrete has reached its specified 28-day strength. Formwork that supports the weight of concrete only, and no construction live loads, or other loads, shall remain in place for not less than seven (7) days or until the concrete has reached 75 percent of its specified 28-day strength. The concrete shall be presumed to have reached its strength when either of the following conditions has been met.

3.7.1 When test cylinders, field cured under the most unfavorable conditions prevailing for any portion of the concrete represented, have reached the required strength. Except for field curing and age at test, the test cylinders shall be taken and tested as specified herein.

3.7.2 When the concrete has been cured as specified herein for the same length of time as the age at test of laboratory-cured cylinders which reached the required strength. The length of time the concrete has been cured in the field shall be determined by the cumulative number of days or fractions thereof, not necessarily consecutive, during which the temperature of air in contact with the concrete is above 50°F, and the concrete has been damp or thoroughly sealed from evaporating and loss of moisture.

3.8 Contractor's Responsibility: In all cases, the Contractor shall be solely responsible for adequate support of the forms to safely carry the load of concrete without undue deflection. The Contractor shall be liable for injury or damage resulting from inadequate forms, false work or from premature removal of same.

END OF SECTION

CONCRETE REINFORCEMENT.....03 20 00

1. GENERAL

1.1 Description: The work of this section consists of furnishing, hauling all reinforcement materials and all tools, labor, equipment and incidentals necessary to complete this section.

2. MATERIALS

2.1 Reinforcing Steel: Reinforcing bars shall conform to the "Standard Specifications for Deformed Billet Steel Bars for Concrete Reinforcement", ASTM A615 or to the "Standard Specifications for Axle-Steel Deformed Bars for Concrete Reinforcement", ASTM A617 and shall be Grade 40, as designated on the plans.

2.2 Welded Wire Fabric: Welded wire fabric shall conform to "Standard Specifications for Welded Steel Wire Fabric for Concrete Reinforcement", ASTM A185.

3. EXECUTION

3.1 General: Unless otherwise indicated on the Plans or specified herein, all cutting and bending of reinforcement bars shall be done at the mill or ship prior to shipment. Cutting and bending in the field will be permitted only where shown on the plans or to correct errors, damage by handling and shipping, and minor omissions in shop bending when authorized by the Resident Project Representative.

3.2 Storing and Cleaning:

3.2.1 All reinforcement shall be stored above ground on skids, pallets or other supports and shall be protected from mechanical injury and from deterioration by exposure.

3.2.2 When placed in the work, reinforcement shall be free from dirt, detrimental scale, concrete, paint, oil or other foreign materials. Tight, thin rust is not considered detrimental and will not require cleaning.

3.3 Placing: Except as shown on the Plans or specified herein, all placement of reinforcing bars, welded wire fabric and bar supports shall conform to the latest editions of "Placing Reinforcing Bars, CRSI-WCRSI Recommended Practices", published by the Concrete Reinforcing Steel Institute. Bars may be moved as necessary to avoid interference with other reinforcing steel, pipes and other embedded items. If bars are moved more than the specified placing tolerances, the resulting arrangement shall be approved by the Resident Project Representative.

3.4 Splices: When splices other than those shown on the plans become necessary, they shall be located at areas of low stress and shall be subject to approval by the Resident Project Representative.

END OF SECTION

CAST-IN-PLACE CONCRETE 03 30 00

1. GENERAL

1.1 Description: The work of this section shall include the furnishing, hauling, placing, curing, and testing of all Portland Cement Concrete required by the Construction Drawings and herein specified.

2. MATERIALS

2.1 Portland Cement: Portland cement shall conform to "Standard Specifications for Portland Cement ASTM C150 Type 1 or Type 1A when specified. One sack of cement shall be considered as one cubic foot of volume or 94 pounds by weight.

2.2 Aggregates: Fine and coarse aggregates shall conform to "Standard Specifications for Concrete Aggregates", ASTM C33. The nominal maximum size of the coarse aggregate shall not be larger than one-fifth of the narrowest dimension between sides of forms, one-third the depth of the labs, nor three-fourths of the minimum clear distance between reinforcing bars or between bars and forms, whichever is least. Coarse aggregate gradation shall conform to ASTM C33 Size 67 for class B.

2.3 Admixtures: Air-entrained admixtures shall conform to "Standard Specifications for Air Entraining Admixtures for Concrete", ASTM C260. The Contractor shall submit a manufacturer's certification and guarantee to the Engineer showing the brand name and designation, the composition or description of the air-entraining agent shall conform to the requirements of these specifications. Water-reducing, retarding, or accelerating admixtures, permitted by the Resident Project Representative, shall conform to "Standard Specifications for Chemical Admixtures for Concrete", ASTM 494. The use of calcium chloride in concrete mixtures will not be permitted.

2.4 Mixing Water: Mixing water for concrete shall be fresh, clean and potable. Non-potable water may be used only if it produces mortar cubes having 7- and 28- day strengths equal to the strength of similar specimens made with distilled water, when tested in accordance with "Method of Test for Compressive Strength of Hydraulic Cement Mortars", ASTM C109.

2.5 Water Stops:

2.5.1 Water stops shall be provided for construction joints where noted on the Plans. Water stops shall be manufactured in accordance with ASTM D471 and shall be made of thermoplastic elastomeric rubber, specifically designed for aggressive chemicals including liquid nitrogen.

2.5.2 The thermoplastic elastomeric rubber water stops shall be WBSTEC, Style #618 or #637 water stops, as manufactured by WESTEC Barrier Technologies, or approved equal

2.6 Curing Compounds: All curing compounds shall conform to specifications for liquid membrane forming compounds for curing concrete ASTM C309 for Type 1-D clear or translucent with fugitive dye or Type 2 white pigmented and shall be applied in accordance with manufacturer's recommendations.

2.7 Reinforcement: Reinforcing steel shall conform with Section 03 20 00 – CONCRETE REINFORCEMENT.

3. PROPORTIONING CONCRETE

3.1 General: Proportions of aggregate to cement and water shall be such to provide a concrete mix which will work readily into comers and angles for forms and around reinforcement and other embedded items without causing segregation of materials.

3.2 Proportioning Ingredients: All ingredients shall be proportioned in order to obtain the following:

Class Of Concrete	Type Of Concrete	Min. 28-Day Com. Strength	Water –Cement Ratio (Maximum)	Maximum Slump (Inches)
B-1	Structural	3,500 psi	5.25 gal/sack	4

Air Entrainment
4% to 7% by volume of air-entrainment for all classes of concrete.

3.2.1 In no case shall the amount of fine aggregate be more than the amount of coarse aggregate (measured by weight) nor shall the amount of coarse aggregate be such as to produce honeycombing.

3.2.2 Portland cement concrete shall be proportioned and placed to provide an average compressive strength sufficiently high to minimize the number of compressive strength tests falling below the specified compressive strength for the concrete structure. Portions of concrete ingredients, including water-cement ratios, shall be established on the basis of laboratory trial batches to provide conformance with compressive strength requirements, workability, and consistency. When different materials are used for difference portions of the project, each combination shall be evaluated separately. Strength tests shall be conducted on test specimens in accordance with ASTM C39 and ASTM C192, from the trial batches using different water-cement ratios. Tabular data showing the compressive strength of the concrete proportions with various water-cement ratios shall be provided to the Engineer prior to placing of concrete on the jobsite.

3.2.3 Concrete shall be provided to develop a minimum 28-day compressive strength for field cured cylinders for each class of concrete indicated. Concrete that, after curing, will be subjected to freezing temperatures while wet shall contain entrained air from 4.0 to 7.0 percent by volume. Concrete that is intended to be water-tight shall have a maximum water-cement ratio of 0.48 by weight.

3.3 Moisture: Moisture in the aggregate shall be measured and the quantity must be included in the water-cement ration specified above.

3.4 Air-Entrainment: Air-entrainment shall be accomplished by the use of Type 1 Portland Cement with the addition of an approved air-entrainment admixture or by the use of Type 1A Portland Cement, as specified herein.

3.5 Trial Batches: Full sized trial batches shall be made in the laboratory using the aggregates selected for the job to establish the correct proportions to give proper workability, strength, and texture with the water-cement ratio specified. The combinations of fine and coarse aggregates shall be adjusted within limits specified in ASTM C33 until the mix meets approval of the Engineer.

3.6 Water-Reducing, Retarding & Accelerating Admixtures: Such admixtures may be used when such use is requested by the Contractor subject to review and approval by the Engineer. For certain uses the Engineer reserves the right to require the use of a retardant or other admixtures for specific uses such as a retardant in extensive wall pours to assure elimination of cold joints or for other such purposes. No additional compensation will be allowed when such admixtures are used either at the Contractor's request or at the request of the Engineer. However, when certain such admixtures are used, it will be allowable to reduce the cement content of the mix to a minimum of 5.5 bags of cement per cubic yard of concrete subject to the following conditions: A trial batch and test cylinders taken therefrom demonstrate that the mix will meet the strength, workability, slump and durability requirements of the specified mix previously herein stated. The strength shall be determined from seven-day test cylinders from a trial batch utilizing the admixture and made using the aggregates selected from the job, to establish the correct proportions to give proper workability with the water-cement ratio specified. The combination of fine and coarse aggregates shall be adjusted within limits specified to equal 95 percent of the specified minimum 28-day strength.

4. MIXING CONCRETE

4.1 Ready-Mixed Concrete: Ready-mixed concrete will be permitted provided it conforms to the "Standard Specification for Ready-Mixed Concrete", ASTM C94 and to the applicable portions of these Specifications. The Contractor shall make all arrangements to satisfy the Engineer that materials used comply with specification requirements.

4.1.1 The Engineer shall have free access to the mixing plant at all times when work is performed for this project for sampling and testing materials. Such privilege shall not relieve the Contractor of his responsibility for compliance with contract requirements.

4.2 Batch Mixing at Site:

4.2.1 The concrete shall be mixed in a batch mixer, conforming to the requirements of the Mixer Manufacturer's Bureau of the Associated General Contractors of America. The mixer shall bear a manufacturer's rating plate indicating the rated capacity and the recommended revolution per minute and shall be operated in accordance with these recommendations. It shall be equipped with a suitable charging hopper, water storage tank, and a water measuring device and shall be capable of thoroughly mixing aggregates, cement and water into a uniform mass within the specified mixing time and discharging the mix without segregation.

4.2.2 The batch shall be so charged into the mixer that some water will enter in advance of the cement and aggregates. Water shall continue to flow for a period which may extend to the end of the first 25 percent of the specified mixing time. Controls shall be provided to ensure that the batch cannot be discharged until the required mixing time has elapsed. Controls shall be provided to ensure that no additional water may be added during mixing. The entire batch shall be discharged before the mixer is recharged.

4.2.3 Each batch of two cubic yards or less shall be mixed for not less than 1-1/2 minutes. The minimum mixing time shall be increased 15 seconds for each additional cubic yard or fraction thereof.

4.3 The mixer shall be clean, and the pick-up and throw-over blades shall be replaced when they have lost 10 percent of their original depth.

4.4 Admixtures:

4.4.1 Air-entraining and chemical admixtures shall be charged into the mixer as a solution and shall be dispensed by an automatic dispenser or similar metering device. Powered admixtures shall be weighted or measured by an admixture shall be with +/-three percent.

4.4.2 Two or more admixtures may be used in the same concrete, provided such admixtures are added separately during the hatching sequence and provided further that the admixtures used in that combination retain full efficiency and have no deleterious effect on the concrete or on the properties of each other.

4.4.3 Addition of retarding admixtures shall not be significantly delayed after the addition of the cement.

4.5 Retempering: Concrete shall be mixed only in quantities for immediate use. Concrete which has set shall not be retempered but shall be discarded.

4.6 Indiscriminate addition of water to increase slump or workability shall be prohibited. When concrete arrives at the project with slump below that suitable for placing, water may be added only if neither the maximum permissible water-cement ratio nor the maximum slump is exceeded. The water must be incorporated by additional mixing equal to at least half of the total mixing required. Any addition of water above that pem1itted by the limitation on water-cement ration must be accompanied by a quantity of cement sufficient to maintain the proper water-cement ration. Such addition must be approved by the Engineer.

4.7 Weather Conditions:

4.7.1 Cold Weather: To maintain the temperature of the concrete above the minimum placing temperature required herein, the as-mixed temperature shall not be less than 55°F when the mean temperature falls below 40°F.

4.7.2 If the water or aggregate has been heated, the water shall be combined with the aggregate in the mixer before cement is added. Cement shall not be added to the mixtures of water and aggregate when the temperature of the mixture is greater than 100°F.

4.7.3 Hot Weather: The ingredients shall be cooled before mixing if necessary to maintain the temperature of the concrete below the maximum placing temperature required herein.

5. CONCRETE PLACEMENT

5.1 Preparation Before Placing: Hardened concrete and foreign materials shall be removed from the inner surfaces of the conveying equipment.

5.2 Formwork shall be completed; reinforcement shall be secured in place; expansion joint material, waterstops, anchors, pipe sleeves, and other embedded items shall be positioned; and the entire preparation shall be approved by the Resident Project Representative before any concrete is placed. Subgrades shall be sprinkled sufficiently to eliminate absorption of water from the concrete before any concrete is placed.

5.3 Conveying: Concrete shall be handles from the mixer to the place of final deposit as rapidly as practicable by methods which will prevent separation or loss of ingredients and is a manner which will assure that the required quality of the concrete is obtained.

5.4 Conveying equipment shall be of size and design to ensure a continuous flow of concrete at the delivery end and shall be approved by the Resident Project Representative. Conveying equipment and operations shall conform to the following requirements:

5.4.1 Truck mixers, agitators, and non-agitating units and their manner of operation shall conform to the applicable requirements of "Specifications for Ready-Mixed Concrete", ASTM C94.

5.4.2 Belt conveyors shall be horizontal or at a slope which will not cause segregation or loss. An approved arrangement shall be used at the discharge end to prevent separation. Long runs shall be discharged without separation into a hopper.

5.4.3 Chutes shall be metal or metal-lined and shall have a slope not exceeding 1 vertical to 2 horizontal and not less than 1 vertical to 3 horizontal. Chutes more than 20 feet long and chutes not meeting the slope requirements may be used provided they discharge into a hopper before distribution.

5.4.4 Pumping or pneumatic conveying equipment shall be without "Y" sections, and with adequate pumping capacity. The equipment shall be cleaned at the end of each operation. Pneumatic placement shall be controlled so that separation is not apparent in the discharged concrete. The maximum loss of slump in pumping or pneumatic conveying equipment shall be 1 inch.

5.5 Depositing: Concrete shall be deposited continuously or in layers of such thickness that no concrete will be deposited on concrete which has hardened sufficiently to cause the formation of seams or plans of weakness within the section. If a section cannot be placed continuously, construction joints shall be located at points as provided for in the drawings or as approved by the Resident Project Representative. Placing shall be carried on at such a rate that the concrete which is being integrated with fresh concrete is still plastic. Concrete which has partially hardened or has been contaminated by foreign materials shall not be deposited. Temporary spreaders in forms shall be removed when the concrete placing has reached an elevation rendering their service unnecessary. They may remain embedded in the concrete only if made of metal or concrete and if prior approval has been obtained.

5.5.1 Placing of concrete in supported elements shall not be started until the concrete previously placed in columns and walls is no longer plastic.

5.5.2 Concrete shall be deposited as nearly as practicable in its final position to avoid segregation due to flowing or rehandling and shall drop vertically into the center of the forms. In no case shall concrete be allowed to fall more than five feet or at other times when required by the Resident Project Representative drop chutes or other approved devices shall be used.

5.6 Where surface mortar is to be the basis of the finish, the coarse aggregate shall be worked back from the forms with a

suitable tool so as to bring a full surface of mortar against the form without the formation of excessive surface voids. All concrete shall be consolidated by vibration, spading, rodding or forking so that the concrete is thoroughly worked around the reinforcement, around embedded items, and into corners of forms, eliminating all air or stone pockets which may cause honeycombing, pitting or plans of weakness. Mechanical vibrators shall have a minimum frequency of 7,000 revolutions per minute and shall be operated by competent workmen. Over vibrating and use of vibrators to transport concrete within forms shall not be allowed. Vibrators shall be inserted and withdrawn at many points, from 18 to 30 inches apart. At each insertion the duration shall be sufficient to consolidate the concrete but not sufficient to cause segregation, generally from 5 to 15 seconds duration. A spare vibrator shall be kept on the job site during all concrete placing operation.

5.7 Weather Conditions:

5.7.1 Unless adequate protection is provided and approved by the Engineer, concrete shall not be placed in rain, sleet, or snow. Rainwater shall not be allowed to increase the mixing water nor to damage the surface finish.

5.7.2 When the mean daily temperature falls below 40°F., the minimum temperature of concrete as placed shall be 50°F.

5.7.3 Concrete deposited in hot weather shall have a placing temperature which will not cause difficulty from loss of slump, flash set or cold joints (usually somewhat less than 90°F.).

5.8 Concreting Under Water: No concrete shall be placed under water without the approval of the Engineer.

6. JOINTS

6.1 Construction Joints: Construction joints shown on the plans are recommended and any deviation from these shall be approved by the Engineer. When joints not shown on the plans are required, they shall be placed so as to least impair the strength of the structure.

6.1.1 All reinforcing bars and welded wire fabric shall continue across construction joints. Construction joints shall conform to the details shown on the plans and shall be keyed as shown. Construction joints shall be thoroughly wetted and coated with a mixture of 1:2 mortar immediately before the new concrete is placed.

6.1.2 The surface of the concrete at all joints shall be thoroughly cleaned and all laitance shall be removed. Immediately before placing fresh concrete, the surface of the existing concrete at the joint shall be dampened but not saturated. The edges of all joints which are exposed to view shall be carefully finished true to line and elevation.

6.2 Expansion Joints:

6.2.1 Reinforcement or other embedded metal items bonded to the concrete shall not be permitted to extend through any expansion joint.

6.2.2 Premolded expansion joint filler shall be of the size shown on the plans and shall conform to "Specifications for Preformed Expansion Joint Filler for Concrete (Standard Cork, Type II)", ASTM. The joint shall be sealed as specified below.

6.3 Water Stops: Each piece of thermoplastic elastomeric rubber waterstop shall be of maximum practicable length in order that the number of splices be held to a minimum. Joints at intersections and at ends of pieces shall be made according to the manufacturer's recommendations and shall develop watertightness fully equal to that of the continuous waterstop material. Care shall be taken during installation of the waterstops so that no leakage will occur across the joint.

6.4 Joint Sealer:

6.4.1 Horizontal joints shall be sealed with a two-part, cold-applied methane joint sealant. Sealant shall be self-leveling and shall conform to Federal Specification TT-S-00227E, Type I, Class A. Joint sealant shall be SEALTIGHT POURTHANE as manufactured by W.R. Meadows, Inc., or approved equal.

6.4.2 Vertical joints shall be sealed with a two-component, gun-grade, non-sag urethane joint sealant. Sealant shall conform to Federal Specification TT-S-00227E, Type IT, Class A. Joint sealant shall be SEALTIGHT Dualthane, as manufactured by W.R. Meadows, Inc., or approved equal.

7. FINISHES

7.1 General: After removal of forms the concrete shall be given one or more of the finishes specified herein.

7.2 All necessary patching shall have been done immediately after forms have been removed and rubbing shall be completed not later than the following day. Surfaces shall be wetted and rubbed with carborundum brick or other abrasive until a uniform color and texture are produced. No cement grout or slush shall be used other than the cement paste drawn from the green concrete itself during the rubbing process.

7.3 Related Uniformed Surfaces: Tops of walls and similar unformed surfaces occurring adjacent to formed surfaces shall be struck smooth after concrete is placed and shall be floated to a texture reasonably consistent with that of the formed surfaces. Final treatment on formed surfaces shall continue uniformly across the unformed surfaces.

7.4 Sidewalk slabs shall be given a coarse transverse scored texture by drawing a broom or burlap belt across the surface. This operation shall follow immediately after floating.

8. PATCHING

8.1 General: All tie holes and all repairable defective areas shall be patched immediately after form removal.

8.2 Defective Areas: All honeycombed and other defective concrete shall be removed down to sound concrete. The area to be patched and an area at least six inches wide surrounding it shall be dampened to prevent absorption of water from the patching mortar. A bonding grout shall be prepared using a mix of approximately one-part cement to one-part fine sand passing a No. 30 mesh sieve, shall be mixed to the consistency of thick cream and shall then be well brushed into the surface.

8.3 The patching mixture shall be made of the same material and of approximately the same proportions as used for the concrete, except that the coarse aggregate shall be omitted and the mortar shall consist of not more than one-part cement to 1-1/2 parts sand by damp loose volume. White portland cement shall be substituted for a part of the gray portland cement on exposed concrete in order to produce a color matching the color of the surrounding concrete as determined by a trial patch.

8.4 The quantity of mixing water shall be no more than necessary for handling and placing. Patching mortar shall be mixed in advance & allowed to stand with frequent manipulation with a trowel without addition of water until it has reached the stiffest consistency that permits placing.

8.5 After surface water has evaporated from the area to be patched, the bond coat shall be well brushed into the surface. When the bond coat begins to lose the water sheen, the premixed patching mortar shall be applied. The mortar shall be thoroughly consolidated into place and struck off so as to leave the patch slightly higher than the surrounding surface. To permit initial shrinkage, it shall be left undisturbed for at least one hour before being finally finished. The patched area shall be kept damp for seven days. Metal tools shall not be used in finishing a patch in a formed wall which will be exposed.

8.6 Tie Holes: After being cleaned and thoroughly dampened, the tie holes shall be filled solid with patching mortar.

8.7 Proprietary Materials: If desired by the Contractor, proprietary compound for adhesion or as patching ingredients may be used in lieu of or in addition to the foregoing patching procedures. Such compounds shall be used in accordance with the manufacturer's recommendations and shall be Standard Dry Wall products or approved equal.

9. CURING AND PROTECTION

9.1 General: Exposed surfaces of concrete shall be protected from premature drying and excessively hot or cold temperatures for the period of time necessary for the hydration of the cement and proper hardening of the concrete.

