

Job No.: JSE0160
Route: C
County: Madison

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(Job Special Provisions shall prevail over General Special Provisions whenever in conflict therewith.)

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	MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 W. CAPITOL AVE. JEFFERSON CITY, MO 65102 Phone 1-888-275-6636
	<i>HNTB Corporation</i> <i>Consultant Address</i> 715 Kirk Drive Kansas City, MO 64105 Certificate of Authority: 001270 Consultant Phone: (816) 472-1201
	If a seal is present on this sheet, JSP's have been electronically sealed and dated.
	Job Number: JSE0160 Madison County, MO Date Prepared: 2/06/2023
	ADDENDUM DATE:
Only the following items of the Job Special Provisions (Roadway) are authenticated by this seal: L	

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JOB
SPECIAL PROVISION

1 General - Federal JSP-09-02J

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 2023 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.

A. Contract Liquidated Damages JSP-13-01B

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 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.

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Notice to Proceed: November 6, 2023
Completion Date: May 15, 2024

2.1 Calendar Days. The count of calendar days will begin on the date the contractor starts any construction operations on the project.

Job Number	Calendar Days	Daily Road User Cost
JSE0160	100	\$1800

3.0 Liquidated Damages for Contract Administrative Costs. Should the contractor fail to complete the work on or before the 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 **\$500** 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 above specified 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 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.

B. Work Zone Traffic Management JSP-02-06M

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.

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

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3.2 Short duration closure special provisions. Short duration closures may be used to construct the soil nail wall and install guardrail, as approved by the engineer

3.2.1 The contractor will only be allowed to close Route C, Monday through Friday between the hours of 7:30 a.m. and 3:30 p.m., unless otherwise approved by the Engineer. This 8-hour allowed closure time may be shortened based on travelling public needs as specified by the engineer. This timeframe was selected based on allowing school busses to use the roadway during their morning and afternoon bus routes.

3.2.2 Motorist delays will have a resulting cost on the traveling public. Therefore, the contractor will be charged with liquidated damages specified in the amount of **\$272** per 15-minute increment for each 15 minutes that the road is closed due to the contractor's operation, in excess of the approved, scheduled 8-hour closures as detailed above. It shall be the responsibility of the engineer to determine the quantity of unapproved closure time.

3.2.3 As directed by the Engineer, the Contractor will coordinate with local businesses to accommodate access through the construction zone. In specific, the Contractor shall notify Madison County Wood Products three weeks prior to the start of the project. The contact for Madison County Wood Products is listed below.

Doug Gaines
Madison County Wood Works
Phone: (314)795-4734

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 Except for the allowable road closures, 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.

C. Emergency Provisions and Incident Management JSP-90-11A

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 area 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 800-525-5555	
City of Fredericktown	Madison County, MO
Fire: 573-783-3575	Sheriff: 573-783-2234
Police: 573-783-3660	

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.

D. Project Contact for Contractor/Bidder Questions JSP-96-05

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

Pete Berry, PE, Project Contact
MoDOT, Southeast District
2675 N. Main Street
Sikeston, MO 63801

Telephone Number: (417) 469-6242
Email: Chris.Berry@modot.mo.gov

All questions concerning the bid document preparation can be directed to the Central Office – Design at (573) 751-2876.

E. Supplemental Revisions JSP-18-01Z

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

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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.

Anti-Discrimination Against Israel Certification

By signing this contract, the Company certifies it is not currently engaged in and shall not, for the duration of the contract, engage in a boycott of goods or services from the State of Israel, companies doing business in or with Israel or authorized by, licensed by, or organized under the laws of the State of Israel, or persons or entities doing business in the State of Israel as defined by Section 34.600 RSMo. This certification shall not apply to contracts with a total potential value of less than One Hundred Thousand Dollars (\$100,000) or to contractors with fewer than ten (10) employees.