9.2 Curing: Initial curing shall immediately follow the finishing operation. Concrete shall be kept continuously moist at least for 24 hours by one of the following materials or methods:

9.2.1 Ponding or continuously sprinkling.

9.2.2 Absorptive mat or fabric kept continuously wet.

9.2.3 Sand or other covering kept continuously wet. Whichever of the above materials or methods is chosen shall be approved by the Engineer.

9.3 Immediately following the initial curing and before the concrete has dried, final curing shall be accomplished by one of the following materials or methods:

9.3.1 Continuation of method used for initial curing.

9.3.2 Waterproof paper conforming to "Specifications for Waterproof Paper for Curing Concrete", ASTM C171.

9.3.3 Other moisture retaining coverings as approved by the Engineer.

9.4 The final curing shall continue for a cumulative number of seven days, not necessarily consecutive, during which the temperature of air in contact with the concrete is above 50°F. If high-early-strength cement has been used, the final curing shall continue for a total of three days. When the mean daily temperature of the atmosphere is less than 40°F, the temperature of the concrete shall be maintained between 50°F and 70°F for the required curing period. When necessary, arrangements for heating, covering, insulating or housing the concrete work shall be made in advance of placement and, shall be adequate to maintain the required temperature and moisture conditions without injury due to concentration of heat or carbon dioxide build up.

9.5 During hot weather, arrangements for installation of windbreaks, shading, spraying, sprinkling, ponding or wet covering shall be made in advance of placement and such protective measures shall be taken as quickly as concrete hardening and finishing operations will allow.

9.6 Changes in temperature of the concrete shall be as uniform as possible and shall not exceed 5°F in any one hour or 50°F in any 24-hour period.

9.7 Protection From Mechanical Injury: During curing the concrete shall be protected from damaging mechanical disturbance, heavy shock or excessive vibration. All finished surfaces shall be protected from damage caused by construction equipment, materials or methods and rain or running water.

9.8 Temperature & Shrinkage Cracks: Temperature and shrinkage cracks which develop prior to the final acceptance of the plant by the Owner shall be repaired and waterproofed as specified herein and other applicable parts of the Specifications.

10. TESTING

10.1 General: The Contractor shall keep a log identifying the exact locations of poured concrete represented by each test cylinder and shall furnish two copies of the test reports and logs to the Engineer as they become available.

10.2 All strength tests shall be performed by a reputable testing laboratory hired by the Contractor at his expense and approved by the Engineer. The costs of performing all strength tests as specified herein shall be borne by the Contractor and no extra compensation will be allowed.

10.3 Slump Tests: Slump tests will be performed when requested by the Resident Project Representative and shall conform to "Standard Method of Test for Slump of Portland Cement Concrete", ASTM C143.

10.4 Strength Tests: Test cylinders shall be taken by the Contractor as directed by the Resident Project Representative and shall be cured and tested in accordance with the "Standard Method of Making and Curing Concrete Compressive and Flexural Strength Test Specimens in the Field", ASTM C31. Not less than three specimens shall be made for each 20 cubic yards of concrete or fraction thereof in each day's pour, except that in no case shall a given mix design be represented by less than five tests. In the event that three test cylinders are not considered sufficient to represent the work done, the Engineer may direct that extra cylinders be made. The standard age of test shall be 28 days, but 7-day tests and 14-day tests may be used provided that the relation between the 7-day, 14-day, and 28-day strengths of the concrete is established in advance by test for the materials and proportions used and approved by the Engineer. If the Contractor desires, extra cylinders may be made and tested for the purpose of indicating sufficient concrete strength for form removal or other purposes. If the average of the strengths of the test cylinders fail to obtain the specified strength so as to justify doubt as to the quality of the concrete, further tests shall be made at the Contractor's expense, of the concrete in place to determine its fitness to remain in the structure. These tests shall be performed in accordance with the "Standard Method of Obtaining and Testing Drilled Cores and Sawed Beams of Concrete", ASTM C42. The strength level of the concrete will be considered acceptable if the average of three, 28-day test strength results equal or exceed the specified compressive strength and no individual tests fall below the specified compressive strength by more than 200 psi.

10.5 Air Content Tests: Air content tests may be requested by the Resident Project Representative at his discretion and shall conform to the "Standard Method of Test for Air Content of Freshly Mixed Concrete by the Volumetric Method", ASTM C173 or the "Standard Method of Test for Air Content of Freshly Mixed Concrete by the Pressure Method", ASTM C231. The Contractor shall provide all necessary equipment, materials, sampling, and testing.

11. CONCRETE CURB AND GUTTER

11.1 Concrete curb and gutter shall be poured on a base of aggregate, contiguous with the base for street paving. Forms shall be metal or sound, dressed lumber, straight, free from warp, of sufficient strength to resist springing during construction, and of a height equal to the full depth of the item to be constructed. The forms shall be thoroughly cleaned, well oiled, securely staked, braced, and held to the required line and grade. A template shall be used to achieve the proper curb and gutter cross section.

11.1.1 In lieu of the forming requirements specified in Paragraph 11.1, slip form methods may be used for placement of concrete curb, concrete gutter, curb and gutter, and paved ditch providing proper line, grades, and typical sections are maintained.

11.2 Required reinforcement and tie bars shall be held in the designated position during the placing of concrete by bar chairs or other approved devices. Joints shall be constructed at intervals and locations shown on the plans or as directed by the Engineer.

11.3 Concrete shall be placed on the prepared and sprinkled subgrade, compacted and struck off to the required thickness. Concrete shall be tamped or vibrated sufficiently to eliminate all voids and to bring mortar to the top, after which the surface shall be finished smooth and even. All edges shall be rounded with an edging tool. Faces of curbs shall be rounded at the top and bottom, by means of an approved tool, to the radius shown. All curb and gutter will be given a light broom finish and shall be sprayed with a liquid membrane-forming compound or as specified by the Engineer.

11.4 After the concrete has set sufficiently, the forms shall be removed, and where necessary, the contractor shall backfill adjacent to the concrete with suitable material, compacted and finished in a satisfactory manner.

11.5 Crack Control Joints: When the concrete curb and gutter has cured sufficiently to allow saw cuts to be made without raveling, the Contractor shall saw crack control joints. These shall be cut at intervals of 20 feet, or as directed by the Engineer. Sawing of the joints shall be considered as a part of the curb and gutter construction with no extra compensation provided. All sawed joints shall be sealed as specified above.

12. CONCRETE SIDEWALK

12.1 Concrete sidewalk shall be poured on an aggregate base.

12.2 Required reinforcement and tie bars shall be held in the designated position during the placing of concrete by bar chairs or other approved devices. Expansion joints shall be constructed at intervals and locations shown on the plans or as directed by the Engineer.

12.3 Concrete shall be placed on the prepared and sprinkled base, compacted and struck off to the required thickness. Concrete shall be tamped or vibrated sufficiently to eliminate all voids and to bring mortar to the top, after which the surface shall be finished smooth and even. All edges shall be rounded with an edging tool. Crack control joints shall be placed with a joint tool at intervals of not more than 4-feet. Concrete sidewalks shall be given a light broom finish and shall be sprayed with a liquid membrane-forming compound or as specified by the Engineer.

12.4 After the concrete has set sufficiently, the forms shall be removed, and where necessary, the Contractor shall backfill adjacent to the concrete with suitable material, compacted and finished in a satisfactory manner. AU joints shall be filled with as specified above.

13. GROUT

13.1 General: This item includes furnishing, placing and finishing the grout at various locations as required.

13.2 Materials: Materials are specified herein.

13.3 Proportioning & Mixing: Grout shall consist of a mixture of 1 part Portland cement and 2 parts fine aggregate with a slump of three inches to five inches. The water-cement ratio shall be maintained at not more than 4 gallons per bag of cement. The ingredients shall be mixed in accordance with the applicable portions of this Specification so as to produce a uniform mass of material.

13.4 Placing: Before placing grout, the concrete shall be thoroughly cleaned of all dust, dirt or other deleterious material and then shall be thoroughly wetted. Grout shall be placed in one continuous operation to the thickness shown on the plans with no construction joints allowed.

13.5 After the grout is placed, it shall be given a floated finish as specified in this Specification and shall be cured as specified under Section 9 of this Specification.

END OF SECTION

CONCRETE ADMIXTURES 03 31 00

1. GENERAL

1.1 Description: The work of this section consists of furnishing and using materials and procedures for air entrainment of and/or addition of chemical admixtures to concrete.

2. MATERIALS

2.1 Air-Entrainment Admixtures: Air-entrainment shall be accomplished by the use of Type 1 Portland cement with the addition of an approved air-entrainment admixture or by the use of Type 1A Portland cement. Air-entrainment admixtures shall conform to "Standard Specifications for Air-Entraining Admixtures for Concrete", ASTM C260, latest revision.

2.2 Water Reducing, Retarding, and Accelerating Admixtures: Water reducing, retarding, or accelerating admixtures, if' permitted by the Owner, shall conform to "Standard Specifications for Chemical Admixtures for Concrete", ASTM C494, latest revision.

2.3 Fly Ash: Fly ash may be allowed as an admixture to the concrete mix provided the following requirements are satisfactorily addressed.

2.3.1 Its use is in strict accordance with ASTM C618, latest revision.

2.3.2 Fly ash shall be sampled and tested in accordance with ASTM C311, latest revision.

2.3.3 Prior to being approved for use, fly ash shall be tested in combination with the cement and aggregates proposed for use to ascertain its suitability with regard to water requirements, strength development, shrinkage, heat of hydration, and durability.

3. EXECUTION

3.1 Water Reducing, Retarding, and Accelerating Admixtures: Such admixtures may be used when such use is requested by the Contractor subject to review and approval by the Owner. For certain uses, the Owner reserves the right to require the use of a retardant or other admixtures for specific uses such as a retardant in extensive wall pours to assure elimination of cold joints or for other such purposes. No additional compensation will be allowed when such admixtures are used. However, when certain such admixtures are used, it will be allowable to reduce the cement content of the mix to a minimum of 5 bags of cement per cubic yard of concrete, subject to the following conditions: A trial batch and test cylinders taken therefrom demonstrate that the mix will meet the strength, workability, slump, and durability requirements of the specified mix previously herein stated. The strength shall be determined from seven-day test cylinders from a trial batch utilizing the admixture and made using the aggregates selected for the job, to establish the correct proportions to give proper· workability with the water-cement ratio specified. The seven-day test strength shall equal 95 percent of the specified minimum 28-day strength.

3.2 Air-entraining and chemical admixtures shall be charged into the mixer as a solution and shall be dispensed by an automatic dispenser or similar metering device. Powdered admixtures shall be weighed or measured by volume as recommended by the manufacturer. The accuracy of measurement by any admixture shall be within ± three percent.

3.3 Two or more admixtures may be used in the same concrete, provided such admixtures are added separately during the batching sequence and provided further that the admixtures used in that combination retain full efficiency and have no deleterious effect on the concrete or on the properties of each other. The addition of retarding admixtures shall not be significantly delayed after the addition of the cement.

3.4 The addition of calcium chloride to the mix will not be allowed

END OF SECTION

AGGREGATES FOR EARTHWORK 31 05 16

1. GENERAL

1.1 Description: The work in this section shall consist of furnishing, hauling, placing, and compacting granular stone for bedding underground utility piping, and for granular stone backfill under pavement and at other locations shown on the drawings.

2. MATERIALS

2.1 Pipe Bedding: Embedment for pipe in ordinary trench conditions with or without high groundwater and with or without a hydraulic gradient shall be ASTM C33 dense graded, clean, manufactured, and processed aggregates described as angular crushed stone, crushed rock, or crushed gravel and crushed stone/sand mixtures containing little or no fines with gradations selected to minimize migration of adjacent soils. Aggregates must be compacted to 85% standard proctor density and tested to ensure proper compaction. Sieve requirements for aggregates for various pipe materials of nominal diameters are shown below.

2.2 Embedment for pipe in ordinary trench conditions without high groundwater and without a hydraulic gradient shall be ASTM C33, clean, manufactured aggregates described as angular crushed stone, crushed rock or crushed gravel with large void content containing little or no fines. Aggregates must be compacted. Sieve requirements for aggregates for various nominal pipe diameters are shown below.

Nominal pipe diameter (inches)	Pipe Material	Amounts Finer Than Each Laboratory Sieve (Square Openings) Mass Percent					
		Sieve Size					
	D.I. or Plastic	1 Inch (37.5 mm)	3/4 Inch (19 mm)	1/2 Inch (12.5m)	3/8 Inch (9.75mm)	No.4 (4.7 mm)	No.200 (0.075 mm)
4	D.I.			100%	90%	<10%	<5%
6	D.I.		100%	90%		<10%	<5%
8	D.I.		100%			<10%	<5%
10 & >	D.I.	100%	90%			<10%	<5%

D.I. ~ Ductile Iron

2.3 High strength embedment (steel reinforced concrete low cradle, steel reinforced concrete high cradle, steel reinforced concrete encasement, or steel reinforced concrete arch) shall be used for problem soil conditions, near karst features including caves and sink holes.

2.4 Pipe Backfill: When granular stone backfill is required, the aggregate shall be identical to the pipe bedding material.

3. EXECUTION

3.1 Pipe Bedding: Granular stone shall be placed in the trench and shaped so as to provide uniform support for the bottom quadrant of the pipe barrel. The bedding shall be not less than six (6) inches in thickness. Following the placement of the pipe, the trench shall be filled with granular stone bedding material to a minimum compacted depth of six (6) inches above the pipe bell. Bedding installation in trench shall be to the widths and depths as shown on the drawings.

3.2 Pipe Backfill: When granular stone backfill is required, it shall be of the specified graduation and shall be placed in the trench in maximum 24-inch-thick layers and compacted to 80% of maximum density.

END OF SECTION

*Revised April 2025.

CLEARING AND GRUBBING 31 11 00

1. GENERAL

1.1 Description: The work in this section consists of furnishing all labor, materials, equipment, and tools necessary for performing all operations for the proper execution of all clearing and grubbing within the construction areas shown on the drawings and as necessary to complete this section.

1.2 Limits: Unless noted otherwise on the drawings, clearing and grubbing shall be performed within the limits of the "Permanent Easement" as shown on the drawings. Incidental clearing and grubbing shall be performed as necessary within the limits of the "Construction Easement" as shown on the drawings.

2. MATERIALS

2.1 None.

3. EXECUTION

3.1 Clearing:

3.1.1 Clearing shall consist of clearing the surface of the ground in the designated areas of all trees, stumps, roots, down timber, logs, snags, brush, undergrowth, hedges, heavy growth of grass or weeds, fences, structures, foundations, debris and rubbish of any nature.

3.1.2 Trees, stumps, roots, brush, and other vegetation in the areas to be cleared shall be cut below the original ground surface.

3.1.3 Trees and vegetation designated in the field by the Owner to remain standing shall be protected from any damage incidental to the clearing, grubbing, and construction operations.

3.2 Grubbing:

3.2.1 Grubbing shall consist of the removal and disposal of stumps, roots larger than two (2) inches in diameter, and matted roots from the areas designated to be grubbed. This material shall be removed to a depth of no less than twelve (12) inches below the original surface of the elevation.

3.2.2 Depressions created by grubbing operations shall be filled with suitable material and compacted.

3.3 Disposal of Materials:

3.3.1 All cleared and grubbed material including trees, stumps, roots, vegetation, organic material, rubbish, and otherwise shall be removed from the project site and disposed of in accordance with federal, state, and local laws.

3.3.2 Limited burning of debris on the site will be permitted if allowed by local, state, and federal law. Any ashes and/or debris left as a result of burning shall be removed from the site and taken to a landfill.

END OF SECTION

FINISH GRADING 31 22 19

1. GENERAL

1.1 Description: The work of this section consists of bringing to finish grade all areas on the site and furnishing all labor, materials, tools, and equipment necessary to complete this section.

2. EXECUTION

2.1 The Contractor shall grade the earth as indicated on the drawings.

2.2 In those areas noted on the drawings to receive seeding and mulching, the top six inches of all excavated areas shall consist of topsoil. Topsoil shall not be placed until the area has been shaped, trimmed, and smoothed, and, if the existing surface has become hardened or crusted, it shall be disked or raked so as to provide a bond with the layer of topsoil. The surface of the topsoil shall be free from lumps, clods, rocks, and shall conform to the lines and grades shown on the drawings.

2.3 Areas within the construction limits, regardless of whether or not they are to be seeded and mulched, shall be graded smooth and left with a neat and sightly appearance. The final grade around all structures shall be pitched to drain water away from the structures, and toward the roadside ditches, and natural drainageways. The finished grade shall be free of any and all projections which could interfere with mowing of the site.

END OF SECTION

EXPLOSIVES.....31 23 16.26

1. GENERAL

1.1 Description: The work in this section consists of undertaking all phases of work which relate to explosives and blasting, including, but not necessarily limited to, receiving, handling, transporting, storing, distributing, priming, loading, firing, and disposal of explosives. The Contractor shall exercise the utmost care at all times so as not to endanger life or property.

1.2 Legal Requirement: The Contractor shall comply with all applicable Federal, State and local laws and regulations pertaining to the use, storage, and handling of explosives, and shall secure all required permits for their use. It is the intent of these specifications to comply with all such laws and regulations. In the event of inconsistencies between these specifications and the laws and regulations, the laws and regulations take precedence.

1.3 Personnel: One competent, experienced person shall be specifically designated as being in charge of explosives at all times. The designated person shall be required to present certification to the Owner that he has successfully completed a course in the handling and use of explosives, given by an accredited institution such as the U.S. Bureau of Mines, DuPont, or other explosive manufacturing company. They shall exercise careful supervision of all work related to the use, storage, and handling of explosives. Only an absolute minimum number of competent, experienced employees, consistent with efficient operation, shall be permitted to handle explosives. Anyone exhibiting carelessness, incompetence, or inexperience shall be immediately excluded from further handling explosives.

2. EXECUTION

2.1 Protection Of Site: The Contractor shall make proper use of blasting mats and other protective devise and shall adopt whatever additional precautions are deemed necessary to prevent damage to trees, shrubs and other landscape features, as well as, to buildings, utilities, monuments, and other structures. All materials lifted by the blasting shall be confined within the limits of the trench or other excavation. Every reasonable effort shall be made to prevent injury to life and damage to the natural and the constructed surroundings. The Contractor shall take special precautions to prevent damage to surface structures, water supply mains, sewers, storm drains, and other buried structures. In the event that damage does occur the Contractor shall be responsible for restoring the damaged property to a condition at least as good as before the damage was incurred or shall make a damage payment to the Owner equal to the cost of restoration.

2.2 General Requirements: The Contractor shall at all times be bound by the National Fire Protection Association Code No.495, Code for the Manufacture, Transportation, Storage, and Use of Explosives and Blasting Agents (latest edition), except when this code is in conflict with existing Federal, State, and local laws and regulations. If there is conflict between the code and the laws and regulations, the most stringent requirement among them shall take precedence over the others. Safety rules, safeguards, and recommendations contained in the Manual of Accident Prevention in Construction (latest edition) of the Associated General Contractors of America shall supplement the above codes and existing laws and regulations. The Contractor shall give special attention to the following specific rules:

2.2.1 Magazines shall be located in accordance with the American Table of Distances for Storage of Explosives.

2.2.2 Magazines shall be bulletproof, fireproof, burglarproof, weather-resistant, and constructed with adequate screened ventilation and dry wooden floors. All nails exposed to the interior of magazines shall be well countersunk. Magazines shall be of such physical weight to preclude movement without heavy equipment (frontend loader, etc.). Magazines shall not be provided with artificial heat or lights and shall be kept securely locked.

2.2.3 Detonators shall not be stored with other explosives but shall be stored in separate magazines.

2.2.4 Magazines and roads to them shall be clearly marked with appropriate caution and danger signs arranged to minimize the possibility of a bullet hitting the magazine should the signs be shot at by vandals.

2.2.5 The blast area shall be cleared of all unnecessary personnel and equipment prior to the delivery of any explosives to the site.

2.2.6 No more than one day's supply of explosives shall be kept at or near the work site and these explosives shall be kept in approved portable magazines.

2.2.7 Wooden tamping bars only shall be used for charging explosives into drill holes.

2.2.8 Electricity from light or power circuits shall not be used for firing shots unless the electrical connection to the circuit is made within an enclosed switch box which shall be kept securely locked with switch in open position.

2.2.9 A positive warning system shall be provided to give adequate warning in every direction immediately prior to the firing of explosives. The Contractor shall advise the Owner in advance of any detonating of charges. All access points to the blast area shall be guarded by responsible employees of the Contractor, stationed to halt personnel and vehicles a safe distance from the blast. Intercommunication between guards and the person firing the blast shall be maintained to determine that the danger area is positively clear prior to firing.

2.2.10 The Contractor shall also provide special signs or signals all access points. Signs shall include a warning to tum off radio transmitters whenever electric detonators are used.

2.2.11 A properly sized "Hell Box" shall be used for electrically detonated shots. The use of equipment starting batteries is prohibited.

2.3 Removal of Materials: After a blast is fired, the Contractor shall cause the excavation to be thoroughly scaled and all loose and shattered rock or other loose material which may be dangerous to workers, pipes, or structures shall be removed and the excavation made safe before proceeding with the work. The fact that the removal of loose or shattered rock or other loose material may enlarge the excavation beyond the required limits shall not relieve the Contractor from the necessity for making such removal. All excavated rock which cannot be removed similar to earth shall be kept separate from other excavated materials and shall not be mixed with other backfill material except as directed by the Owner.

2.4 Insurance: An insurance certificate covering blasting shall be furnished to the Owner by the Contractor or subcontractors, before any blasting is performed.

2.5 Seismograph: If any question arises as to the effect of blasting on adjacent utilities, structures, etc., the Contractor shall be responsible for providing a seismograph to record the shock resulting from blasting activities.

END OF SECTION

DEWATERING 31 23 19

1. GENERAL

1.1 Description: The work of this section consists of completing all dewatering work necessary for the initiation and prosecution of elements of work specified elsewhere.

2. EXECUTION

2.1 Workmanship: Maintain all excavations and trenches free from water at all times while construction is in progress using pump. Prevent surface water runoff from collecting in excavations or trenches or running down the faces of excavated cut or fill slopes, causing sloughing or caving, ponding in excavated areas or saturating the soils below foundations of structures by adjusting grades to provide temporary drainage facilities. The Contractor shall furnish and operate sufficient pumps and appliances, and provide all materials, labor, etc., required to prevent interference with any work by water, ice or snow. Damage of any kind resulting from insufficient pumping facilities or similar lack of proper conduct of the work shall be made good by the Contractor at their own expense. No structure or pipes shall be laid in water, and water shall not be allowed to run into or over any concrete work or pipe, or into or through any pipe.

END OF SECTION

COMPACTION CONTROL AND TESTING.....31 23 23.23

1 GENERAL

1.1 Description: The work of this section consists of furnishing all equipment, labor, materials, and incidentals to compact the various fill areas. Also, the Contractor shall provide the necessary on-site testing facilities and equipment.

2 MATERIALS

2.1 None.

3 EXECUTION

3.1 Maximum Density: The maximum density of the fill material shall be determined according to ASTM D698, "Standard Proctor Method". If more than one type of fill material is used, the maximum density for each type shall be determined. Determination of the maximum densities shall be the Contractor's responsibility. The Owner shall be provided with one copy of each maximum density test result, which shall include the maximum density and the optimum moisture content.

3.2 Compaction Operations: See Section 31 23 33 – TRENCHING AND BACKFILLING.

3.3 Compaction Requirements: Compaction requirements for soils as controlled by methods of testing described herein are as follows:

3.3.1 Range A - In place compacted density of soil shall be equal to or greater than one hundred (100) percent of the maximum density at optimum moisture content.

3.3.2 Range B - In place compacted density shall be equal to or greater than ninety-five (95) percent of the maximum density at optimum moisture content.

3.3.3 Range C - In place compacted density shall be equal to or greater than eighty (80) percent of the maximum density at optimum moisture content.

3.4 Density range for compaction shall be as stated on the drawings or as specified herein. Compaction requirements for granular stone or sand, as controlled by methods of testing described herein shall be to a density of not less than ninety-five (95) percent of the referenced density.

3.4.1 Range B Compaction shall be used for all compacted fill.

3.5 Compaction Operations:

3.5.1 Trenches & Adjacent to Structures: Compaction shall be achieved using manually operated mechanical tampers or towed and self-propelled drum and vibrator tampers.

3.5.2 Roadways & Fills: Compaction shall be achieved using rollers, vibrators, compactors, or mechanical tampers.

3.5.3 Variances: The use of water jetting or similar techniques of compaction is prohibited as the sole means for compaction.

3.6 Moisture Content & Control:

3.6.1 Content: The moisture content requirements as determined under the methods of testing described herein are as follows:

a. Range A Compaction: The moisture content of the soil at the time of compaction shall be uniform and shall be not higher than five (5) percentage points above the optimum nor lower than the optimum of the soil involved.

b. Range B Compaction: The moisture content of the soil at the time of compaction shall be uniform and shall not be lower than three (3) percentage points below the optimum moisture content of the soil involved.

c. Range C Compaction: The moisture content of the soil at the time of compaction shall not be lower than five (5) percentage points below the optimum moisture content of the soil involved.

d. Compaction of Granular Stone or Sand: The moisture content shall be not less than ten (10) percentage points below the optimum content at the time of compaction.

3.6.2 Control:

a. Water Application: The moisture content of the soil at the time of compaction shall be within the moisture range designated. When the natural moisture content of the embankment soil does not fall within the required moisture range, water shall be added or the material shall be aerated, whichever is needed to adjust the soil to the proper moisture content. Water may be transported or distributed from calibrated tank trucks, or the water may be added to the soil in the borrow and cut areas before hauling, as long as the moisture content of the soil at the time of compaction is uniform and within the designated moisture range.

b. Testing: The amount of water to be added shall be only that amount that will, as determined by the field moisture tests, provide a moisture content in the soil to be within the required range plus a reasonable amount to compensate for evaporation and other unavoidable losses. Satisfactory methods and sufficient equipment shall be used for the furnishing and handling of the water so there will be no undue loss due to evaporation. If water is added to cut areas or borrow pits, the surfaces of the areas or pits shall be maintained in such a manner that will prevent undue loss of moisture.

c. Visual Control: From other than the results of the moisture content test, the moisture content of the soil being compacted shall be considered as being too high to ensure compaction when after repeated passes with the sheepsfoot roller, the roller continues to pick up excessive amounts of soil and refuses to "build up" so that the tamping feet eventually ride the compacted surface.

3.7 Compacting Equipment:

3.7.1 Sheepsfoot Rollers: Tamping or sheepsfoot rollers shall consist of metal rollers, drums, or shells, surmounted by metal studs with tamping feet projecting not less than six and one-half (6 ½) inches from the surface of the rollers, drum or shell. Tamping feet shall be spaced not less than six (6) inches nor more than twelve (12) inches, measured diagonally center to center; and the cross-section area of each tamper foot, measured perpendicularly to the axis of the stud, shall not be less than four (4) nor more than twelve (12) square inches. The weight of tamping rollers shall be such that, when fully loaded, the load on each tamper foot shall not be less than two hundred (200) pounds per square inch of cross-sectional area. The load per tamper foot will be determined by dividing the total weight of the roller (loaded) by the number of tamper feet in one (1) row parallel to the width of the roller.

3.7.2 Pull-Type Steel Rollers: Pull-type steel rollers shall not have less than forty-eight (48) inches effective width of roll and shall be designed and constructed so that the weight per lineal inch of roll can be varied from two hundred (200) to at least three hundred (300) pounds.

3.7.3 Trench Rollers, Self-Propelling: The trench roller shall be an approved type and shall not weigh less than three hundred (300) pounds per inch of width.

3.7.4 Manually Operated Compactors: Equipment shall be in good mechanical condition and shall be capable of transmitting forceful vibrations and impacts to the various materials placed in construction.

4. SOIL TESTING

4.1 Testing Methods: Density tests, as prescribed in these specifications, will be made on the soil to be used in the construction of the project to determine a reference density, optimum moisture content, and the moisture range applicable to the soil required to attain specified compaction. The field density and actual moisture content of the

compacted material shall also be determined as prescribed previously herein.

4.1.1 Reference Density: The density as determined by the specified compaction test shall be the density to which the field density is referred for comparison or percentage for each type of soil used in the work.

4.1.2 Optimum: The optimum shall be the moisture content corresponding to the reference density on the specified compaction test curve.

4.1.3 Moisture Range: The moisture range shall be the limits of moisture content of the soil with the optimum as a reference.

4.1.4 Field Density: The field density shall be the density of the compacted material determined by the field density test. If an in-field density test shows results below the minimum requirements, the lift or area in question shall be retested after additional compaction efforts are performed. If the original in-field density test results are more than two percentage points below minimum. requirements, additional tests are required, and the area in question shall be scarified and re-compacted, if so designated by the Engineer. Additional testing and scarification shall be performed by the Contractor without any additional payment and shall be considered incidental to the completion of the project.

4.1.5 Moisture Content: The moisture content shall be the actual moisture content of the soil in the compacted embankment or fill at the time of compaction.

4.2 Scope of Tests:

4.2.1 Borrow Areas: All areas selected to supply backfill and area fill materials requiring a specified density shall have moisture-density relationships determined by ASTM Designation D-698, when the soil is initially excavated. In place density of compacted soil shall be tested in accordance with ASTM Designation D2167-63T or D2922, latest revision, to determine compliance with specifications. Specific testing locations will be determined by the Engineer.

4.2.2 Granular Stone & Sand: Granular stone and sand shall have moisture-density relationships determined by ASTM Designation 02049. In place density shall be determined by ASTM Designation D2167, ASTM D698, or D2922.

4.2.3 Compacted Soil Sub-Base Supporting Concrete, Steel, or Masonry Structures: Density shall be determined by a minimum of three samples and/or tests per structure, or two samples and/or tests per 1000 S.F. of area, for each two lifts of fill by ASTM Test Designation D2167-63T, or D2922.

4.2.4 Compacted Soil Sub-Base Supporting Rigid & Flexible Pavements & Crushed Stone Surfacing: Density shall be determined by a minimum of three samples and/or tests, or two samples and tests per 500 S.Y. of area, for each 6 inches of fill.

4.2.5 Compacted Granular Stone or Sand Supporting Concrete, Steel, Masonry Structures, Rigid And Flexible Pavements: Density shall be determined by a minimum of three samples and/or tests, or one sample and/or test per 100 S.Y. of area, whichever is greater.

END OF SECTION

TRENCHING AND BACKFILLING 31 23 33

1. GENERAL

1.1 Description: The work of this section consists of excavation for trenches relating to the construction *of* underground piping. There will be no distinction made in any definition or classification of excavation covered by this section between wet or dry materials below the surface of the earth. Trench excavation shall be considered as unclassified, which shall consist of all materials of whatever character encountered in the work, including soil, solid rock, fragmented rock, water, or other. Work under this section shall also include:

1.1.1 All sheeting, shoring, bracing, protection of adjacent property, preparation of all sub-grades, storage of excavated materials, backfilling, tamping, grading, and surfacing.

1.1.2 Diversion of surface water, and all pumping, draining, or other means of dewatering excavations.

1.1.3 All subsequent handling and disposal of excavated material, together with the preparation of all trench sub-grade.

1.2 Protection of Adjacent Property: The Contractor shall protect all excavations and trenches from settlement or displacement by approved means of bracing and shoring. All existing underground utilities and structures as well as all surface improvements and structures shall be protected, and their functional purpose preserved.

2. CLASSIFICATION OF EXCAVATION

2.1 All excavation shall be considered as unclassified.

3. TRENCHING

3.1 Lines and Grades: The Contractor shall furnish and set all stakes to establish and maintain the lines and grades as shown on the drawings including all grade boards, uprights, and accessory materials required. Line and grade shall be maintained either by grade boards with string or laser beam.

3.1.1 Grade boards shall be installed across the trench at intervals not to exceed 25 feet. The Contractor shall be held responsible for verification of lines and grades as established and shown on the drawings. The Owner may check the line and grade at any given point before backfilling has been started, and if there is a variation of more than two-hundredths (0.02) of a foot from the true grade, the same shall be raised or lowered as required.

3.1.2 In the event a laser beam is used to set line and grade for the pipe laying operation, grade stakes shall be set at each structure and at 25 feet, 50 feet, 100 feet, and then 100-foot increments thereafter, upgrade of the structure. The laser must be checked at the beginning of each day and at each grade stake to insure the proper line and grade of the pipe.

3.2 Excavation: All excavation for trenches shall be made with a sufficient working space to permit the placement, inspection, and completion of all work contemplated in the contract. Excavated material that is unsuitable for backfill, and all boulders exposed by grading shall be removed from the work area. Trenches shall be excavated in accordance with the drawings for trench width relative to trench depths.

3.2.1 Trenches shall be excavated to six inches below the bottom of the pipe when set to established flow lines. Should the trench be excavated more than six inches below the bottom of the pipe, the Contractor shall use only granular stone bedding material to establish flow line grade.

3.2.2 Trench excavation shall, in all cases, be made continuous from the ground surface to the established trench depth. Materials excavated shall be stockpiled at the sides of the trench and within established area limits so as to minimize inconvenience to the public, and damage to vegetation and structures in the area.

3.2.3 Trenching, shoring, bracing, and shields shall be placed by the Contractor whenever necessary for the proper

preservation of any excavation, embankment, or structure. Where the ground is of such a character or other conditions are such as to render it necessary, the sheeting shall be closely driven and to such depth below the lowest point of the final excavation as may be directed. The Contractor shall be held responsible for the sufficiency of all sheeting and bracing used, and for any and all persons injured, or property damaged as the result of improper quality, strength, placement, maintenance, or removal of the same. No extra compensation will be made for sheeting and bracing, whether left in place or not. The Contractor shall, at his own expense, shore up, protect, and insure from injury all building, retaining walls, piers, and footing, storm sewers, sanitary sewers, gas lines, water lines, fences, curbs, trees, or other property liable to be injured during the process of the work, and they will be held responsible for all damage which may occur by reason of prosecution of the work. Sheeting, shoring, and bracing shall be provided, installed, and maintained to protect the excavation, ensure the safety of workers, and as required by applicable federal, state, and local laws, rules, and regulations.

3.2.4 Trench width from six inches below the bottom of the pipe to six inches above the pipe bell shall be held to 1.4 times the outside diameter of the pipe plus twelve inches. Trench width above these levels may be wider to accommodate shoring, bracing, and shields, but shall be kept within practical limits. The Contractor shall not receive additional payment for extra trench width.

3.3 Removal of Water: The Contractor shall furnish and operate sufficient pumps and appliances, and shall provide all material, labor, etc. required to prevent interference with any work by water, ice, or snow. Damage of any kind resulting from insufficient pumping facilities or similar lack of proper conduct of the work shall be made good by the Contractor at their own expense. No structure or pipe shall be placed in water and water shall not be allowed to run into or cover any concrete work or pipe, or into or through any pipe, unless by special permission given by the Owner in writing.

3.4 Record Drawings: Even though all excavation shall be considered unclassified for pay purposes, the Contractor shall clearly indicate on the Record Drawings (which shall be submitted to Carthage Water and Electric Plant) the elevations and extent of all solid rock encountered during construction of the project.

4. BACKFILLING AND COMPACTING

4.1 Excavated material used for backfilling of trenches shall be free from perishable matter and from other material liable to become unstable when saturated with water after having been compacted. No frozen material shall be used in backfill. No large stones or organic matter shall be placed within two feet of the top of the pipe. Care shall be taken to prevent damage to the pipe and structures. Special precautions shall be taken in backfilling over pipes. No backfill shall be placed over any portion of pipes and/or joints not inspected by Carthage Water and Electric. The granular stone bedding material shall be brought to a depth of at least six inches over the top of the pipe with this material carefully deposited in uniform layers not exceeding six inches in depth; and each layer carefully and solidly tamped with mechanical tampers in such a manner as to avoid damage to pipe or disturbing completed work. Unless noted otherwise on the drawings, backfilling for the remainder of the trench shall be previously excavated earth and shall contain no stone over three inches in its largest dimensions. This backfilling shall be deposited and spread in layers and solidly tamped. As the trenches are backfilled, the Contractor shall remove all surplus material and re-grade the surface leaving it in good order. The trenches shall be filled to the ground surface elevation which previously existed.

4.1.1 The Contractor may be required to settle certain backfill material with water, in addition to other backfilling procedures. The water shall be furnished by the Contractor without cost to Carthage Water and Electric Plant. Methods and procedures in using the water shall be approved by the Carthage Water and Electric Plant prior to carrying out the operation.

4.1.2 Whenever, in the opinion of Carthage Water and Electric Plant or their representative, the excavated material is not suitable for backfilling the trench, or there is a deficiency of material, the Contractor shall, under change order, provide suitable material.

4.1.3 All excess excavation materials shall be cleaned up by the Contractor as directed. All backfilled trenches shall be maintained by the Contractor for a period of one year after Final Acceptance of the work by the Owner.

4.1.4 At all open cut roadway crossings, beneath paved surfacing, and as noted elsewhere, the trench shall be backfilled to grade with granular stone meeting the requirements of Section 31 05 16 – AGGREGATES FOR

EARTHWORK. For roadway and other paved surface replacement, see Section 32 01 10 – ROADWAY SURFACE AND SIDEWALK REPLACEMENT.

4.1.5 Private Drives, Field Entrances, etc. At all open-cut crossings of private drives, field entrances, and the like, the trench backfill, either earth or granular stone, shall be deposited and spread in layers and solidly tamped to Range "B" compaction requirements set forth in Section 31 23 23.23 – COMPACTION CONTROL AND TESTING. Private drives, etc. shall be backfilled "immediately" upon completion of the pipe installation across the drive. The driving surface shall be restored to its original condition immediately following proper compaction of the backfill.

END OF SECTION

SHORING 31 41 00

1. GENERAL

1.1 Description: The work of this section shall consist of furnishing all equipment, labor, materials, tools, and incidentals necessary to provide for the safety of the employees and to protect the excavations for both structural and trenching and existing structures; and as required by the applicable federal and state laws and regulations.

2. METHODS

2.1 Responsibilities: The Contractor is solely and totally responsible for the design, installation, maintenance, and safety of any shoring and/or bracing that may be required.

2.2 Type of Shoring & Bracing: The type of shoring and bracing shall be that which is removable following the installation of the buried pipe or structure. No permanent type of shoring or sheeting shall be used which must remain within the limits of the excavation. The shoring or bracing shall be removed following the excavation, installation of the buried pipe or structures and installation of required backfill material.

END OF SECTION

DIVISION 32 – EXTERIOR IMPROVEMENTS

ROADWAY SURFACE AND SIDEWALK REPLACEMENT 32 01 10

1. GENERAL

1.1 Description: The work of this section shall consist of furnishing all labor, materials, tools, equipment, and incidentals necessary to replace all roadway surfaces and sidewalks removed during utility construction. This section shall include, but not be limited to, vehicular and pedestrian pavements, and surfaces of stone, gravel, asphalt, and Portland cement concrete, in addition to parking areas.

2. MATERIALS

2.1 Portland Cement Concrete: Shall conform to Section 03 30 00 – CAST-IN-PLACE CONCRETE.

2.2 Hot-Mix Asphaltic Concrete: Shall conform to Section 32 12 16 – ASPHALT PAVING.

2.3 Crushed Stone: Shall conform to Type 1 aggregate as specified in Section 32 11 23 – AGGREGATE BASE COURSES.

2.4 Chip and Seal Pavement Repair:

2.4.1 Aggregate: For aggregate seal asphalt paving, the aggregate shall consist of a combination of crushed stone and/or crushed gravel, well-graded within the following limits:

Sieve Size	Percent Paving By Weight
1/2”	90-100%
3/8”	48-80%
#4	0-15%
#6	0-5%

2.4.2 Liquid Asphalt: The liquid asphalt shall be grade CRS-2. Should the Contractor desire, (because of climatic conditions or otherwise) they may request a change in the liquid asphalt grade. No change shall be made until the Contractor receives written approval from the Owner.

3. EXECUTION

3.1 General: Existing paving shall be cut vertically and horizontally to straight lines. The trench shall be backfilled with granular stone bedding or controlled backfill material compacted to Range B compaction requirements (see Section 31 23 23.23 – COMPACTION CONTROL AND TESTING) to within eight inches of the final roadway surface. The top eight inches shall be backfilled with crushed stone base compacted level with the existing riding surface of the roadway. This level shall be maintained by the Contractor until all secondary settling has occurred. Any crushed stone required to maintain the trenches in a suitable condition for traffic during this period shall be furnished at the Contractor's expense. When the trench has been properly backfilled and has settled sufficiently to permit final repairs, roadway surfacing shall be applied according to this specification. At the time of final repairs, the Contractor shall remove sufficient material to allow placement of roadway surfacing to the thicknesses specified as follows.

3.2 Roadway Surface Replacement:

3.2.1 Portland Cement Concrete: Edges of existing pavement at the trench shall be trimmed vertically to produce a neat even edge. A minimum 8-inch-thick concrete slab shall be placed to match the elevation of the existing pavement, as shown on the drawings.

3.2.2 Hot-Mix Asphaltic Concrete: Edges of existing pavement at the trench shall be trimmed vertically to produce a neat, even edge. A minimum of 4-inches of hot-mix asphaltic shall be placed in two lifts to match the elevation of the existing pavement, as shown on the drawings.

a. The surface to receive the asphaltic concrete shall be cleaned of all loose material, dust, and foreign matter prior to the application. The primer or tack coat, as required, shall be applied upon a dry surface only at a rate of 0.15 gallons per square yard. Forms may be of any material or design provided they secure the designed grade control. It shall be the responsibility of the Contractor to set and maintain necessary grade stakes and forms, and execute the work to the lines, grades, cross sections, and dimensions shown on the plans.

b. After spreading, the mixture shall be thoroughly and uniformly compressed by a three wheel or tandem power-driven roller or rollers, weighing not less than 200 pounds per inch of tread width, as soon after being spread as it will bear the roller without undue displacement. Delays in rolling freshly spread mixture will not be tolerated. Rolling shall start longitudinally at the sides and proceed toward the center of the pavement overlapping on successive trips by at least one-half the width of a read wheel. Alternate trips of the roller shall be of slightly different lengths.

c. After final compaction, the finished course shall at no point have a density less than ninety-five (95) percent of the laboratory compacted density. At least two (2) in-place density samples shall be taken and tested.

d. No traffic shall be permitted on the finished pavement until it has cooled to atmospheric temperature.

3.2.3 Chip and Seal Pavement Repair: For this type of repair, a double layer of chip and seal resurfacing over the entire roadway width shall be utilized.

a. The existing roadway shall be bladed to eliminate minor depressions and humps. Following the blading operation, the surface shall be thoroughly cleaned and swept to remove all mud, matted earth, dust, and other foreign material.

b. A prime coat of liquid asphalt shall be applied at the rate of 0.30 gallons per square yard at a minimum temperature of 120°F for asphalt grade CRS 2. On the primed base, a course of aggregate shall be spread at the rate of twenty-five (25) pounds per square yard. This stone shall be roller compacted from the sides to center with a steel wheeled roller weighing a minimum of five tons.

c. Immediately following the compaction of the first course of asphalt and aggregate, a second course, identical to the first, shall be applied. The finish surface shall be swept to remove any loose stones.

d. No traffic shall be allowed on the finished surface until it has cooled to atmospheric temperature.