Ground Tire Rubber (GTR) Dry Process Modification of Bituminous Pavement Material

1.0 Description. This work shall consist of the dry process of adding ground tire rubber (GTR) to modify bituminous material to be used in highway construction. Existing GTR requirements in Section 1015 pertain to the wet process method of GTR modification that blends GTR with the asphalt binder (terminal blending or blending at HMA plant). The following requirements shall govern for dry process GTR modification. The dry process method adds GTR as a fine aggregate or mineral filler during mix production. All GTR modified asphalt mixtures shall be in accordance with Secs 401, 402, or 403 as specified in the contract; except as revised by this specification.

2.0 Materials. The contractor shall furnish a manufacturer's certification to the engineer for each shipment of GTR furnished stating the name of the manufacturer, the chemical composition, workability additives, and certifying that the GTR supplied is in accordance with this specification.

2.1 Product Approval. The GTR product shall contain a Trans-Polyoctenamer (TOR) added at 4.5 % of the weight of the crumb rubber or an engineered crumb rubber (ECR) workability additive that has proven performance in Missouri. Other GTR additives shall be demonstrated and proven prior to use such as a five-year field performance history in other states or performance on a federal or state-sanctioned accelerated loading facility.

2.2 General. GTR shall be produced from processing automobile or truck tires by ambient or cryogenic grinding methods. Heavy equipment tires, uncured or de-vulcanized rubber will not be permitted. GTR shall also meet the following material requirements:

Table 1 – GTR Material Properties		
Property	Test Method	Criteria
Specific Gravity	ASTM D1817	1.02 to 1.20
Metal Contaminates	ASTM D5603	$\leq 0.01\%$
Fiber Content	ASTM D5603	$\leq 0.5\%$
Moisture Content	ASTM D1509	$\leq 1.0\%^*$
Mineral Filler	AASHTO M17	$\leq 4.0\%$

*Moisture content of the GTR shall not cause foaming when combined with asphalt binder and aggregate during mix production

2.3 Gradation. The GTR material prior to TOR or ECR workability additives shall meet the following gradation and shall be tested in accordance with ASTM D5603 and ASTM D5644.

Table 2 – GTR Gradation	
Sieve	Percent Passing by Weight
No. 20	100
No. 30	98-100
No. 40	50-70
No. 100	5-15

3.0 Delivery, Storage, and Handling. The GTR shall be supplied in moisture-proof packaging or other appropriate bulk containers. GTR shall be stored in a dry location protected from rain before use. Each bag or container shall be properly labeled with the manufacturer's designation for the GTR and specific type, mesh size, weight and manufacturer's batch or Lot designation.

4.0 Feeder System. Dry Process GTR shall be controlled with a feeder system using a proportioning device that is accurate to within ± 3 percent of the amount required. The system shall automatically adjust the feed rate to always maintain the material within this tolerance and shall have a convenient and accurate means of calibration. The system shall provide in-process monitoring, consisting of either a digital display of output or a printout of feed rate, in pounds per minute, to verify feed rate. The supply system shall report the feed in 1-pound increments using load cells that will enable the user to monitor the depletion of the GTR. Monitoring the system volumetrically will not be allowed. The feeder shall interlock with the aggregate weight system and asphalt binder pump to maintain correct mixture proportions at all production rates.

Flow indicators or sensing devices for the system shall be interlocked with the plant controls to interrupt mixture production if GTR introduction rate is not within ± 3 percent. This interlock will immediately notify the operator if GTR introduction rate exceeds introduction tolerances. All plant production will cease if the introduction rate is not brought back within tolerance after 30 seconds. When the interlock system interrupts production and the plant has to be restarted, upon restarting operations; the modifier system shall run until a uniform feed can be observed on the output display. All mix produced prior to obtaining a uniform feed shall be rejected.

4.1 Batch Plants. GTR shall be added to aggregate in the weigh hopper. Mixing times shall be increased per GTR manufacturer recommendations.