3.2.4 Crushed Stone: Trenches along or across unpaved roadways, including country roads, and city streets, as well as on dirt, or gravel shoulders of paved streets, roads, or highways, shall be backfilled in compliance with these specifications. The trench shall be backfilled to a level with the existing riding surface of the roadway. When the trench has been properly backfilled and has settled sufficiently to permit final repairs, the backfill shall be removed as necessary for crushed stone surfacing. The crushed stone shall be rolled and thoroughly compacted in layers to a minimum finished thickness of six inches.

3.2.5 Sidewalk Replacement: The existing concrete sidewalk and base material shall be removed for a distance equal to the trench width plus two feet as shown on the drawings. The trench shall be backfilled to a height that will allow the placement of four inches of crushed stone and a four-inch-thick concrete walk above. The elevation of the top of the new sidewalk section shall match that of the existing sidewalk.

END OF SECTION

AGGREGATE BASE COURSES 32 11 23

1. GENERAL

1.1 The work shall consist of furnishing and placing one or more courses of aggregate on a prepared subgrade in accordance with these specifications and in conformance with the lines, grades, thicknesses, and typical cross sections shown on the plans.

2. MATERIALS

2.1 Granular stone base shall consist of MoDOT Type 1 or MoDOT Type 5 aggregate.

2.1.1 Type 1 aggregate shall be essentially limestone or dolomite. The aggregate shall not contain more than 15 percent deleterious rock and shale. Sand may be added only for the purpose of reducing the plasticity index of the fraction passing the No. 40 sieve in the finished product. Any sand, silt, and clay, and any deleterious rock shall be uniformly distributed throughout the mass. The fraction passing the No. 40 sieve shall have a maximum plasticity index of six. The aggregates shall conform to the following gradation requirements:

Percentage by Weight Passing Each Sieve:	
1- Inch Sieve	100%
½-Inch Sieve	60-90%
No. 4	35-60%
No. 40	10-35%

2.1.2 Type 5 aggregate shall consist of crushed stone or sand or gravel. The aggregate shall not contain more than 15 percent deleterious rock and shale. If crushed stone is used, sand may be added only for the purpose of reducing the plasticity index of the fraction passing the No. 40 sieve in the finished product. Any sand, silt, and clay, and any deleterious rock and shall be uniformly distributed throughout the mass. The fraction passing the No. 40 sieve shall have a maximum plasticity index of six. When sand and gravel aggregate are used, the fraction passing the No. 200 sieve shall be less than one half of that fraction passing the No. 30 sieve. The aggregates shall conform to the following gradation requirements:

Percentage by Weight Passing Each Sieve:	
1- Inch Sieve	100%
½-Inch Sieve	60-90%
No. 4	35-60%
No. 30	10-35%
No. 40	0-15%

2.2 Material shall be delivered with sufficient moisture content to provide specified densities when compacted.

3. METHODS

3.1 Subgrade: All work on that portion of the subgrade on which the base is to be constructed shall be completed in accordance with the requirements of these specifications prior to the placing of any base material on that portion. Aggregate base shall not be placed on a frozen subgrade.

3.2 Placing: The maximum compacted thickness of any one layer shall not exceed six (6) inches. When the specified compacted depth of the base course exceeds six (6) inches, the base shall be constructed in two or more layers of approximately equal thickness. The compacted depth of a single layer of the base course may be increased to eight (8) inches for shoulders and lightly traveled areas. After preliminary compaction has been secured, finish compaction shall be carried out to completion by means of self-propelled steel-wheeled rollers weighing not less than ten (10) tons.

Shaping and compacting shall be carried on until a true, even, uniform base course of proper grade, cress section, and density is obtained. Proper moisture content shall be maintained by wetting the surface or allowing it to dry as required during shaping and compacting operations. The use of excess water, resulting in run-off or in the formation of a slurry on the surface shall be avoided. The stone base shall be compacted to not less than ninety-five (95) percent of the maximum density at optimum moisture content.

3.3 Testing: The compacted base shall be tested for in-place density by ASTM Method D2950, latest revision, at the rate of one (1) determination for each 1000 square yards of base surface, or as required by the Owner or his designated representative.

3.4 Tolerance: The compacted base shall be brought to within a tolerance of ½ inch or less below design grade.

3.4.1 The compacted aggregate base thickness shall not be deficient in excess of ½ inch from the plan thickness. Thickness measurement shall be taken and determined for each 1500 square yards of base surface or as designated by the Owner or his representative.

END OF SECTION

ASPHALT PAVING 32 12 16

1. GENERAL

1.1 Description: The work of this section consists of furnishing all labor, materials, equipment, and tools for construction of asphaltic concrete paving for streets and drives. The asphaltic concrete shall be placed in one or more courses on a prepared stone base or underlying course in conformity with the lines, grades, thicknesses, and typical cross sections shown on the plans, or as designated by the Engineer.

2. MATERIALS

2.1 Base Course: Shall conform to specification Section 32 11 23 – AGGREGATE BASE COURSES.

2.2 Prime Coat: The prime coat shall be medium-curing, cut back (MC-30) asphalt and shall conform to AASHTO M-82.

2.3 Tack Coat: The tack coat shall be an emulsified asphalt (SS-1) and shall conform to ASTM 977.

2.4 Surface Course: The asphaltic concrete surface course shall comply with MoDOT Type BP-2 and associated MoDOT specifications.

2.5 Binder Course: The asphaltic concrete binder course, if job specified, shall comply with MoDOT, Section 301, and shall consist of a mineral aggregate compound of crushed stone and/or crushed gravel, sand gravel, sand, mineral filler, if needed, and asphaltic cement in such proportions that the composition of the finished mix is within following range:

	%Min.	% Max
Pasing 1-Inch Sieve	100	-
Pasing 1/2-Inch Sieve	60	90
Passing No. 4 Sieve	35	65
Passing No. 8 Sieve	25	50
Passing No. 30 Sieve	15	35
Passing No. 200 Sieve	3.5	6

2.6 Asphalt Cement: Shall be AC-10, AC-20, AC-30 asphalt cement or approved by Engineer, homogenous, and free of water and shall not, in heating, foam below 232°C. Asphalt cement shall be prepared by refining crude petroleum by suitable methods and shall conform to the requirements of Section 1015 of the Missouri Standard Specifications for Highway Construction.

2.7 Samples: At least 15 days prior to preparing any of the mixture on the project, the Contractor shall obtain in the presence of the Engineer, representative samples of the asphalt cement and mineral aggregate for tests. The samples of materials shall be of the size specified by the Engineer and the Contractor shall submit the samples to a qualified laboratory for testing. The Contractor shall also submit for the Engineer's approval a job-mix formula for each mixture to be supplied for the project. No mixture will be accepted until the job-mix formula for the project is approved by the Engineer.

3. EXECUTION

3.1 Existing Roadway: The existing roadway surfacing shall be removed to the depth and cross sections shown on the plans.

3.2 Sub-grade Preparation: Shall be as described in specifications Section 31 23 23.23 – COMPACTION CONTROL & TESTING.

3.3 Base Course:

3.3.1 Contractor shall furnish, place, and compact a thickness of base course as specified on the plans of crusher run limestone on a prepared subgrade, as described in Section 32 11 23 – AGGREGATE BASE COURSES.

3.3.2 In no case shall the Contractor be permitted to place the granular base or manipulate it on muddy or frozen sub-grade. Any mixture containing frost or frozen particles shall not be placed on the subgrade, or compacted.

3.3.3 The granular base shall be handled in such manner as to avoid undue segregation. If segregation occurs or if the mixture becomes contaminated, such segregation or contaminated material shall be removed and replaced with material of suitable quality and gradation. Segregated or contaminated materials ordered removed by the Engineer shall be replaced at the sole expense of the Contractor.

3.3.4 Preliminary compaction shall be performed by means of pneumatic-tired Rollers. After preliminary compaction has been secured, finish compaction shall be carried to completion by means of self-propelled steel-wheeled rollers weighing not less than ten tons. Shaping and compacting shall be carried on until a true, even, uniform base course of proper grade, cross-section, and density is obtained. Proper moisture content shall be maintained by wetting the surface or allowing it to dry as required during shaping and compacting operations. The use of excessive water resulting in run-off or in the formation of a slurry on the surface shall be avoided. The stone base shall be compacted to not less than 95 percent of the maximum density of optimum moisture content as determined by Mod AASHTO T-99.

3.4 Prime Coat: The prime coat shall be placed only on a dry or slightly damp, clean base free from loose or foreign material when atmospheric temperature is above 50°F. The rate of application shall be from 0.2 to 0.5 gallons per square yard, depending upon the surface texture. The temperature of the prime coat at the time of application shall not be less than 100°F, or more than 180°F. Any prime coat overspray on adjacent concrete surfaces shall be removed to the Owner's satisfaction.

The prime coat shall be allowed to cure a minimum of 24 hours before application of the surface course.

3.5 Tack Coat: The tack coat shall be placed on an existing asphaltic surface which is free of all dust, loose material, grease, or other foreign materials when atmospheric temperature is above 40°F. The asphalt emulsion shall be applied uniformly with a pressure distributor at a rate of application from 0.02 to 0.10 gallons per square yard. Water may be added to the asphalt emulsion and mixed therewith in such proportion that the resulting mixture will not contain more than 50 percent of added water. The application of the resulting mixture shall be such that the original emulsion will be spread at the specified rate. The temperature of the tack coat at the time of application shall not be less than 75°F or more than 130°F.

3.5.1 The tack coat shall be allowed to properly cure, and the tacked surface shall be cleaned of all dirt and surplus sand before the next course is placed.

3.5.2 The tack coat shall be applied in such a manner as to cause the least inconvenience to traffic and to permit one-way traffic without pickup or tracking of the asphalt emulsion.

3.6 Surface and Bituminous Base Course: The asphalt concrete surface course shall be a hot plant-mix of specified thickness suitably placed and compacted and shall be placed in layers not exceeding three inches in compacted thickness. The asphaltic concrete shall be delivered to the work area in dump trucks properly lubricated to prevent sticking. The asphaltic concrete shall be covered during transit, and shall arrive at the job site at not less than 275°F. Placing of asphaltic concrete shall be as follows:

3.6.1 The asphaltic concrete shall not be placed, when either the air temperature or temperature of the surface on which the mixture is to be placed is below 50°F for the surface course or 40°F for the bituminous base course, or on any wet or frozen surface, or when weather conditions prevent the proper handling or finishing of the mixture, or when authorized by the Engineer.

3.6.2 The asphalt concrete surface shall be compacted while the mixture is hot with power roller equipment as specified. Rolling shall continue until a uniform, even textured surface of the thickness specified is produced. Rolling shall begin at the outer edge and continue toward the center. Each pass shall overlap the preceding one by at least one-half of the rear roller width. Delays in rolling freshly spread mixture will not be tolerated. Traffic shall not be permitted on the finished pavement until it has cooled to atmospheric temperature. Final rolling shall be done with either a two or three-wheel tandem-type roller weighing not less than 10 tons.

3.6.3 Around areas not accessible to power rollers, compaction shall be secured by hand tamping, and all joints must be effectively sealed.

3.6.4 The finished surface shall be rolled until it is free from waves and irregularities. All surplus material shall be removed prior to final acceptance.

3.6.5 If the asphaltic concrete construction consists of more than a single layer, each layer shall be compacted as specified and allowed to cool to the ambient temperature before the next layer is placed.

3.6.6 The contractor shall provide a leveling course at areas and at a thickness necessary to obtain the elevation and cross sections as shown on the plans, prior to placing the surface course. The areas of existing asphaltic pavement which require an overlay of asphaltic concrete shall be as specified on the plans. The finished surface course as placed shall be performed in such a manner as to provide the smoothest possible riding surface.

3.7 Equipment: All equipment, tools, and machines used in the performance of the work shall be subject to the approval of the Engineer and shall be maintained in satisfactory working condition at all times.

3.7.1 The Asphalt Distributor: Shall be a machine manufactured for the specific purpose of applying heated asphaltic materials by pressure spray application. The Distributor shall be designed to permit the application of the heated asphalt material in a uniform spray without atomization and at the rate, temperature, and pressure specified by the Asphalt Institute. The Distributor shall be equipped for circulation and agitation of the bituminous material during the heating process.

3.7.2 The Power Roller: Shall be a self-propelled type weighing at least eight tons and shall be suitable for rolling bituminous pavements. A five-ton roller may be used around radii and driveways where rolling with an eight-ton roller is not feasible. The roller shall be equipped with adjustable wheel scrapers and a sprinkling system which will uniformly wet the wheels to prevent adherence of bituminous material to them. Rubber tired rollers may be used after initial rolling with eight-ton roller.

3.7.3 Mechanical Spreaders and Finishers: Shall be adjustable and capable of spreading upon the prepared surface a tamped, screeded, and finished wearing surface of asphalt concrete of the specified thickness.

3.7.4 Broom Drag and Power Brooms: Shall be of the type suitable for effectively cleaning the surface to be treated.

3.7.5 Automatic Screed Control: The use of automatic screed control devices will be required except for paving small irregular areas, shoulders, entrances, and side road connections. The screed of the mechanical spreading and finishing machine shall be regulated by an automatically controlled grade leveling and slope control device approved by the Engineer. The device shall be of a standard commercial quality adapted to the type of paver used and shall provide control for producing a uniform surface to the established grade, and a cross slope conforming to the requirements of the typical section.

The initial pass of the paver, when placing the first continuous layer, shall be made with the sensor following a traveling reference plane not less than 30 feet in length that is an integral part of the paver. An established grade reference is required by the contract, the Contractor shall establish the grade and shall furnish variable thickness values at intervals along the center line of the roadbed for the use in setting a grade reference. Regardless of the method used for placing the first continuous layer, all other layers shall be placed by use of a shoe-type sensor or indicator, the traveling reference plane, or by additional use of the established grade reference.

3.8 Compaction and Testing:

3.8.1 After final rolling, the finished course shall at no point have a density less than ninety-five (95%) percent of the laboratory compacted density. Field determination of the density shall be the responsibility of the Contractor and considered incidental to the paving operations. Contractor shall provide access to the Engineer and his representatives for any and all testing of asphaltic concrete paving.

3.8.2 Testing Pavement: The finished courses shall have the minimum thickness shown on the plans. Tests will be made to ensure that each course is being constructed of proper thickness, composition, and density. The Contractor shall cut samples from any layer of the compacted mixture at locations designated by the Engineer and shall deliver them to the testing laboratory in good conditions. Samples may be obtained by either sawing with a power saw or by drilling 4-inch diameter cores. Each sawed sample shall consist of a single piece of the pavement of the size designated by the Engineer, but not larger than 12 inches square.

3.8.3 Density Samples: Each sample for laboratory density determination shall consist of four cores. All samples, whether sawed or cored, shall consist of an undisturbed portion of the compacted mixture removed for the full depth of the layer or course to be tested.

3.8.4 Thickness Samples: Each sample taken for course thickness shall consist of one 4-inch diameter core taken for the full depth of the course. Each sample taken for total compacted thickness shall consist of one 4-inch diameter core taken for the full depth of bituminous construction. Total thickness samples shall be obtained after all bituminous construction is completed on the project and shall be taken at locations designated by the Engineer.

3.8.5 Surface Restoration: The surface from which samples have been taken shall be restored by the Contractor with the mixture then being produced not later than the next day of plant operation, if construction is still in progress. If bituminous construction has been completed, the surface from which samples have been taken shall be restored within 48 hours with hot mix asphalt acceptable to the Engineer.

3.8.6 Grade and Surface Smoothness Requirements: The finished surface of the bituminous courses shall conform to the grade lines and elevations shown on the plans. The grade and crown slopes shall not deviate more than 0.05 feet from the plan grades. The surface shall not vary more than 1/4 inch when a 12-foot straightedge is laid on the surface parallel with the centerline of the paved area or transverse from the crown to pavement edge.

3.8.7 Quality of Samples & Tests: The Contractor shall provide as an obligation incidental to the performance of the contract the following minimum quantity of samples and tests.

a. From the paving spreader, not less than one (1) composite sample for each 1000 square yards or less of surfacing to be constructed. This sample shall be tested for asphaltic cement content, aggregate gradation and content, and attainable density.

b. From the compacted surfacing, not less than one (1) core sample for each 2500 square yards of asphalt surfacing applicable for thickness determination and laboratory tests. On the compacted surface, not less than one (1) in place density test for each 300 square yards of asphalt surfacing applied.

3.8.8 Test Designation:

a. Asphaltic Cement Content: Compacted and uncompacted samples shall be tested by procedures established by ASTM D2172, latest revision, to determine asphalt cement content.

b. Aggregate Gradation: Coarse and fine aggregate from asphaltic concrete samples shall be tested for gradation by ASTM Test Method C136, latest revision. Mineral filler content shall be determined by Test Method ASTM C117, latest revision.

c. Density: In place density shall be determined by ASTM Test Method D2950. Reference density shall be determined by ASTM D1188, or ASTM D2726 procedures and ASTM procedures D2041.

4. REMEDY AND CORRECTION OF DEFICIENCY

4.1 The Contractor shall provide, at no cost to the Owner, remedy and correction of deficiencies in the asphaltic surfacing, in the following specified from and procedures:

4.1.1 Deficiency in Asphalt Cement: Should test on uncompacted samples or core samples indicate the asphalt content is below the specified amount, the Contractor shall provide additional asphaltic concrete overlays to the entire

surfacing area for which the tests indicated an asphalt cement deficiency. One (1) inch of compacted asphaltic concrete overlay shall be added for each one-tenth percent the asphalt cement content falls below specified minimum. The percent deficiency shall be determined from the average of the percent asphalt cement content from five samples.

4.1.2 Deficiency in In-Place Density: Should tests on core samples or in-place density tests indicate density of the asphaltic concrete to be below the specified minimum density, the basis of payment for deficiency in in-place densities for any one day's run of asphaltic concrete shall be determined as follows:

Average Density (%) As determined from 4 in-place Density tests or total tests Performed during each day's run Of asphalt	Percent of Payment
95 – 100	100.0
94.9	100.0
94.8	99.9
94.7	99.8
94.6	99.6
94.5	99.4
94.4	99.1
94.3	98.7
94.2	98.3
94.1	97.8
94.0	97.3
93.9	96.3
93.8	94.1
93.7	92.2
93.6	90.3
93.5	87.9
93.4	85.7
93.3	83.3
93.2	80.6
93.1	78.0
93.0	75.0
Below 93.0	Reject

4.1.3 Deficiency in Surface Limit: Surface finish shall be provided such that surface water drains to ditches and guttering. Depressions in the surfacing, which are exhibited by ponding of water, shall be remedied by the addition of an overlay of asphaltic concrete to eliminate the depression.

4.1.4 Deficiency in course and total thickness: Should tests on core samples indicate the thickness is less than the design thickness, the Contractor shall provide additional asphaltic concrete overlay to the entire surfacing area for which the tests indicated a thickness deficiency. One inch minimum of compacted asphaltic concrete overlay shall be added to those deficient areas. The areas which are found to be deficient shall first be cold milled 1/2 inch minimum over the entire deficient area, then overlaid with a thickness sufficient to bring the area up to the design thickness and grade. The deficient area shall be determined in accordance with 3.6.7.2 and/or from core samples taken at a minimum distance of 200 feet between cores, or as approved by the Engineer.

END OF SECTION

SURFACE RESTORATION..... 32 92 19

1. GENERAL

1.1 Description: The work of this section consists of furnishing all labor, materials, tools, and incidentals necessary to restore the surface of all areas affected by construction, including finish grading and landscaping as required herein, replacement of fences, stone-lined ditches, walls and embankments, and restoration of miscellaneous structures (mailboxes, street signs, etc.). The minimum requirement for surface restoration shall be Type B.

1.1.1 Type A Surface Restoration: Regardless of the site's previous condition, restoration consists of furnishing and placing topsoil (which may need to be hauled in), liming, seeding, mulching, laying netting as required, and otherwise preparing and establishing a uniformly grassed area as specified herein. Areas requiring Type A surface restoration shall be so designated on the drawings.

1.1.2 Type B Surface Restoration: Consists of furnishing and placing all the necessary materials to restore areas affected by construction to a condition equal to that which existed prior to construction.

1.1.3 Pavement Repair and Replacement shall conform to Section 32 01 10 – ROADWAY SURFACE AND SIDEWALK REPLACEMENT.

2. MATERIALS

2.1 Topsoil Stripped and Stored: Topsoil stripped, stored, and placed shall be fertile, friable, with liberal content of humus, and capable of sustaining vigorous plant growth.

2.2 Topsoil to be furnished: If the stripped topsoil is not adequate to complete the work, sufficient topsoil shall be furnished and shall be a natural, fertile, friable soil, possessing characteristics representative of productive soils in the vicinity. It shall be obtained from naturally well-drained areas. It shall not be excessively acid or alkaline (except for those planes requiring acid soil) nor contain toxic admixture of subsoil and shall be cleaned and reasonably free from clay lumps, stumps, roots, or similar substances, debris, or other objects which might be a hindrance to planting operations.

2.3 Lime: Lime shall be ground limestone containing not less than 85% of total carbonates and shall be ground to such a fineness that 50% will pass through a 100 mesh sieve and 90% will pass through a 20 mesh sieve. Coarser material will be acceptable, provided the specified rates of application are increased proportionately on the basis of quantities passing the 100 mesh sieve.

2.4 Fertilizer: Commercial fertilizer shall be formula 12-12-12, and shall conform to the applicable state fertilizer laws. It shall be uniform in composition, dry, and free flowing, and shall be delivered to the site in the original, unopened containers, each bearing the manufacturer's guaranteed analysis. Any fertilizer which becomes caked or otherwise damaged, making it unsuitable for use, will not be accepted.

2.5 Herbicide: Herbicide shall be a pre-emergence type for mixing with soil designed to eliminate noxious weeds without harming landscaped plants.

2.6 Lawn Materials: Grass seed shall be mixed and certified by the dealer and shall be a blend of K-31 fescue and Lespedeza, acceptable to the landowner. The seed shall be uniformly sown.

2.7 Water: The Contractor shall make, at his expense, whatever arrangements may be necessary to ensure an adequate supply of water to meet the needs of this contract. He shall also furnish all necessary hose, equipment, attachments, and accessories for the adequate watering of plants as may be required to complete the work as specified.

2.8 Netting: Netting shall be a uniform, open, plain weave mesh of single jute yarn or 25 to 35. pound natural, unbleached kraft paper. Minimum width of netting fabric shall be 42 inches. Jute netting shall have 76 warp ends per 48-inch width and 41 weft ends per yard, minimum. Kraft paper netting shall have 5.5 warp yarns by 3.5 filling yarns per inch. Staples for anchoring netting shall be No. 11 gauge steel wire, six (6) inches long.

2.9 Mulch: Vegetative mulch shall be the shredded cereal straw form stalks of oats, rye, wheat, or barley. The straw shall be free of prohibited weed seeds as stated in the State Seed Law; shall be relatively free of all other noxious and undesirable seeds; and shall be clean, bright, and dry enough to spread properly. A binder emulsion shall be applied to prevent straw from blowing.

3. EXECUTION

3.1 All areas within the limits of fine grading not required to be developed otherwise shall be planted with grass.

3.2 Soils Test: The Contractor shall, at his own expense, contact the County Extension Agent and secure a soil test of the topsoil. If recommended by tins test, the topsoil shall be limed in quantity recommended by the Extension Agent (Generally a soil pH of 6.0 to 6.5 is desirable.) Three copies of the soil test shall be sent to the Owner along with recommendations on lime use. Estimates of lime requirements are as follows:

POUNDS OF GROUND LIMESTONE PER 1,000 SQUARE FEET

pH	Light Sandy Soil-Pounds	Medium Sandy Soil-Pounds	Loam & Silty Loam-Pounds	Clay Loam-Pounds
4.0	90	120	172	217
4.5	82	112	157	202
5.0	67	90	127	150
5.5	52	67	97	120
6.0	None	None	None	None

3.3 Time of Planting for Lawns: The Contractor shall coordinate the work so that lawn areas will be topsoiled and graded to meet the planting schedule as follows:

3.3.1 Preferred Time of Planting: February 1 to April 20.

3.3.2 Alternative time of Planting: September 1 to October 30. For this time of planting, the Contractor shall keep the lawn well watered through the summer, or until the project is accepted by the Owner.

3.4 The Owner is aware that in some cases, it would create a hardship to maintain the above schedule. If the Contractor wishes to make recommendations for other times when seeding could be done, the Owner will consider these recommendations. However, methods or time of planting shall be agreed to, in writing, before commencing this portion of the work or the above schedule shall be followed.

3.5 Preparation of Topsoil: The topsoil shall be graded and uniformly compacted according to Section 31 22 19 – FINISH GRADING.

3.6 Sulphur: If the addition of sulphur is necessary, it shall be applied at a rate of two pounds per 1000 square feet.

3.7 Applying fertilizer: Commercial fertilizer shall be applied at the rate of 20 pounds per 1,000 square feet to the lawn areas being prepared for planting. Fertilizer may be applied with seed, however, application after sprouting of the lawn seed is preferred.

3.8 Sowing of Seed: Immediately before any seed is to be sown, the ground shall be scarified as necessary and shall be raked until the surface is smooth, friable, and of uniformly fine texture. Lawn areas shall be seeded evenly at the rate of 100 pounds per acre, lightly raked, and watered with a fine spray. The method of seeding may be varied at the discretion of the Contractor on their own responsibility to establish a smooth, uniformly grassed lawn.

3.9 Mulching: Within 24 hours after seeding, mulch with binder emulsion shall be spread evenly over the entire area at the rate of 2 1/2 tons per acre.

3.10 Optional Establishment of Lawns: At the option of the Contractor, sod may be used for establishing all or part of grass lawn areas. Sod on slopes shall be held in place by wooden pins about one inch square and six inches long driven through the sod into the soil until they are flush with the top of the sod. Before any sod is laid, all soft spots and

inequalities in ground shall be corrected. Fertilizer spread shall be raked in. Sod shall be laid so that no voids occur and shall be tamped or rolled. The complete sodded surface shall be true to finish grade, even, and firm at all points. Sod shall be placed so that the surface of the compacted sod will be slightly below the surrounding surface soil. All soils tests and pH adjustment specified previously shall be undertaken prior to sodding.

3.11 Clean-up: Any soil, manure, peat or similar material which has been brought onto paved areas by hauling operations, or otherwise, shall be removed promptly, keeping these areas clean at all times. Upon completion of the planting, all excess soil, stones, and debris which have not previously been cleaned up shall be removed from the site or disposed of. All lawns and planting areas shall be prepared for final inspection.

3.12 Maintenance: Maintenance shall begin immediately after planting and shall continue in accordance with the following requirements:

3.12.1 Repairs: Repairs to lawns or replacement of plants necessary during the maintenance period due to removal, vandalism, or acts of neglect on the part of others may be done on request by the Owner and will be done at the expense of the Owner.

3.12.2 Maintenance: Lawns shall be protected and maintained by the Contractor by water, mowing, and replanting as necessary for at least thirty (30) days and as much longer as is necessary to establish a uniform stand of the specified grasses, and until acceptance by the Owner.

3.13 Inspection: Inspections of the work to determine completion of contract work exclusive of possible replacement, will be made by the Owner at the conclusion of the maintenance period upon written notice requesting such inspection submitted by the Contractor at least 10 days prior to the anticipated date. The condition of lawns will be noted, and determination made by the Owner as to whether maintenance shall continue in any part. After inspection, the Contractor will be notified in writing by the Owner of acceptance of seeding work exclusive of the possible replacement.

3.14 Guaranty and Replacement: Lawns and planting shall be guaranteed for a maximum of one year after the conclusion of the maintenance period, or for the duration of one full growing season, after planting, whichever is longer, and shall be alive, and in satisfactory growth at the end of the guaranty period, subject to normal care as recommended by this Contractor after acceptance of the work. At the end of the guaranty period, inspection will be made by the Owner upon written notice requesting such inspection submitted under this contract that is dead or not in satisfactory growth, as determined by the Owner, shall be removed from the site. These shall be replaced as soon as conditions permit but during the normal planting season.

END OF SECTION

DIVISION 33 – UTILITIES

UTILITY BORING AND JACKING 33 05 07.26

1. GENERAL

1.1 Description: The work defined by this section consists of furnishing all labor, equipment, tools, supervision, and materials for underground excavation. Materials excavated are unclassified and shall have no differentiation made for earth, rock, solid rock, sand, water, or other materials encountered.

2. MATERIALS

2.1 Carrier Pipe: Shall be of the size and type as noted on the plans, as specified in other sections of this document and as required by the permitting authority. The permitting authority shall have jurisdiction regarding type of materials required for the carrier pipe. The following list denotes applicable diameters for common pipe sizes and is based on published data. The Contractor shall be responsible for ensuring the accuracy of the largest diameter prior to construction.

Nominal Diameter	Material	Type of Joint	Largest O.D.
6"	D.I.	Push-On	9.54"
6"	D.I.	M.J.	11.31"
8"	D.I.	Push-On	11.78"
8"	D.I.	M.J.	13.37"
10"	D.I.	Push-On	14.05"
10"	D.I.	M.J.	15.62"
12"	D.I.	Push-On	15.22"
12"	D.I.	M.J.	17.88"

2.2 Welded Steel Encasement Pipe: Shall be smooth wall, welded steel pipe with a minimum wall thickness as specified in American Petroleum Institute Code No. 1102. The provision of this code is listed as follows:

Nominal Diameter	Nominal Wall Thickness (Uncoated)
Under 12-3/4"	0.188” Min.
12-3/4"	0.282” Min.
14" and 16"	0.313” Min.
18"	0.344” Min.
20"	0.375” Min.
22"	0.407” Min.
24" and 26”	0.438” Min.
28"	0.469” Min.
30"	0.501” Min.
32" and 34"	0.563” Min.
36", 38"and 40"	0.626” Min.
42"	0.688” Min.

3. EXECUTION

3.1 Where designated on the plans, the Contractor shall carry out underground excavation for installation of pipe. Underground excavation shall be accomplished by tunneling, boring, or jacking methods. Each method shall provide for removal of earth and rock coinciding with the installation of a primary liner or encasement pipe. Where jacking or tunneling is utilized, the annular space between the casing and earth shall be pressure grouted with sand cement grout. The casing pipe diameter shall be of sufficient diameter to comply with the requirements of the permitting authority. Typically, the inside diameter of the casing shall be a minimum of 4" greater than the largest outsize diameter of the carrier pipe; therefore, an 8" diameter ductile iron pipe with push-on joints would require a minimum casing diameter of

15.78" or 16" steel casing. The Contractor shall verify all requirements of the permitting authority prior to commencing work.

3.2 The Contractor shall insure that traffic interruptions are minimized during the underground excavation operations. After the operation is completed, the Contractor shall slide the pipe into place. All pipe joints shall be completed outside of the tunnel and inspected by the Owner before the pipe is pushed into the tunnel. After the pipe is in place, the ends of the tunnel shall be sealed with sandbags prior to necessary backfilling. Carrier pipe shall be fitted with PVC spacers, or equivalent.

3.3 Any excavation required to provide equipment or personnel access to the tunnel work shall be considered incidental to the tunneling operation.

3.4 The Contractor shall make highway and railroad crossings where shown on the plans and shall obtain the permits and pay the necessary fees to make all crossings on the project. The Contractor shall comply with all requirements of the permitting authority and acquire necessary permits and bonds. Where the permitting authority (Highway Department, railroad company, etc.) requires encasement, tunneling, boring, timbering, shoring, bracing, rock excavation, cutting, and replacing pavement and base, and any other labor and material required. The Contractor shall receive no additional payment for any extra items involved.

END OF SECTION

JOINT RESTRAINT 33 05 09.33

1. GENERAL

1.1 Description: The work in this section consists of furnishing and installing the joint restraints at the various locations as noted on the drawings and as specified herein.

2. MATERIALS

2.1 All restraint fitting components shall be manufactured from a minimum ASTM A536, 60-42-10 ductile iron.

3. MANUFACTURER

3.1 Joint Restraint systems shall be MEGALUG as manufactured by EBAA IRON SALES, INC. or approved equal and of the following series.

3.1.1 Mechanical joint restraints shall be Series 1100.

3.1.2 Ductile iron pipe push-on joint restraints for shall be Series 1700.

4. EXECUTION

4.1 Joint restraints may be considered in lieu of concrete thrust blocking at locations where thrust blocking is not practical. Requests to utilize joint restraints shall be submitted to Carthage Water & Electric Plant and the Carthage Water & Electric Plant representative shall determine where only joint restraints will be allowed. The Carthage Water & Electric Plant determination shall be final.

4.2 Restraints shall be assembled and installed per the manufacturer's detailed instructions and recommendations.

END OF SECTION

DUCTILE IRON PIPE AND FITTINGS 33 05 19

1. GENERAL

1.1 Description: The work in this section consists of furnishing, hauling, placing, and backfilling as necessary the ductile iron pipe, fittings, and fitting restraints in the designated locations and to the lines and grades as shown on the drawings.

1.2 ANSI-AWWA Standard: Reference hereinafter to ANSI and AWWA Standards refer to the latest revision or edition thereof.

2. MATERIALS

2.1 Ductile Iron Pipe: Unless otherwise specified or shown on the drawings, ductile iron pipe shall be Wall Thickness Class 52 and shall conform to the latest revision of ANSI A21.51 - (AWWA Cl51) Standard for Ductile Iron Pipe Centrifugally Cast in Metal Molds or Sand Lined Molds, for Water or Other Liquids. The pipe shall be standard asphaltic varnish coated on the outside. Pipe shall be cement mortar lined in conformance with ANSI A21.4-(AWWA Cl04) unless specified otherwise.

2.2 Fittings: The fittings to be used with ductile iron pipe may be with gray iron or ductile iron and shall conform to the requirements of ANSI/AWWA C110-A21.10. All fittings shall be coated and lined in the same manner as the pipe. All fittings up to and including 12 inches shall be Class 350, with all larger fittings of Class 250. Flanged fittings shall be Class 125 unless noted otherwise on the drawings. Mechanical joint and push-on joint fittings shall meet all applicable requirements of ANSI A 21.11-(AWWA C111). Ductile iron compact fittings shall conform to ANSI/AWWAC153/A21.53.

2.3 Joints: Unless specifically noted otherwise, joints for ductile iron pipe that is to be buried shall be either a push-on type or a mechanical joint. Unless noted otherwise, joints for pipe used inside buildings or structures shall be either flanged or a lock coupling for grooved-end pipe.

2.3.1 Push on Type Joint: The push-on type joints consisting of a single neoprene gasket which are acceptable are "Tyton" as manufactured and licensed by the U.S. Pipe and Foundry Company, "Fastite" as manufactured and licensed by the American Cast Iron Pipe Company, and "Bell-Tite" as manufactured and licensed by James B. Clow and Son, Inc. All required joint materials including the neoprene gasket and the lubricant shall be furnished with the pipe.

2.3.2 Mechanical Joint: Mechanical joint ends shall comply with the requirements of ANSI A21.11- (A.WWA C111). All required joint materials including neoprene gasket, gland, bolts, and nuts shall be included with the pipe.

2.3.3 Flanged Joint: The flanged joint shall be integrally cast and shall conform to the requirements of ANSI Specification B16.1 for Class 125. Screw-on flanges will be acceptable, but any required threading of pipe barrel shall be done by the factory in conformance with AWWA C115/A21.15 utilizing Class 53 pipe. Flanges shall be ductile iron. The pipe barrel and flange shall not be field assembled. The flanges shall be furnished with factory purchased full face gaskets 1/8 inch thick of SBR rubber per ANSI/AWWA C111/A21.11.

2.4 Polyethylene Encasement:

2.4.1 Seamless, conforming to ANSI/AWWA C105/A21.5 and ASTM A674; 8-mil LLDPE or 4-mil LHDPE.

2.4.2 Provide polyethylene encasement on all buried pipe and fittings.

3. EXECUTION

3.1 Cutting, Cleaning, and Inspecting: All cutting of ductile iron pipe shall be done by a means of mechanical cutter. Wheel cutters shall be used whenever practical. After cutting, the interior of the pipe shall be thoroughly swabbed or cleaned of all foreign matter before being installed into the system and shall be kept clean during and after installation. Before installation of any pipe or fitting, each piece shall be inspected for defects and any cracks. All defective, damaged, or unsound pipe or fittings shall be rejected.

3.2 Installation:

Mechanical Joint: The last eight inches outside of the spigot and the inside of the bell of the mechanical joint or push-on fittings shall be thoroughly cleaned to remove oil, grit, excess coating, and other foreign matter from the joint, and then coated with a soap solution. The ductile iron gland shall then be slipped on the spigot end of the pipe with the lip extension of the gland toward the socket or bell end. The rubber gasket shall be coated with soap solution and placed on the spigot end in the bell. The gasket shall then be pressed into place with the bell. Care shall be taken to locate the gasket evenly around the entire joint. The ductile iron gland shall be moved into position for bolting. Nuts spaced 180 degrees apart shall be tightened alternately in order to produce an equal pressure on all parts of the gland.

3.2.2 Flanged Joint: When assembling the flange joint, the Contractor shall insure that the ring gasket is properly located and placed flat against the face of the flange. Flanges shall be assembled by alternately tightening bolts spaced 180 degrees apart in order to produce an equal pressure on all parts of the gland.

3.2.3 Restrained Joint: Installation of restrained joint fittings shall be in strict accordance with the manufacturer's printed literature.

3.3 Corrosion Protection:

3.3.1 Polyethylene Encasement: Provide all buried ductile iron pipe, fittings, and specials with at least one wrap of polyethylene encasement. Where ductile iron pipe is also encased in concrete, the polyethylene wrap shall extend at least 5-feet into each end of the concrete encasement.

END OF SECTION

*Revised April 2025.

POLYETHYLENE UTILITY PIPE 33 05 33

1. GENERAL

1.1 Description: The work of this section shall consist of furnishing, hauling, storing, and installing polyethylene pipe for water service lines.

2. MATERIALS

2.1 Water Service Line: Crosslinked polyethylene (PEX) pipe or tubing shall conform to all applicable requirements of the latest versions of ASTM D2765, ASTM D2837, ASTM F876, and AWWA C904. PEX pipe or tubing shall be rated for use with water at 73°F at a hydrostatic design stress of 1000 psi and a maximum working pressure of 160 psi. Minimum burst pressure shall be 350 psi at 73°F, as determined in accordance with ASTM D1599, latest revision. In addition, pipe or tubing shall withstand without failing, bursting, or weeping, for a period of at least 300 hours at 180°F, a test pressure of 150 psi. The test procedure outlined in ASTM D1598 shall be followed. PEX pipe or tubing shall be permanently marked to indicate the nominal size, SDR 9, pressure rating at 73°F, manufacturer's name, date, code, appropriate ASTM designation, and the National Sanitation Foundation seal for potable water applications.

3. EXECUTION

3.1 Installation: PEX pipe for water service lines shall be installed as specified in Section 33 10 00 – WATER SUPPLY SYSTEMS.

END OF SECTION

*Added April 2025.

WATER SUPPLY SYSTEMS..... 33 10 00

1. GENERAL

1.1 Description: The work in this section consists of furnishing and installing all underground water supply piping in the designated locations and to the lines and grades as shown on the plans and herein specified, and all tools, labor, equipment, materials, and incidentals necessary to complete this section.

1.2 All applicable work shall be done in accordance with the latest AWWA Standards.

2. MATERIALS

2.1 Ductile Iron Pipe: All ductile iron pipe and fittings three inches in diameter and larger shall be cement mortar lined with mechanical or push-on joints, meeting the specifications given in Section 33 05 19 – DUCTILE IRON PIPE AND FITTINGS. Provide all buried ductile iron pipe, fittings, and specials with at least one wrap of polyethylene encasement.

2.2 Polyethylene Utility Pipe: All water service line shall crosslinked polyethylene (PEX) pipe or tubing, SDR 9 as specified in Section 33 05 33 – POLYETHYLENE UTILITY PIPE

3. EXECUTION

3.1 General: Only competent workmen shall be employed on this phase of the work and equipment suitable for the execution of the work shall be utilized. Installation of ductile iron pipe shall conform to ANSI/AWWA Standard C600 - latest revision, and to the drawings.

3.2 Delivery of Materials to Job:

3.2.1 All materials shipped by rail shall be carefully inspected for damage in transit in the cars, and if such is found, same shall not be unloaded, except upon the instructions from the official freight agent. In the event of damaged pipe, same may be lifted out of the cars, and placed along the site, but must not be removed from the railroad company's property.

3.2.2 All materials delivered by truck shall be inspected as they are unloaded. Damaged pipe or materials shall not be left at the storage yard or taken to the job site, but shall be removed as soon as possible such that rejected material will not be mistakenly used on construction.

3.2.3 All pipe fittings, valves, and other accessories shall be unloaded by the use of hoists or skidways. Same shall be handled in such manner as to avoid damage due to shock. Under no circumstances shall pipe be dropped to the ground from cars or trucks. Special precautions shall be taken to prevent the rolling of pipe to strike another forcefully.

3.3 Trench Excavation:

3.3.1 Machine-excavated trenches, as well as hand-excavated trenches, shall be cut to the alignment and configuration as shown on the drawings. Unless noted otherwise on the drawings, trenches shall be cut as deep as necessary on either side of natural Depressions, ditches, waterways, etc., to provide minimum 42 inches of cover over the pipe. Excessive change in gradient will not be allowed. Line shall be constructed to a grade which prevents high spots which could pocket air and cause air binding of the line.

3.3.2 Trenches over four feet deep shall be braced and safety maintained until after laying operations have been completed. Trenches shall not be cut too far ahead of laying operations.

3.3.3 The maximum degree of deflection, either vertical or horizontal, shall not cause a pipe joint's annular clearance in the bell to be less than one-fourth inch (1/4") at its closest point. In case any portion of the trench is excavated below grade due to unsuitable soil conditions, further depth shall be refilled to the proper grade with crushed stone or other approved material.

3.3.4 Special care shall be taken to remove all rocks or boulders, or ledge rock encountered so as to provide a clearance under the pipe of at least six inches, and this space shall be refilled with approved material and firmly compacted before laying the pipe.

3.4 Installation

3.4.1 The pipe shall be lowered in the trench piece by piece by means of derricks, ropes, or other suitable equipment. Under no circumstances shall pipe or other materials be dropped or dumped into the trench. Before lowering or while suspended over the trench, pipe shall be inspected for defects. Any defective, damaged, or unsound pipe shall be rejected. A suitable swab shall be pushed through the pipe to ensure that all foreign matter is removed from the pipe prior to laying.

3.4.2 To avoid improperly sized or spaced bell holes impairing the pipe length bearing on the trench bottom, bell holes shall be dug by hand and only far enough ahead that the accuracy of their proper location can be assured. They shall be of minimum size, yet providing ample room that the joint may be properly and efficiently made. Machine-cut bell holes shall not be permitted.

3.4.3 Water mains must be laid at least 10 feet horizontally from any existing or proposed non-potable pipeline. The distance shall be measured edge to edge. In cases where it is not practical to maintain a ten-foot separation, the department may allow deviation on a case-by-case basis, if supported by data from the design engineer. Such deviation may allow installation of the water main closer to a non-potable pipeline, provided that the water main is laid in a separate trench located as far away from the non-potable line as feasible and meets other requirements of Paragraph 8.6 of the Missouri Department of Natural Resources, *Minimum Design Standards for Missouri Community Water Systems*, December 10, 2013 edition.

3.4.4 The water system must be protected from introduction of contaminants by backflow in accordance with 10 CSR 60-11.010 Prevention of Backflow as specified in Paragraph 8.9 of the Missouri Department of Natural Resources, *Minimum Design Standards for Missouri Community Water Systems*, December 10, 2013 edition.

3.4.4.1 This includes the installation of a double check backflow prevention device on all irrigation and lawn watering connections.

3.4.5 Each water service shall be individually metered and constructed in accordance with included Water Meter installation and Service Tap Details.