4.2 Drum Plants. The feeder system shall add GTR to aggregate and liquid binder during mixing and provide sufficient mixing time to produce a uniform mixture. The feeder system shall ensure GTR does not become entrained in the exhaust system of the drier or plant and is not exposed to the drier flame at any point after introduction.

5.0 Testing During Mixture Production. Testing of asphalt mixes containing GTR shall not begin until at least 30 minutes after production or per additive supplier's recommendation.

6.0 Construction Requirements. Mixes containing GTR shall have a target mixing temperature of 325 F or as directed by the GTR additive supplier. The additive supplier's recommendations shall be followed to allow for GTR binder absorption/reaction. This may include holding mix in the silo to allow time for binder to absorb into the GTR. Rolling operations may need to be modified.

7.0 Mix Design Test Method Modification. A formal mixing procedure from the additive supplier shall be provided to the contractor and engineer that details the proper sample preparation, including blending GTR with the binder or other additives. Samples shall be prepared and fabricated in accordance with this procedure by the engineer and contractor throughout the duration of the project.

8.0 Mix design Volumetrics. Mix design volumetric equations shall be modified as follows:

8.1 Additional virgin binder added to offset GTR absorption of binder shall be counted as part of the mix virgin binder

8.2 GTR shall be included as part of the aggregate when calculating VMA of the mix.

8.2.1 GTR SPG shall be 1.15

8.3 Mix G_{sb} used to determine VMA shall be calculated as follows:

$$G_{sb (JMF)} = \frac{(100 - P_{bmv})}{\left(\frac{P_s}{G_{sb}} + \frac{P_{GTR}}{G_{GTR}}\right)}$$

where:

$G_{sb (JMF)}$ = bulk specific gravity of the combined aggregate including GTR

P_{bmv} = percent virgin binder by total mixture weight

P_s = percent aggregate by total mixture weight (not including GTR)

P_{GTR} = percent GTR by total mixture weight

G_{sb} = bulk specific gravity of the combined aggregate (not including GTR)

G_{GTR} = GTR specific gravity

8.4 G_{se} shall be calculated as follows:

$$G_{se} = \frac{(100 - P_b - P_{GTR})}{\left(\frac{100}{G_{mm}} - \frac{P_b}{G_b} - \frac{P_{GTR}}{G_{GTR}}\right)}$$

8.5 P_{be} shall be calculated as follows:

$$P_{be} = P_b - \frac{P_{ba}}{100} * (P_s + P_{GTR})$$

9.0 Minimum GTR Amount. The minimum dosage rate for GTR shall be 5 % by weight of total binder for an acceptable one bump grade or 10 % by weight of total binder for an acceptable two bump grade as detailed in the following table. Varying percentage blends of GTR and approved additives may be used as approved by the engineer with proven performance and meeting the specified requirements of the contract grade.

Contract Binder Grade	Percent Effective Virgin Binder Replacement Limits	Required Virgin Binder Grade	Minimum GTR Dosage Rate
PG 76-22	0 - 20	PG 70-22	5 %
		PG 64-22	10 %
PG 70-22	0 - 30	PG 64-22	5 %
		PG 58-28	10 %
PG 64-22	0 – 40*	PG 58-28	5 %
		PG 52-34	10 %
PG 58-28	0 – 40*	PG 52-34	5 %
		PG 46-34	10 %

* Reclaimed Asphalt Shingles (RAS) may be used when the contract grade is PG 64-22 or PG 58-28. RAS replacement shall follow the 2 x RAS criteria when calculating percent effective binder replacement in accordance Sec 401.

Buy America

In addition to Section 106.9 of the Missouri Standard Specifications for Highway Construction, the following requirements will also be in effect for this project.

1.0 Description. The Bipartisan Infrastructure Law (BIL) was enacted on November 15, 2021. The BIL includes Build America, Buy America Act Publication L. No. 117-58. This provision expands the Buy America requirements beyond what is currently only required for steel and iron products. The steel and iron provisions have not changed with the new bill. Cement and cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives are excluded from this requirement. All other materials and manufactured products permanently incorporated into the project will be subject to Buy America requirements. There are three categories requiring Buy America Certification:

- Iron and steel – no changes to the current specification requirements.