3.4.6 All fire protection services, no matter the size, shall be metered as specified in Section 33 19 16.23 – TURBINE WATER METER AND VAULT.

3.4.7 Valves shall be provided at intervals not more than 500 feet in commercial districts and not more than one block or 800 feet in other districts.

3.5 Backfill and Compaction: Pipe shall be laid in a bed of granular stone as shown on the drawings and as specified in Section 31 05 16 – AGGREGATES FOR EARTHWORK. In all cases, full length joints of pipe shall be used except in making closures. Pipe embedment material and trench backfill and compaction shall be as specified in Section 31 23 33 – TRENCHING AND BACKFILLING and as detailed on the drawings.

3.6 Anchorage of Bends, Tees, and Plugs: On all pipelines four inches (4") in diameter and larger, all tees, plugs, and caps, and bends exceeding 22-1/2 degrees shall be squarely anchored by suitable concrete thrust blocking. Such concrete blocking shall be so placed that the pipe or fitting joints will be accessible for repair. The concrete shall be 3,000 psi mix and shall be placed between undisturbed solid ground and the fitting to be anchored. The area of the thrust block bearing on the ground in each instance shall be a minimum of four square feet or of the size required by internal pipe pressures. Where concrete thrust blocking is not practical, joint restraints as specified in Section 33 05 09.33 may be considered.

3.6.1 Pipe joints immediately outside of buildings shall be properly and adequately restrained so as to prevent any movement due to internal pressures that would result in piping inside the building being subjected to an external force.

Said restraint shall be provided by mechanical joint retained glands, restrainer glands, restrainer fittings, or other means approved by the Owner. Restraint shall be provided at the exterior pipe joints and not at joint or fittings located within the building.

3.7 Testing: Installed water lines shall be hydrostatically tested as follows. Testing shall include both a "pressure test" of at least two hours duration for the purpose of blowing defective joints, and a "leakage test" to determine actual loss of water from the system. The use of compressed air for testing pipe will not be permitted. The Contractor shall be responsible for properly restraining the end sections of water pipe to ensure that the pipe does not move during testing (provide thrust blocks, etc.).

3.7.1 Pressure Test: After the pipe has been laid, all newly laid pipe shall be subjected to a hydrostatic pressure of at least 150 psi at the lowest point in the system.

a. Test Pressure Restrictions: Test pressures shall 1) be of at least 2-hour duration; 2) not vary by more than ± 5 psi; 3) not exceed twice the rated pressure of the valves of hydrants when the pressure boundary of the test section includes closed gate valves or hydrants.

b. Pressurization: Each valved or isolated section of pipe shall be filled with water slowly and the specified test pressure, based on the elevation of the lowest point of the line or section under test and corrected to the elevation of the test gauge, shall be applied by means of a pump connected to the pipe in a manner satisfactory to the Owner.

c. Air Removal: Before applying the specified test pressure, air shall be expelled completely from the pipe. After all the air has been expelled, the test pressure shall be applied.

d. Examination: All exposed pipe, fittings, valves, joints, and hydrants shall be examined fully during the test. Any damaged or defective pipe, fittings, valves, or hydrants that are discovered following the pressure test shall be repaired or replaced with sound material and the test shall be repeated until it is satisfactory to the Owner.

3.7.2 Leakage Test: A leakage test shall be conducted concurrent with the pressure test.

a. Leakage Defined: Leakage shall be defined as the quantity of water that must be supplied into the newly laid pipe, or any valved section thereof; to maintain pressure within 5 psi of the specified test pressure after the air in the pipeline has been expelled and the pipe has been filled with water.

b. Allowable Leakage: No pipe installation will be accepted if the leakage is greater than that determined by the following:

$$L = \frac{(\mathrm{N})(\mathrm{D})(\sqrt{P})}{7400}$$

in which L is the allowable leakage in gallons per hour; N is the number of joints in the length of pipeline tested; D is the nominal diameter of the pipe in inches; and P is the average test pressure during the leakage test, in pounds per square inch gauge. When testing against closed metal-seated valves, an additional leakage per closed valve of 0.0078 gal/hr/in of nominal valve size shall be allowed. When hydrants are in the test section, the test shall be made against the closed hydrant.

c. Acceptance of Installation: Acceptance shall be determined on the basis of allowable leakage. If any test of pipe laid disclosed leakage greater than that specified above, the Contractor shall at his own expense, locate and repair the defective material until the leakage is within the specified allowance. All visible leaks are to be repaired regardless of the amount of leakage.

3.8 Disinfecting Lines: All potable water lines shall be disinfected with a chlorine solution utilizing the tablet method described in AWWA C651 to deliver the disinfecting agent. The tablet method consists of placing calcium hypochlorite tablets or calcium hypochlorite granules in the water main as it is being installed. Extreme care shall be taken by the Contractor to ensure all pipes and appurtenances are kept clean and dry during construction. Calcium hypochlorite

shall conform to ANSI/AWWA B300, latest edition and shall contain approximately 65 percent available chlorine by weight.

3.8.1 Placement of calcium hypochlorite granules: During construction granules shall be placed at the upstream end of each branch main and at intervals of no more than 500 feet. See Table 1 for the amount of granules required at each placement.

3.8.2 Placement of Calcium Hypochlorite Tablets: During construction 5-gram tablets shall be placed in each section of pipe. One tablet shall also be placed in each hydrant, hydrant branch, and other appurtenance. Tablets shall be attached to the pipes by food grade adhesive and shall be placed on the inside and at the top of the main. The adhesive shall only be on the broadside of the tablet that is to be applied to the pipe. Table 2 indicates the number of tablets required for each section of pipe of various lengths and diameters.

TABLE 1

Pipe Diameter		Calcium Hypochlorite Granules	
in.	mm	oz.	g
4	100	1.7	48
6	150	3.8	113
8	200	6.7	200
10	250	10.5	300
12	300	15.1	430

TABLE 2

Pipe Diameter		Length of Pipe Section, ft (m)				
In	mm	3 (4.0) or less	18 (5.5)	20 (6.1)	30 (9.1)	40 (12.2)
4	100	1	1	1	1	1
6	150	1	1	1	2	2
8	200	1	2	2	3	4
10	250	2	3	3	4	5
12	300	3	4	4	6	7

3.8.3 Filling and Contact: When installation bas been completed the main shall be filled with water at a rate to ensure that the water within the main will flow at a velocity of no greater than 1 ft/sec. Precautions shall be taken to ensure that all air pockets are eliminated. The water shall remain in the pipe at least 24 hours. Should the water temperature be less than 41°F the contact time shall be increased to 48 hours. A detectable chlorine residual should be found at each sampling point after the 24-hour period and the results reported to MDNR.

3.8.4 Final Flushing: After the applicable retention period, the chlorinated water shall be flushed from the main, fittings, valves, and branches until chlorine measurements show that the concentration in the water leaving the main is no higher than that generally prevailing in the distribution system or that is acceptable for domestic use.

3.8.5 Microbiological Quality: Within 48 hours after the flushing and disinfecting of lines has been satisfactorily completed, the Contractor shall take two water samples from the line spaced 24 hours apart. The samples shall be taken by an independent laboratory satisfactory to the reviewing authority. The results shall be submitted to the reviewing authority for review. The test results of the two samples shall have satisfactory results in accordance with 10 CSR 60-4.010 before placing the lines into the water system.

3.9 Repairs: In the event of leaks or breaks or other malfunctions of material within one year from the date of acceptance, the Contractor shall repair such defects at his expense or reimburse the Owner for expenses incurred by Owner for implementing repairs.

END OF SECTION

*Revised April 2025.

TURBINE WATER METER AND VAULT 33 19 16.23

1. GENERAL

1.1 Description: The work in this section includes furnishing all labor, materials, equipment, supervision and requisite incidentals required for the construction of a reinforced concrete vault and an inline flow meter and pipework assembly as described in these specifications and as depicted on drawings.

1.2 All fire protection services, no matter the size, shall be metered as specified herein and as constructed in accordance with typical detail drawings.

2. MATERIALS

2.1 Valves:

2.1.1 Flanged Gate Valves: Shall be as specified in Section 40 05 61 – GATE VALVES AND BOXES and equipment with a hand-wheel operator closing clockwise as indicated on the drawings.

2.1.2 Tapping Gate Valves: Shall be as specified in Section 40 05 61 – GATE VALVES AND BOXES with a two-inch square operating nut and closing clockwise.

2.2 Valve Boxes: Valve boxes shall be No. P-104 cast-iron, slip type two-piece with a 4-1/4" shaft as manufactured by Clay and Bailey Mfg. Co., or an approved equivalent.

2.3 Flow Meter: Shall be a Badger Meter Recordall® Turbo Series or an approved equal. Meter shall be of a size and capacity stipulated by the Carthage Water & Electric Plant for the designated service connection.

2.4 Vault: Shall be of reinforced concrete construction, cast-in-place or precast, minimum of 4’-0” x 7’-6” inside dimensions, with 6-inch thick walls and top slab or large enough to accommodate meter assembly and valves. Depth of vault shall be such as to provide a minimum pipe bury depth of 42-inches plus 24-inches. Floor of vault shall be 8 inch thick of ASTM D448, class 57 or 67, free draining clean crushed stone over compacted earth.

3. EXECUTION

3.1 Vault and Pipework: Each vault and meter assembly shall be installed at the locations and grades as shown on the plans. Construction shall conform to the detail drawings provided with these specifications. The Contractor shall ensure that all valves operate freely and that the valve box and handwheel operator is properly placed centered and plumb to allow the use of the necessary tools for the operation of the valve. The tops of the valve boxes shall be level with the finish grade elevation.

END OF SECTION

*Revised April 2025.

DIVISION 40 – PROCESS INTERCONNECTIONS

GATE VALVES AND BOXES.....40 05 61

1. GENERAL

1.1 Description: The work in this section consists of furnishing, hauling, and placing the gate valves as shown on the plans and herein specified, and all labor, tools, and equipment necessary to install the valves.

2. MATERIALS

2.1 Valves: Gate valves shall be resilient, seat gate with non-rising stem, o-ring stem seal, and a two-inch square operating nut as indicated on the drawings. Gate valves shall conform to ANSI/AWWA C509, latest revision. The stem and all external and internal nuts and bolt shall be hex head and of 430F stainless steel.

2.2 End Connections: Shall be as indicated on the drawings.

2.3 Valve Boxes: Valve boxes shall be No. P-104 slip type two-piece with a 4-1/4" shaft as manufactured by Clay and Bailey Mfg. Co.

3. EXECUTION

3.1 Installation: Each gate valve shall be installed at the locations and grades as shown on the plans. The Contractor shall ensure that the valve is operating freely and that the valve box, if required, is properly placed to allow the use of the necessary tools for the operation of the valve and is plumb and centered over the operating nut on the valve. When buried, the tops of the valve boxes shall be level with the finish elevation of the ground. Valve storage, shipment, and installation shall strictly comply with ANSI/AWWA C509, latest revision.

END OF SECTION

DOUBLE CHECK VALVE ASSEMBLY BACKFLOW PREVENTER 40 05 67.16

1. GENERAL

1.1 Description: The work in this section includes furnishing all labor, materials, equipment, supervision and requisite incidentals required for the construction of a double check detector assembly and pipework in a reinforced concrete vault as described in these specifications and as depicted on drawings.

2. MATERIALS

2.1 Valves:

2.1.1 Flanged Gate Valves: Shall be as specified in Section 40 05 61 – GATE VALVES AND BOXES and equipment with a hand-wheel operator closing clockwise as indicated on the drawings.

2.1.2 Tapping Gate Valves: Shall be as specified in Section 40 05 61 – GATE VALVES AND BOXES with a two-inch square operating nut and closing clockwise.

2.2 Valve Boxes: Valve boxes shall be No. P-104 cast-iron, slip type two-piece with a 4-1/4" shaft as manufactured by Clay and Bailey Mfg. Co., or an approved equivalent.

2.3 Double Check Detector Assembly: Shall be a Watts LF709 or an approved equivalent. Assembly shall conform to Carthage Water & Electric Plant standards and shall be listed in the current USC FCCC&HR list of approved assemblies.

2.4 Bypass Detector Meter and Double Check Assembly: Shall be a Watts LF 007 backflow preventer assembly, or an approved equivalent, ¾-inch, with Mueller 300 handled ball valves, and miscellaneous galvanized iron pipework and fittings.

2.5 Fire Department Connection: Shall consist of a 4-inch galvanized riser pipe with UL/FM wafer check valve and ball drip.

2.6 Vault: Shall be of reinforced concrete construction, cast-in-place or precast, minimum of 4'-0" x 7'-6" inside dimensions with 6-inch thick walls and top slab or large enough to accommodate double check assembly, valves, and fire department connection. Depth of vault shall be such as to provide a minimum pipe bury depth of 42-inches plus 24-inches. Floor of vault shall be 8 inch thick of ASTM D448, class 57 or 67, free draining clean crushed stone over compacted earth.

3. CONSTRUCTION

3.1 Vault and Pipework: Each vault and double check detector assembly shall be installed at the locations and grades as shown on the plans. Construction shall conform to the detail drawings provided with these specifications. The Contractor shall ensure that all valves operate freely and that the valve box and handwheel operator is properly placed centered and plumb to allow the use of the necessary tools for the operation of the valve. The tops of the valve boxes shall be level with the finish grade elevation. Test cocks in the check valves shall be sealed with stainless-steel threaded plugs.

END OF SECTION

*Revised April 2025.

FIRE HYDRANTS AND APPURTENANCES.....40 05 81.13

1. GENERAL

1.1 Description: The work in this section consists of furnishing and installing the fire hydrants in the designated locations and to the lines and grades as shown on the plans and herein specified, and all tools, labor, equipment, materials, and incidentals necessary to complete this section. Hydrant shall conform to ANSI/AWWA C502-latest edition.

2. MATERIALS

2.1 Fire Hydrant: Hydrant shall have two, 2-1/2-inch hose outlets, one 4-1/2-inch pumper outlet and one 5-1/4-inch valve opening. Upper and lower stem rods, and all internal and external hardware shall be of 430F stainless steel.

2.2 Fire Hydrants shall be manufactured by AVK.

3. EXECUTION

3.1 Installation: The fire hydrant shall be set plumb with mechanical joint inlet bottom connection buried at a depth of 3'-6". A 6-inch gate valve shall be installed between the main line and the fire hydrant as shown on the standard installation detail drawing.

END OF SECTION

*Revised April 2025.

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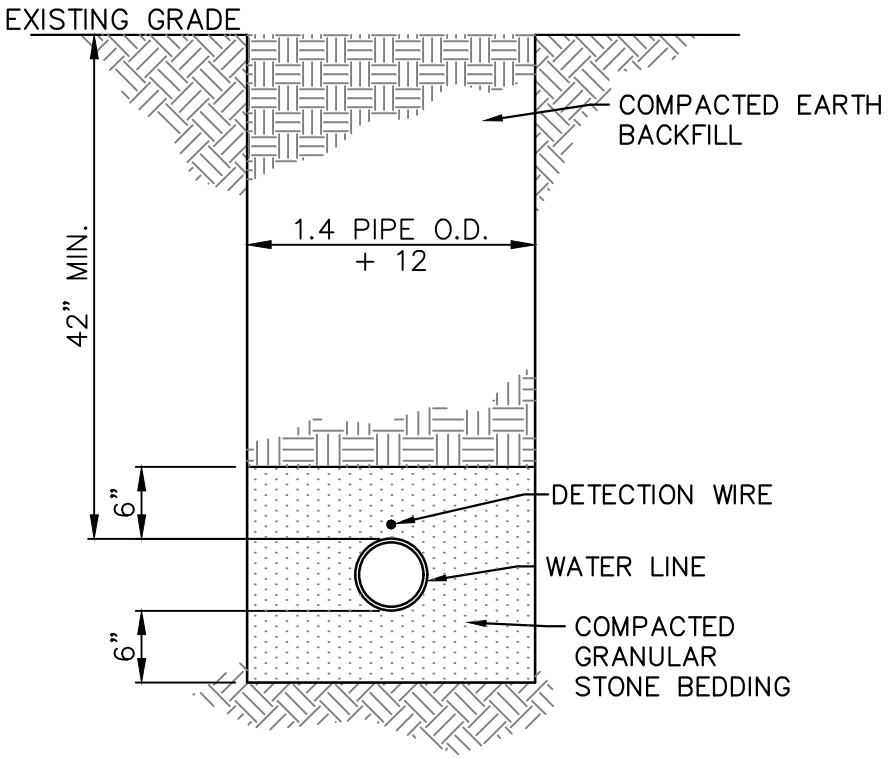


CIVIL ENGINEER: JOHN T. BRIGGS
LICENSE NO. E-2010019510

STATE OF MISSOURI
JOHN T. BRIGGS
CWEP Stand Spec
NUMBER
PE-2010019510
7/7/25
PROFESSIONAL ENGINEER

WTR-2 - TRENCH & BEDDING
CARTHAGE, MISSOURI

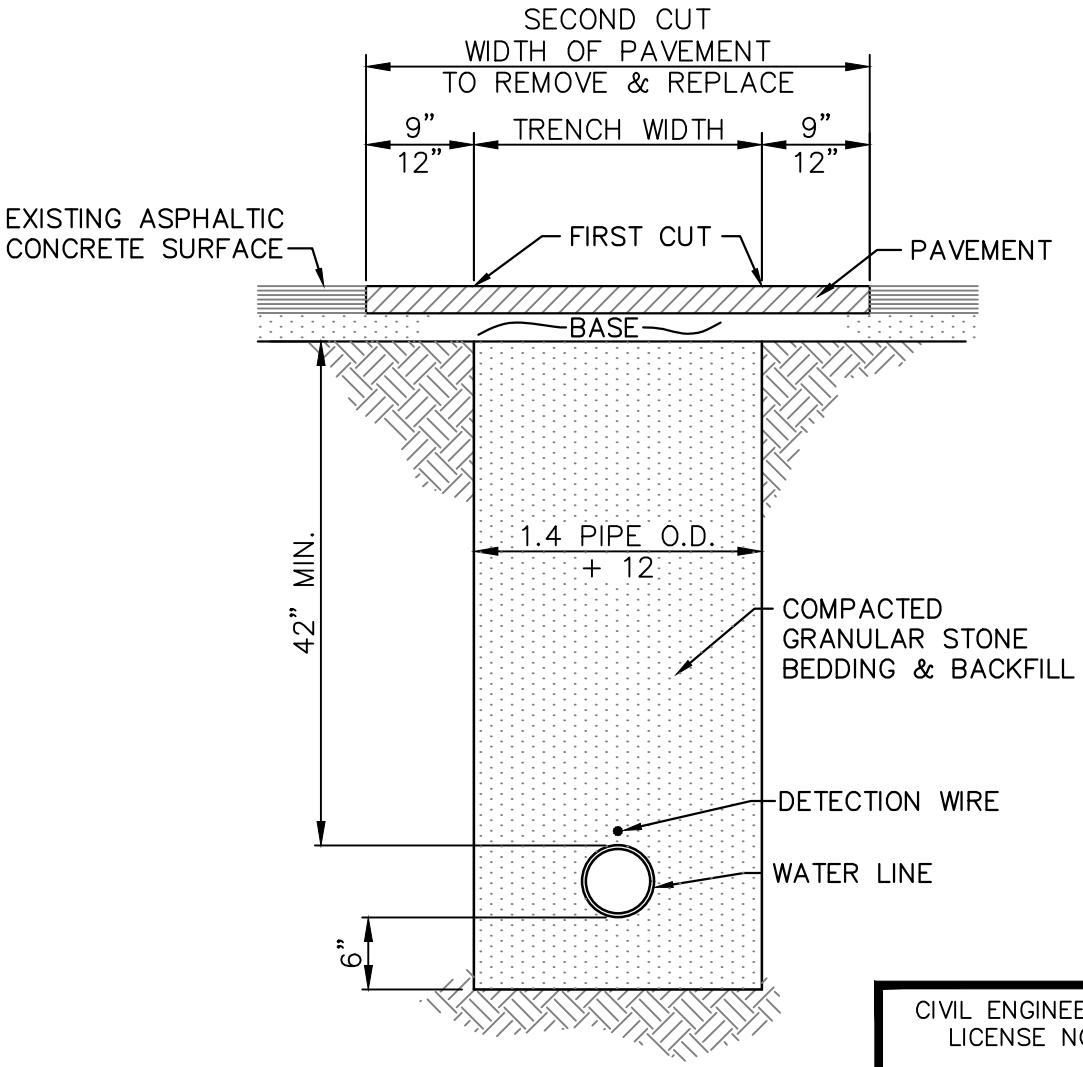
CW&EP
JUNE 2025

ALLGEIER, MARTIN and ASSOCIATES, INC.
CONSULTING ENGINEERS and SURVEYORS
7231 EAST 24th STREET JOPLIN, MISSOURI 64804 (417) 680 - 7200

CERTIFICATE OF AUTHORITY
MISSOURI NO. 000427

Z:\CARTHAGE MO\CARTHAGE WATER & ELECTRIC PLANT\WATER\CW&EP STANDARD SPECS\DRAWINGS\CITY STANDARD DETAILS WTR-2 TO 12.DWG

NOTE:
ALL TRENCHES ACROSS STREETS, ALLEYS, AND PUBLIC DRIVEWAYS SHALL BE BACKFILLED TO NATURAL OR FINISHED GRADE WITH APPROVED GRANULAR MATERIAL AS SOON AS CONDITIONS PERMIT. THE GRADE IS TO BE MAINTAINED UNTIL COMPACTED OR APPROVED BY THE ENGINEER. AFTER COMPACTION A FOUR-INCH THICK ASPHALTIC CONCRETE PATCH SHALL BE PLACED.



CIVIL ENGINEER: JOHN T. BRIGGS
LICENSE NO. E-2010019510

STATE OF MISSOURI
JOHN T.
BRIGGS
CWEP Stand Spec
NUMBER
PE-2010019510
7/7/25
PROFESSIONAL ENGINEER

WTR-3 - STREET CROSSING
CARTHAGE, MISSOURI

CW&EP
JUNE 2025

ALLGEIER, MARTIN and ASSOCIATES, INC.
CONSULTING ENGINEERS and SURVEYORS
7231 EAST 24th STREET JOPLIN, MISSOURI 64804 (417) 680 - 7200

CERTIFICATE OF AUTHORITY
MISSOURI NO. 000427

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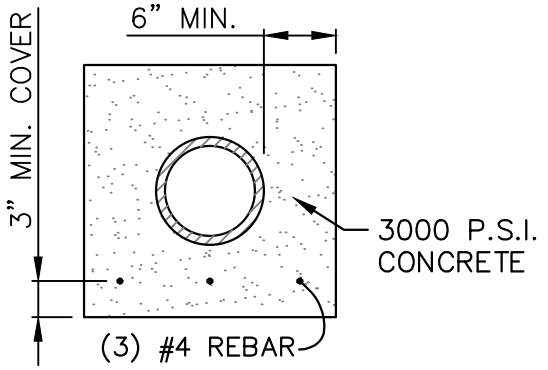
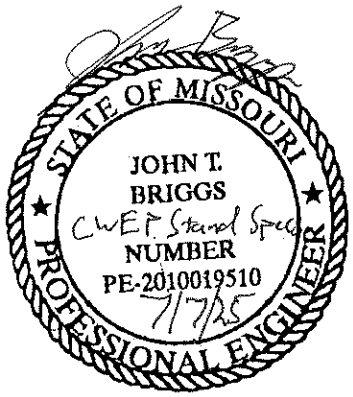


CIVIL ENGINEER: JOHN T. BRIGGS
LICENSE NO. E-2010019510



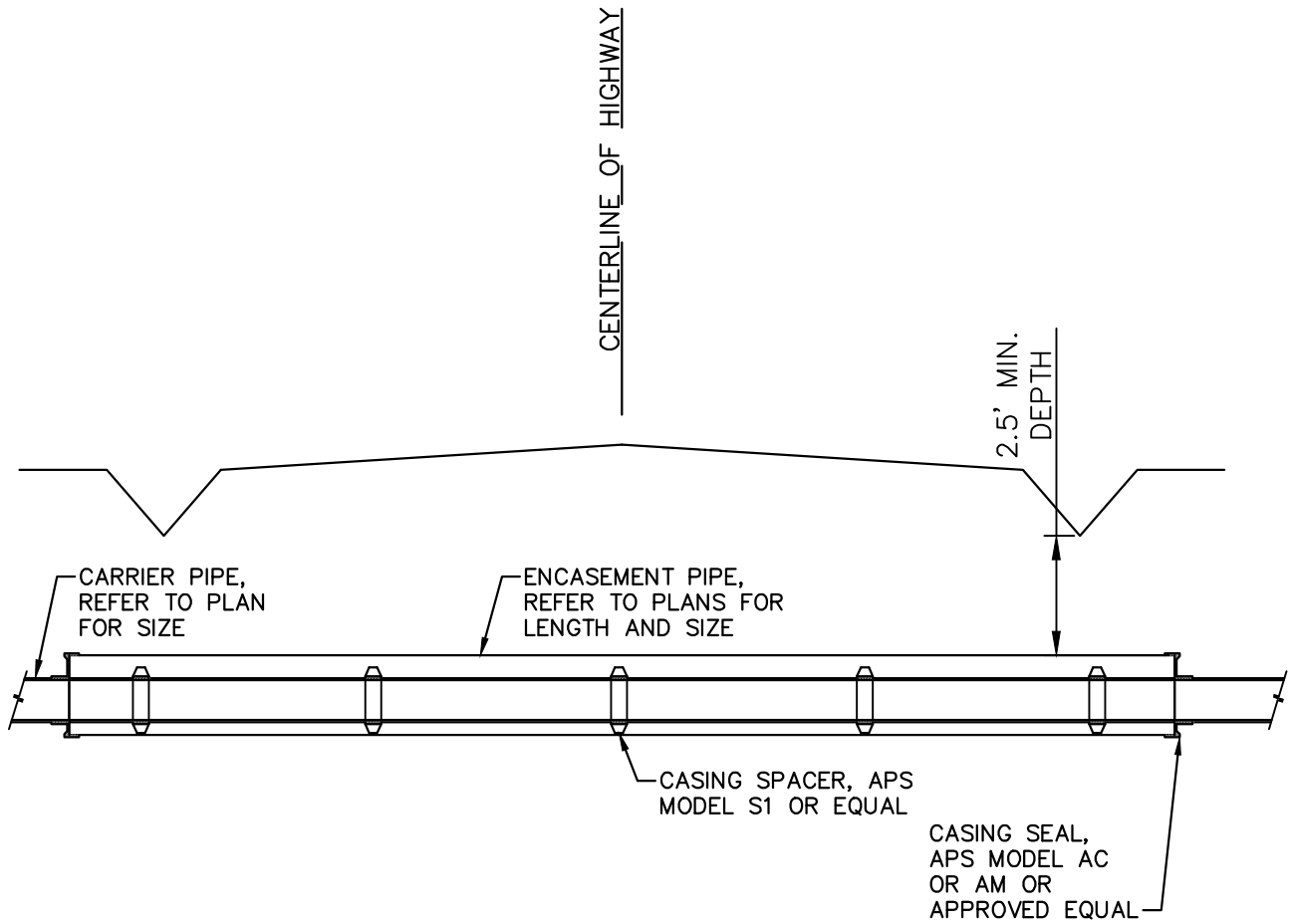
WTR-4 - CONCRETE ENCASEMENT
CARTHAGE, MISSOURI

CW&EP
JUNE 2025

ALLGEIER, MARTIN and ASSOCIATES, INC.
CONSULTING ENGINEERS and SURVEYORS
7231 EAST 24th STREET JOPLIN, MISSOURI 64804 (417) 680 - 7200

CERTIFICATE OF AUTHORITY
MISSOURI NO. 000427

Z:\CARTHAGE MO\CARTHAGE WATER & ELECTRIC PLANT\WATER\CW&EP STANDARD SPECS\DRAWINGS\CITY STANDARD DETAILS WTR-2 TO 12.DWG



CIVIL ENGINEER: JOHN T. BRIGGS
LICENSE NO. E-2010019510

WTR-5 - ENCASEMENT PIPE AND BORE — CW&EP
CARTHAGE, MISSOURI — JUNE 2025

ALLGEIER, MARTIN and ASSOCIATES, INC.
CONSULTING ENGINEERS and SURVEYORS
7231 EAST 24th STREET JOPLIN, MISSOURI 64804 (417) 680 - 7200

CERTIFICATE OF AUTHORITY
MISSOURI NO. 000427

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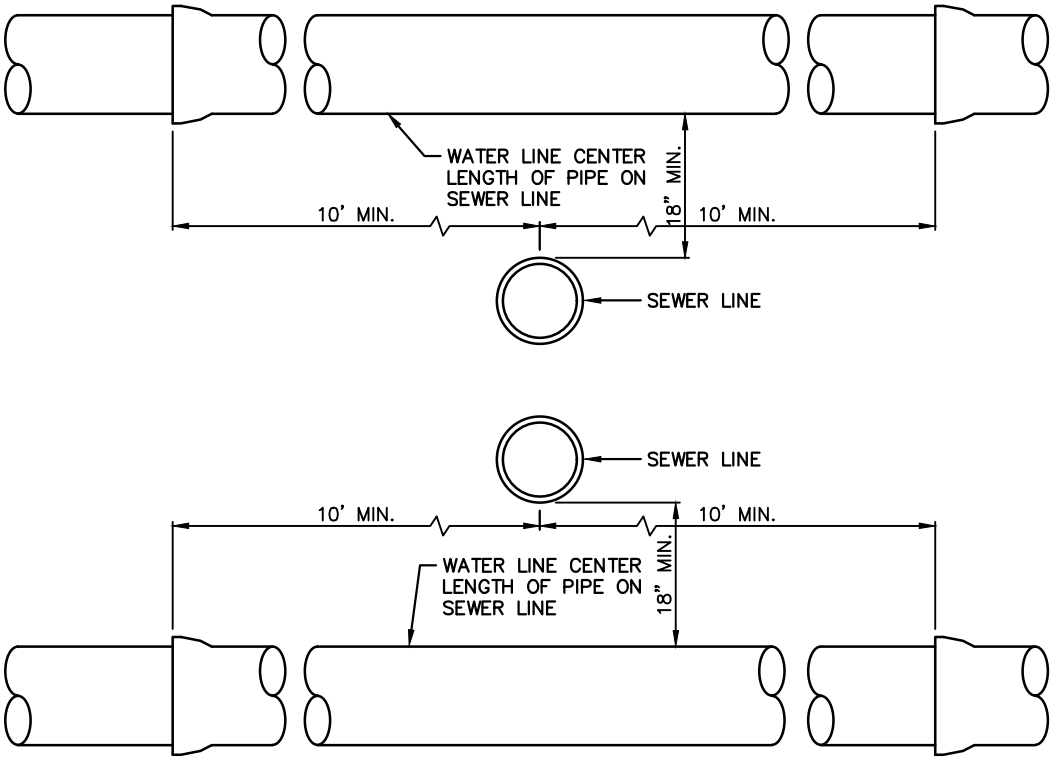

CIVIL ENGINEER: JOHN T. BRIGGS
LICENSE NO. E-2010019510

STATE OF MISSOURI
JOHN T.
BRIGGS
CWEP Stand Spec
NUMBER
PE-2010019510
7/7/25
PROFESSIONAL ENGINEER

WTR-6 - SEWER CROSSING
CARTHAGE, MISSOURI

CW&EP
JUNE 2025

ALLGEIER, MARTIN and ASSOCIATES, INC.
CONSULTING ENGINEERS and SURVEYORS
7231 EAST 24th STREET JOPLIN, MISSOURI 64804 (417) 680 - 7200

CERTIFICATE OF AUTHORITY
MISSOURI NO. 000427

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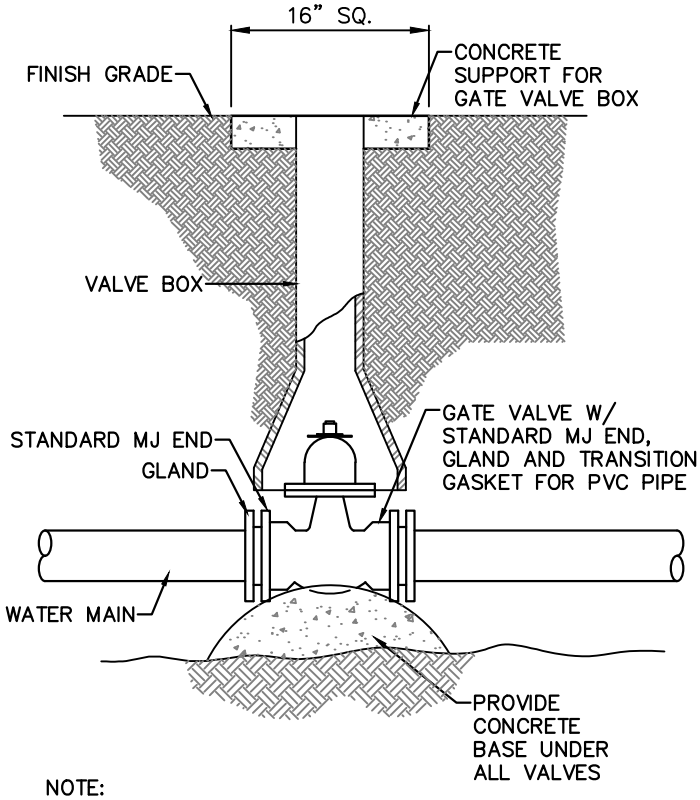

NOTE:
WHEN G.V. IS INSTALLED IN EXISTING DUCTILE OR C.I. PIPE, REPLACE TRANSITION GASKET W/ STANDARD MJ GASKET.

CIVIL ENGINEER: JOHN T. BRIGGS
LICENSE NO. E-2010019510

WTR-7 - GATE VALVE INSTALLATION — CW&EP
CARTHAGE, MISSOURI — JUNE 2025

ALLGEIER, MARTIN and ASSOCIATES, INC.
CONSULTING ENGINEERS and SURVEYORS
7231 EAST 24th STREET JOPLIN, MISSOURI 64804 (417) 680 - 7200

CERTIFICATE OF AUTHORITY
MISSOURI NO. 000427

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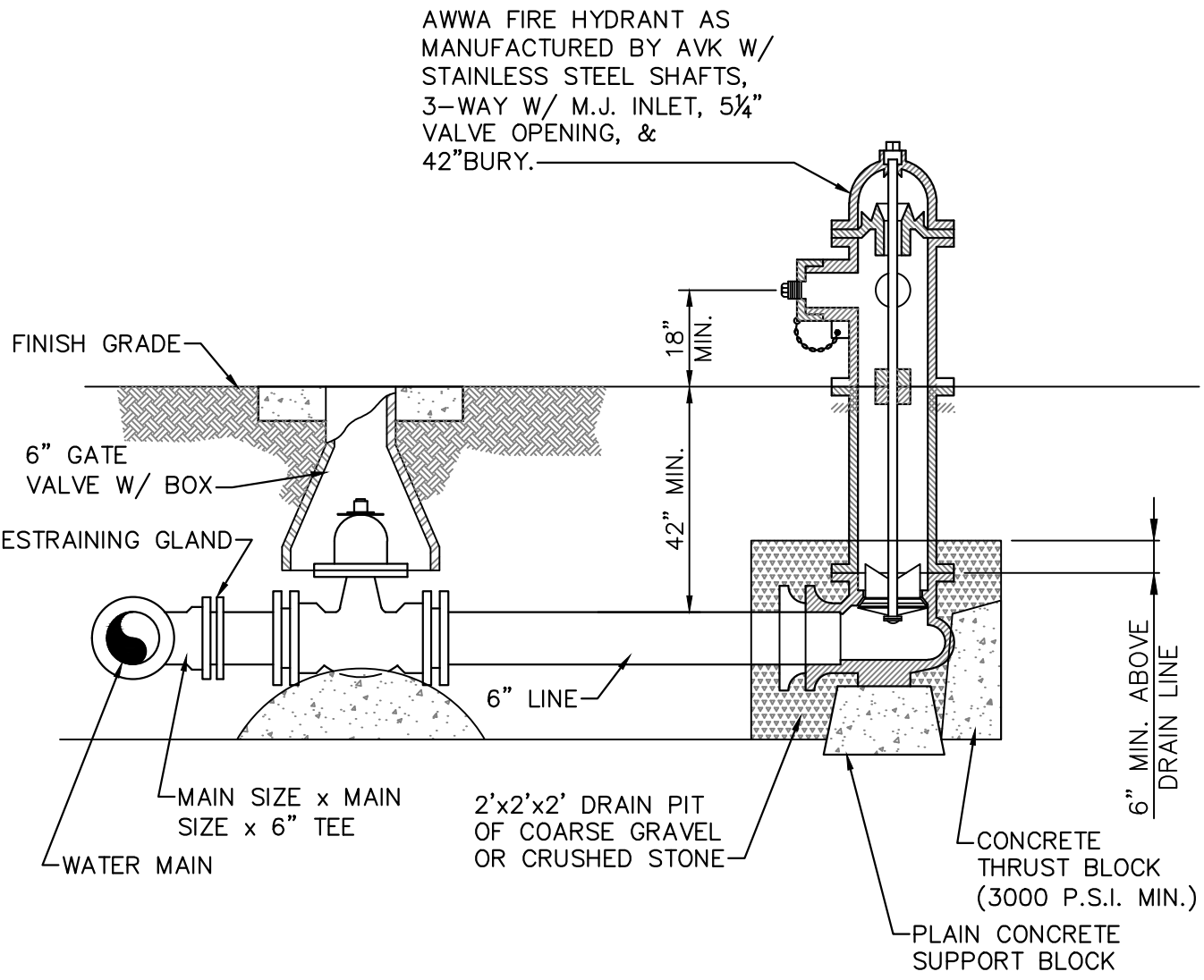

CIVIL ENGINEER: JOHN T. BRIGGS
LICENSE NO. E-2010019510

STATE OF MISSOURI
JOHN T. BRIGGS
CWEP Stand Spec
NUMBER
PE-2010019510
7/7/25
PROFESSIONAL ENGINEER

WTR-8 - FIRE HYDRANT
CARTHAGE, MISSOURI

CW&EP
JUNE 2025

ALLGEIER, MARTIN and ASSOCIATES, INC.
CONSULTING ENGINEERS and SURVEYORS
7231 EAST 24th STREET JOPLIN, MISSOURI 64804 (417) 680 - 7200

CERTIFICATE OF AUTHORITY
MISSOURI NO. 000427

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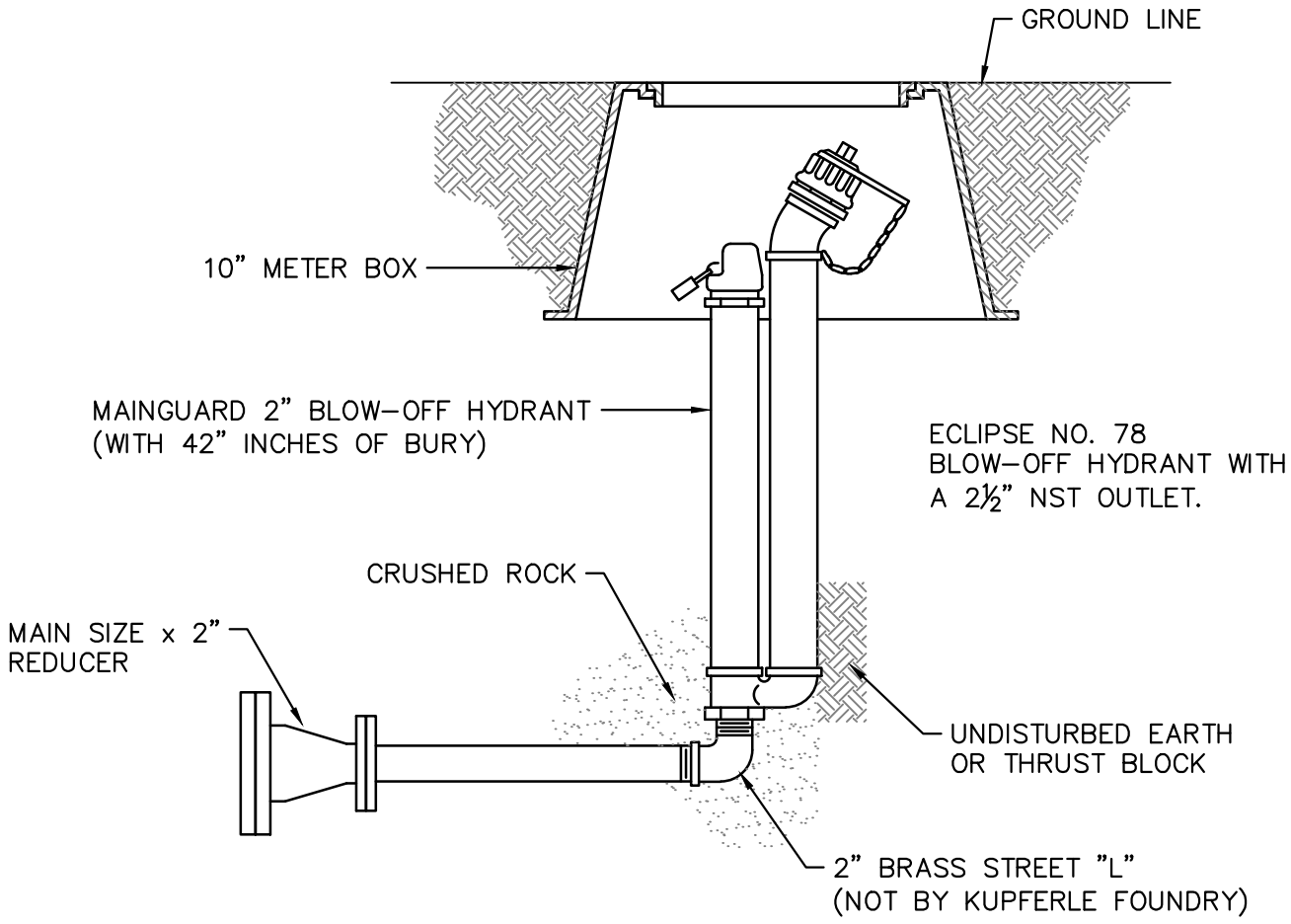
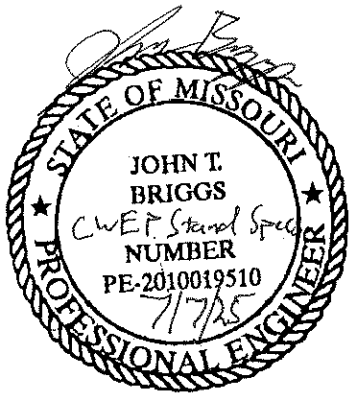


CIVIL ENGINEER: JOHN T. BRIGGS
LICENSE NO. E-2010019510



WTR-9 - FLUSH HYDRANT
CARTHAGE, MISSOURI

CW&EP
JUNE 2025

ALLGEIER, MARTIN and ASSOCIATES, INC.
CONSULTING ENGINEERS and SURVEYORS
7231 EAST 24th STREET JOPLIN, MISSOURI 64804 (417) 680 - 7200