- b) Manufactured products – these are currently exempted under the 1983 waiver from FHWA.
- c) Construction materials consisting primarily of:
- Non-ferrous metals;
 - Plastic and polymer-based products (including polyvinylchloride, composite build materials, and polymers used in fiber optic cables);
 - Glass (including optic glass);
 - Lumber; or
 - Drywall

1.1 All products and or materials will only be classified under one of these categories and not under multiple categories. It is the prime contractor's responsibility to assure all submittals required for Buy America are submitted to the Engineer prior to the products and or materials being incorporated in the job. The implementation of this policy will be in effect for all projects awarded after November 10, 2022.

1.2 New items designated as construction materials under this requirement will require the prime contractor to submit a material of origin form certification prior to incorporation into the project. The Certificate of Material origin form ([link to certificate form](#)) from the supplier and/or fabricator must show all steps of the manufacturing being completed in the United States. The Certificate of Material form shall be filed with the contract documents.

1.3 Any minor miscellaneous construction material items that are not included in the materials specifications shall be certified by the prime contractor as being procured domestically. The certification shall read "I certify all materials permanently incorporated in this project covered under this provision have been to the best of my knowledge procured and all manufactured domestically." The certification shall be signed by an authorized representative of the prime contractor.

1.4 The National Transportation Product Evaluation Program (NTPEP) compliance program verifies that some non-iron and steel products fabrication processes conform to 23 CFR 635.410 Buy America Requirements and an acceptable standard per 23 CFR 635.410(d). NTPEP compliant suppliers will not be required to submit step certification documentation with the shipment for some selected non-iron and steel materials. The NTPEP compliant supplier shall maintain the step certification documentation on file and shall provide this documentation to the engineer upon request.

2.0 Basis of Payment. Any costs incurred by the contractor by reason of compliance with the above requirements shall be considered as included in and completely covered by the unit price bid for the various items of work included in the contract.

Delete Sec 403.19.2 and substitute the following:

403.19.2 Lots. The lot size shall be designated in the contractor's QC Plan. Each lot shall contain no less than four sublots and the maximum sublot size shall be 1,000 tons. The maximum lot size shall be 4,000 tons for determination of pay factors. Sublots from incomplete lots shall be combined with the previous complete lot for determination of pay factors. When no previous lot exists, the mixture shall be treated in accordance with [Sec 403.23.7.4.1](#). A new lot shall begin when the asphalt content of a mixture is adjusted in accordance with [Sec 403.11](#).

F. Utilities JSP-93-26F

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:

<u>Utility Name</u>	<u>Known Required Adjustment</u>	<u>Type</u>
AT&T Distribution Allen Rich 222 West Main Park Hills, MO 63601 Phone: (573) 431-4589 Phone: (636) 232-4917 Email: ar1629@att.com	None	Communication

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.

2.0 Project Specific Provisions : No utility conflicts are anticipated.

G. Contractor Quality Control NJSP-15-42

1.0 The contractor shall perform Quality Control (QC) testing in accordance with the specifications and as specified herein. The contractor shall submit a Quality Control Plan (QC Plan) to the engineer for approval that includes all items listed in Section 2.0, prior to beginning work.

2.0 Quality Control Plan.

- (a) The name and contact information of the person in responsible charge of the QC testing.

- (b) A list of the QC technicians who will perform testing on the project, including the fields in which they are certified to perform testing.
- (c) A proposed independent third party testing firm for dispute resolution, including all contact information.
- (d) A list of Hold Points, when specified by the engineer.
- (e) The MoDOT Standard Inspection and Testing Plan (ITP). This shall be the version that is posted at the time of bid on the MoDOT website (www.modot.org/quality).

3.0 Quality Control Testing and Reporting. Testing shall be performed per the test method and frequency specified in the ITP. All personnel who perform sampling or testing shall be certified in the MoDOT Technician Certification Program for each test that they perform.

3.1 Reporting of Test Results. All QC test reports shall be submitted as soon as practical, but no later than the day following the test. Test data shall be immediately provided to the engineer upon request at any time, including prior to the submission of the test report. No payment will be made for the work performed until acceptable QC test results have been received by the engineer and confirmed by QA test results.

3.1.1 Test results shall be reported on electronic forms provided by MoDOT. Forms and Contractor Reporting Excel2Oracle Reports (CRE2O) can be found on the MoDOT website. All required forms, reports and material certifications shall be uploaded to a Microsoft SharePoint® site provided by MoDOT, and organized in the file structure established by MoDOT.

3.2 Non-Conformance Reporting. A Non-Conformance Report (NCR) shall be submitted by the contractor when the contractor proposes to incorporate material into the work that does not meet the testing requirements or for any work that does not comply with the contract terms or specifications.

3.2.1 Non-Conformance Reporting shall be submitted electronically on the Non-Conformance Report form provided on the MoDOT Website. The NCR shall be uploaded to the MoDOT SharePoint® site and an email notification sent to the engineer.

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

4.0 Work Planning and Scheduling.

4.1 Two-week Schedule. Each week, the contractor shall submit to the engineer a schedule that outlines the planned project activities for the following two-week period. The two-week schedule shall detail all work and traffic control events planned for that period and any Hold Points specified by the engineer.

4.2 Weekly Meeting. When work is active, the contractor shall hold a weekly project meeting with the engineer to review the planned activities for the following week and to resolve any outstanding issues. Attendees shall include the engineer, the contractor superintendent or project manager and any foreman leading major activities. This meeting may be waived when, in the opinion of the engineer, a meeting is not necessary. Attendees may join the meeting in person, by phone or video conference.

4.3 Pre-Activity Meeting. A pre-activity meeting is required in advance of the start of each new activity, except when waived by the engineer. The purpose of this meeting is to review construction details of the new activity. At a minimum, the discussion topics shall include: safety precautions, QC testing, traffic impacts, and any required Hold Points. Attendees shall include the engineer, the contractor superintendent and the foreman who will be leading the new activity. Pre-activity meetings may be held in conjunction with the weekly project meeting.

4.4 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, in the opinion of the engineer, a review of the preceding work is necessary before continuation to the next stage.

4.4.1 A list of typical Hold Point events is available on the MoDOT website. Use of the Hold Point process will only be required for the project-specific list of Hold Points, if any, that the engineer submits to the contractor in advance of the work. The engineer may make changes to the Hold Point list at any time.

4.4.2 Prior to all Hold Point inspections, the contractor shall verify the work has been completed in accordance with the contract and specifications. 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. Re-scheduling of Hold Points require a minimum 24-hour advance notification from the contractor unless otherwise allowed by the engineer.

5.0 Quality Assurance Testing and Inspection. MoDOT will perform quality assurance testing and inspection of the work, except as specified herein. The contractor shall utilize the inspection checklists provided in the ITP as a guide to minimize findings by MoDOT inspection staff. Submittal of completed checklists is not required, except as specified in 5.1.

5.1 Inspection and testing required in the production of concrete for the project shall be the responsibility of the contractor. Submittal of the 501 Concrete Plant Checklist is required.

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

H. Guardrail Posts in Asphalt

1.0 Description. This work shall consist of the coring of new holes to install posts that fall within the limits of the asphalt surface, and the backfilling of material in the new locations in accordance with the plans and these provisions.

2.0 Construction Requirements. Posts holes for the new MGS guardrail shall be installed in the asphalt per Standard Plan 606.50. The post hole slots shall be filled with coarse Type 1 Aggregate to within two (2) inches of the surface. The top two (2) inches shall be filled with compacted hot mix asphalt or a dense cold asphalt repair mix. The purpose of the capped material is to prevent water intrusion.