CERTIFICATE OF AUTHORITY
MISSOURI NO. 000427

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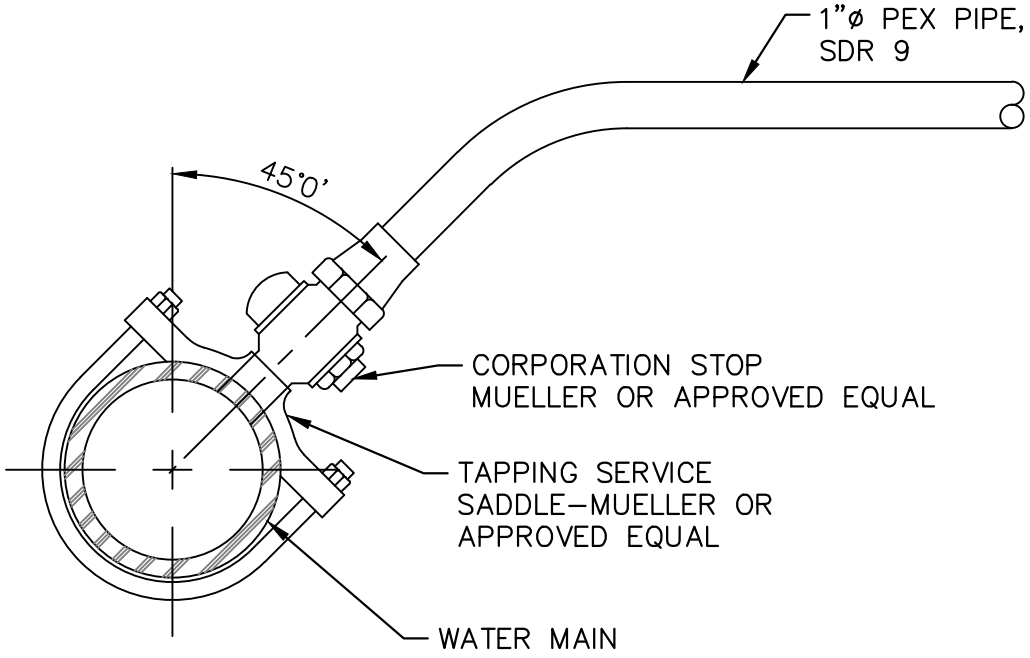

CIVIL ENGINEER: JOHN T. BRIGGS
LICENSE NO. E–2010019510

STATE OF MISSOURI
JOHN T.
BRIGGS
CWEP Stand Spec
NUMBER
PE-2010019510
7/7/25
PROFESSIONAL ENGINEER

WTR-10 - SERVICE TAP
CARTHAGE, MISSOURI

CW&EP
JUNE 2025

ALLGEIER, MARTIN and ASSOCIATES, INC.
CONSULTING ENGINEERS and SURVEYORS
7231 EAST 24th STREET JOPLIN, MISSOURI 64804 (417) 680 - 7200

CERTIFICATE OF AUTHORITY
MISSOURI NO. 000427

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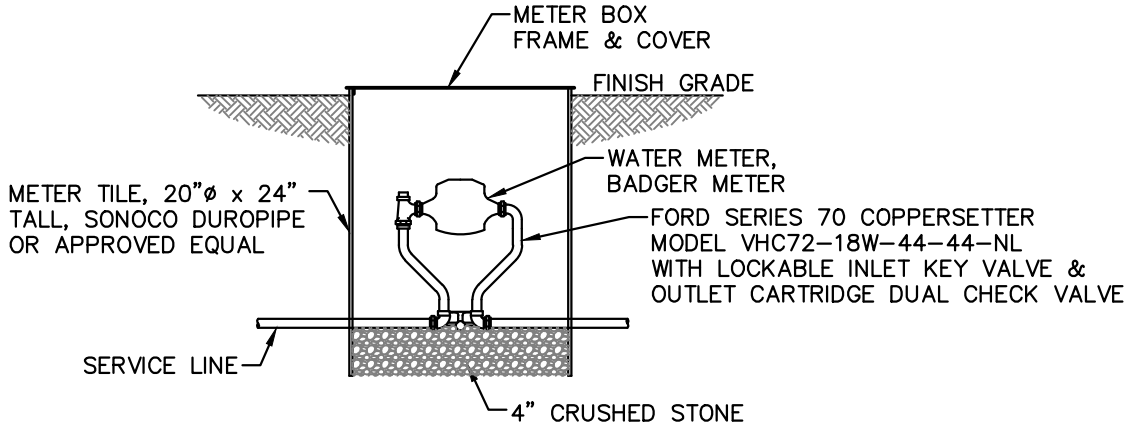
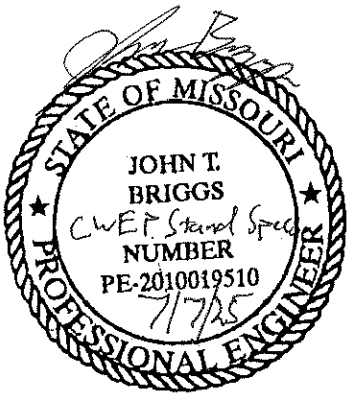


CIVIL ENGINEER: JOHN T. BRIGGS
LICENSE NO. E-2010019510



WTR-11 - WATER METER INSTALLATION — CW&EP
CARTHAGE, MISSOURI — JUNE 2025

ALLGEIER, MARTIN and ASSOCIATES, INC.
CONSULTING ENGINEERS and SURVEYORS
7231 EAST 24th STREET JOPLIN, MISSOURI 64804 (417) 680 - 7200

CERTIFICATE OF AUTHORITY
MISSOURI NO. 000427

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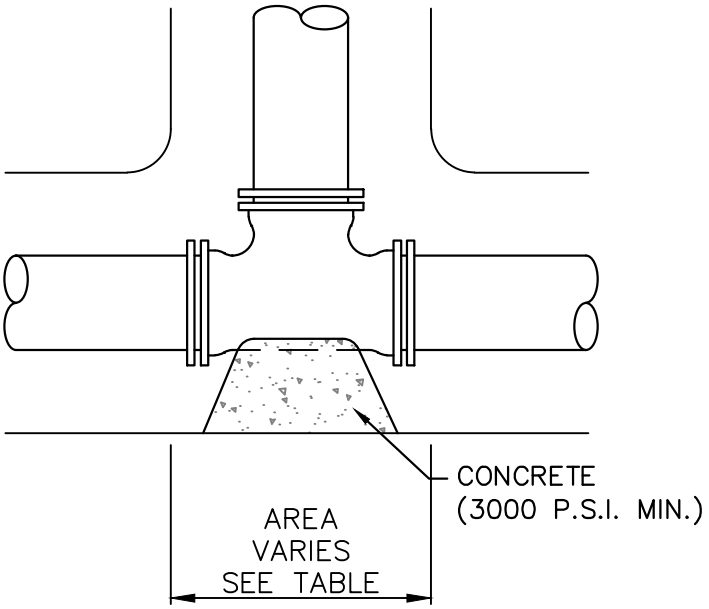

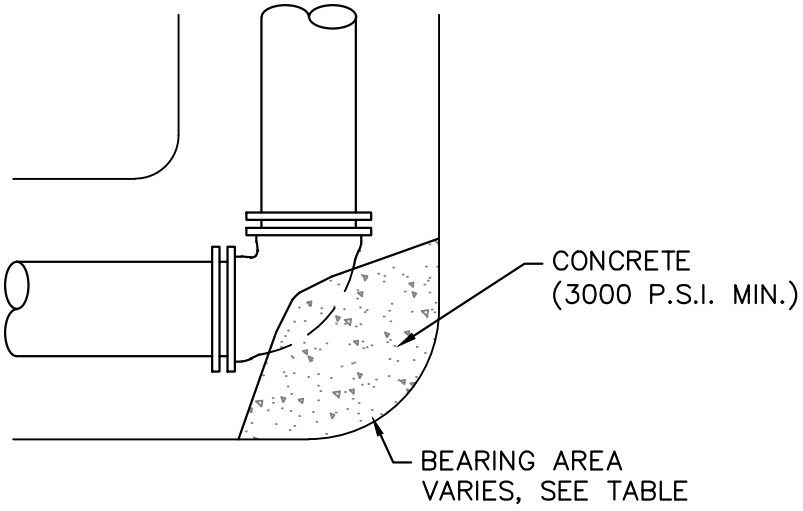

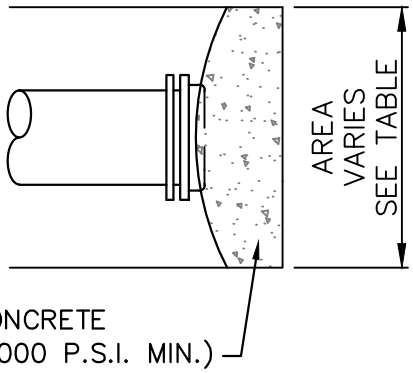

NOTE:
THRUST BLOCKING REQUIRED ON TEES, ELLS, PLUGS, CAPS, VALVES, ETC.

6" LINE OR SMALLER	4 SQUARE FEET
8" LINE	5 SQUARE FEET
12" LINE	8 SQUARE FEET

CIVIL ENGINEER: JOHN T. BRIGGS
LICENSE NO. E-2010019510

WTR-12 - THRUST BLOCK
CARTHAGE, MISSOURI

CW&EP
JUNE 2025

ALLGEIER, MARTIN and ASSOCIATES, INC.
CONSULTING ENGINEERS and SURVEYORS
7231 EAST 24th STREET JOPLIN, MISSOURI 64804 (417) 680 - 7200

CERTIFICATE OF AUTHORITY
MISSOURI NO. 000427

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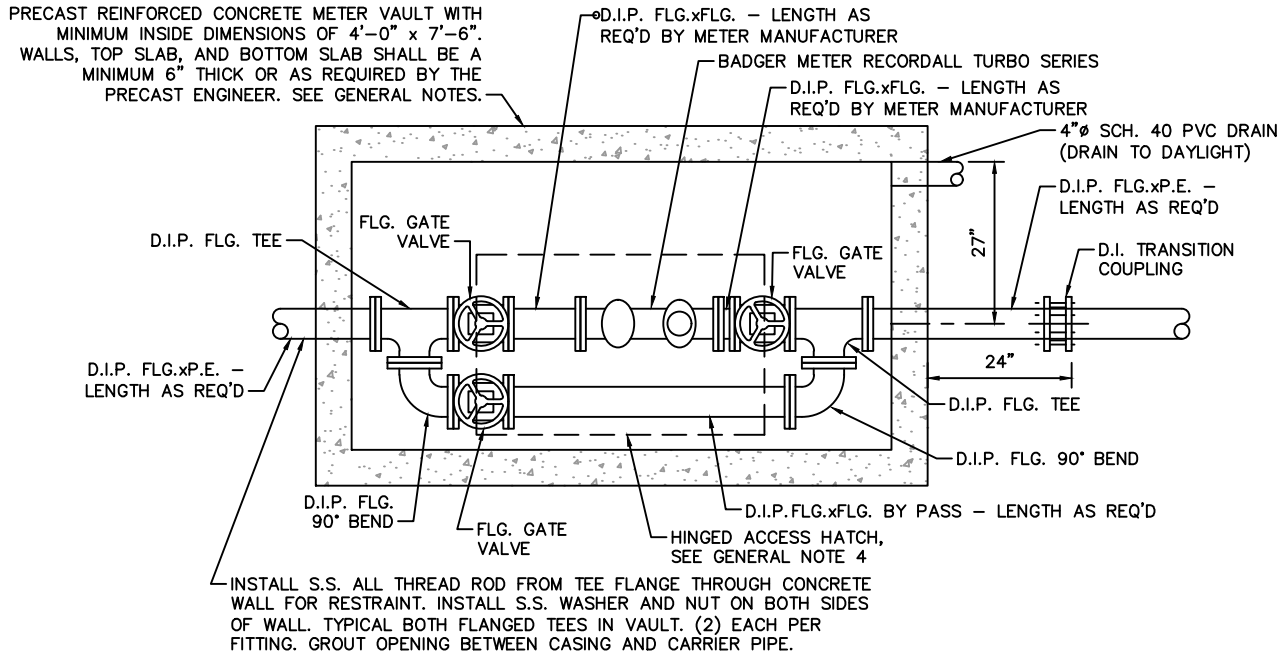
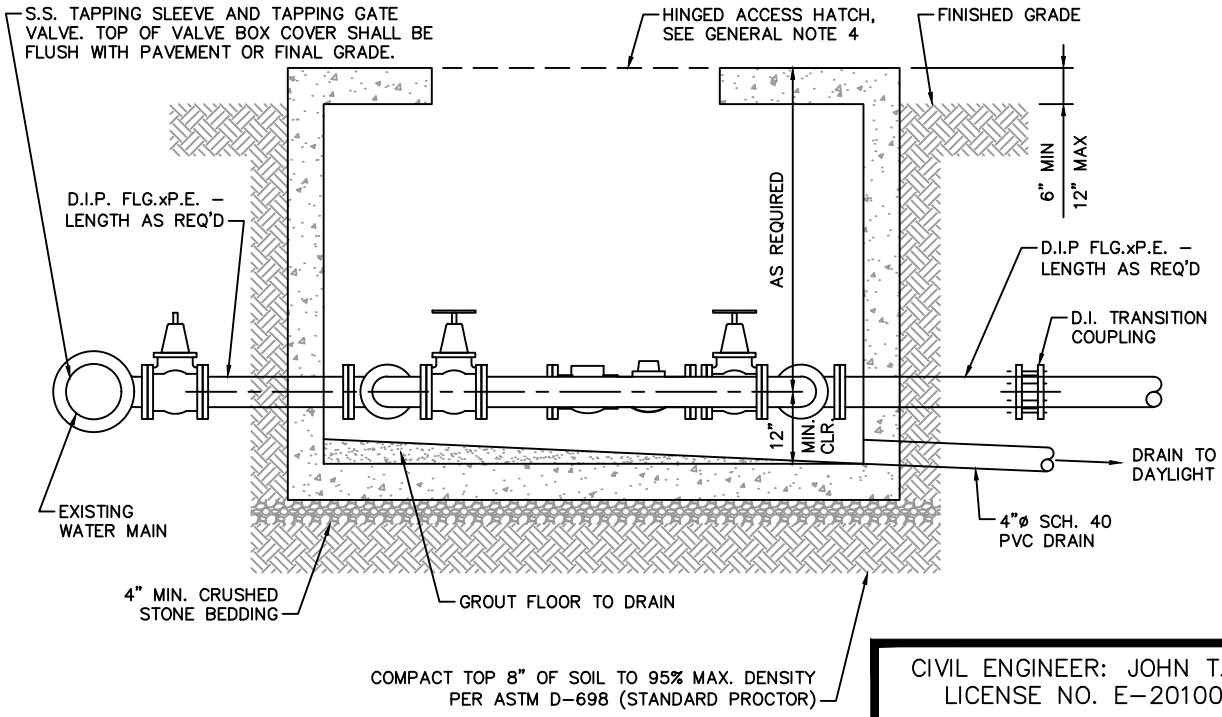
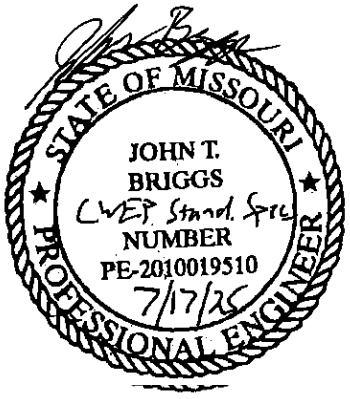




GENERAL NOTES:

1. PRECAST CONCRETE SHALL CONFORM TO ACI 318.
2. PRECAST CONCRETE STRUCTURAL DESIGN SHALL CONFORM TO ASTM C890.
3. IN ADDITION TO THE DESIGN REQUIREMENTS OF ASTM C890, PRECAST BOTTOM SLAB SHALL BE DESIGNED FOR 1,500 PSF UNIFORM LOADING IN BOTH DIRECTIONS. PRECAST CONCRETE TOP SLAB SHALL BE DESIGNED FOR 300 PSF UNIFORM LOADING (DOWN).
4. TOP SLAB SHALL HAVE A 30"x48" SINGLE LEAF, ALUMINUM, FLOOR ACCESS DOOR. ACCESS DOOR SHALL HAVE A LOAD RATING OF 300 PSF. CLEAR OPENING SHALL BE ROUGHLY CENTERED OVER METER/STRAINER.

CIVIL ENGINEER: JOHN T. BRIGGS
LICENSE NO. E-2010019510



WTR-13 - METER VAULT
CARTHAGE, MISSOURI

CW&EP
JULY 2025

ALLGEIER, MARTIN and ASSOCIATES, INC.
CONSULTING ENGINEERS and SURVEYORS
7231 EAST 24th STREET JOPLIN, MISSOURI 64804 (417) 680 - 7200

CERTIFICATE OF AUTHORITY
MISSOURI NO. 000427

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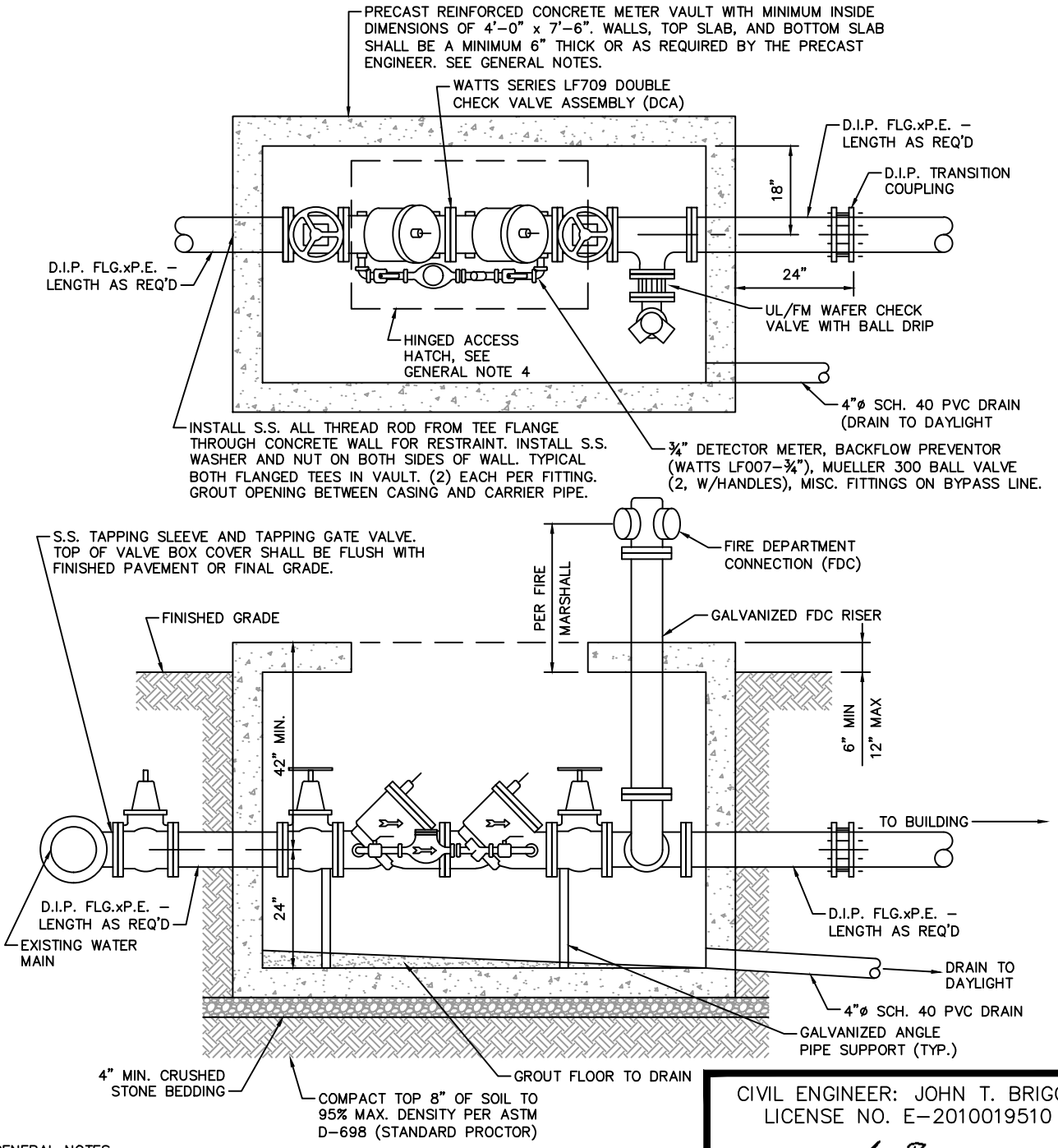


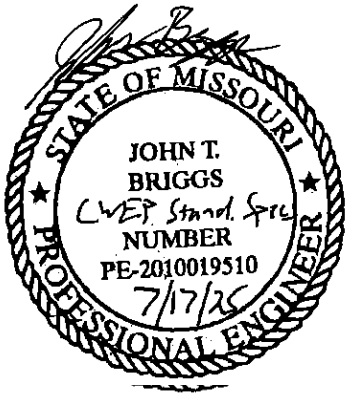
GENERAL NOTES:

1. PRECAST CONCRETE SHALL CONFORM TO ACI 318.
2. PRECAST CONCRETE STRUCTURAL DESIGN SHALL CONFORM TO ASTM C890.
3. IN ADDITION TO THE DESIGN REQUIREMENTS OF ASTM C890, PRECAST BOTTOM SLAB SHALL BE DESIGNED FOR 1,500 PSF UNIFORM LOADING IN BOTH DIRECTIONS. PRECAST CONCRETE TOP SLAB SHALL BE DESIGNED FOR 300 PSF UNIFORM LOADING (DOWN).
4. TOP SLAB SHALL HAVE A 30"x48" SINGLE LEAF, ALUMINUM, FLOOR ACCESS DOOR. ACCESS DOOR SHALL HAVE A LOAD RATING OF 300 PSF. CLEAR OPENING SHALL BE ROUGHLY CENTERED OVER METER/STRAINER.

WTR-14 - FDC/DCA VAULT
CARTHAGE, MISSOURI

CW&EP
JULY 2025

CIVIL ENGINEER: JOHN T. BRIGGS
LICENSE NO. E-2010019510



ALLGEIER, MARTIN and ASSOCIATES, INC.
CONSULTING ENGINEERS and SURVEYORS
7231 EAST 24th STREET JOPLIN, MISSOURI 64804 (417) 680 - 7200

CERTIFICATE OF AUTHORITY
MISSOURI NO. 000427