2.1 The contractor shall note that with the presence of rock, many of the posts will need to be set in rock per the Standard Plans. This may affect the size of the post holes and post hole slots.

3.0 Method of Measurement. Measurement of Guardrail Posts in Asphalt will be per each new post installation that falls within the limits of the asphalt surface.

4.0 Basis of Payment. All labor, equipment, and materials necessary for compliance with this provision, including setting posts in subsurface rock, will be paid for at the contract unit bid price for Item 606-99.02, Misc. Guardrail Posts in Asphalt, per each.

I. Relocate Crashworthy End Terminal

1.0 Description. This work shall consist of the careful removal of the existing crashworthy end terminal and all associated hardware and relocating it to a new location as shown on the plans.

2.0 Construction Requirements. The contractor shall carefully remove the posts, blockouts, beams, end section, and all associated hardware specific to the existing crashworthy end terminal. Any damaged items shall be replaced in kind at the contractor's expense as approved by the engineer. Replacement parts shall conform to the manufacturer's requirements of the existing crashworthy end terminal.

2.1 Posts for the relocated crashworthy end terminal shall be installed per manufacturers recommendations, and if necessary, through asphalt and/or rock per other job special provisions or Standard Plan 606.50.

2.2 Beams, blockouts, end section, and all associated hardware shall be installed per original manufactures recommendations.

3.0 Method of Measurement. Measurement of relocated crashworthy end terminal will be per lump sum.

4.0 Basis of Payment. All labor, equipment, and materials necessary for compliance with this provision will be paid for at the contract unit bid price for Item 606-99.01, Misc. Relocate Crashworthy End Terminal, per lump sum.

J. Damage to Existing Roadway and Entrances

1.0 Description. This work shall consist of repairing any damage to existing pavement, shoulders, side roads, and entrances caused by Contractor operations. This shall include, but is not limited to, damage caused by the traffic during Contractor operations within the project limits including the work zone signing.

2.0 Construction Requirements. Any cracking, gouging, or other damage to the existing pavement, shoulders, side roads, or entrances from general construction shall be repaired within twenty-four (24) hours of the time of damage at the Contractor's expense. Repair of the damaged pavement, shoulders, side roads, or entrances shall be as determined by the Engineer.

3.0 Method of Measurement. No measurement of damaged pavement, shoulder, side roads, or entrances, as described above, shall be made.

4.0 Basis of Payment. No payment will be made for repairs to existing pavement, shoulders, side roads or entrances damaged by Contractor operations.

K. Soil Nail Retaining Wall Requirements

1.0 Description. This work consists of designing and constructing a permanent soil nail retaining wall at the location shown on the plans and as required to support the slope above the roadway. The Contractor shall furnish all labor, plans, working drawings, design calculations as necessary, and all other material and equipment required to construct the soil nail wall in accordance with the plans and this Specification. Plans for the existing structures, boring logs and lab data are available for informational purposes only.

2.0 Materials. Materials shall be in accordance with the Standard Specifications or as described in these Provisions.

2.1 Soil Nails.

2.1.1 Nail Solid Bar. AASHTO M31/ASTM A615, 5. Deformed bar, continuous without splices or welds, new, straight, undamaged, bare, or epoxy-coated, galvanized, or encapsulated as required to meet the design and corrosion protection requirements as shown on the plans. Threaded, a minimum of 6 in. on the wall anchorage end, to allow proper attachment of bearing plate and nut. Threading may be continuous spiral deformed ribbing provided by the bar deformations (continuous thread bars) or may be cut into a reinforcing bar. If threads are cut into a reinforcing bar, provide the next-larger bar number designation from what is required by design, at no additional cost.

2.1.2 Bar Coupler. Bar couplers shall develop 100 percent of the full ultimate tensile strength of the bar as certified by the manufacturer.

2.2 Soil Nail Appurtenances.

2.2.1 Centralizer. Manufactured from Schedule 20 or 40 PVC pipe or other material not detrimental to the nail steel (wood shall not be used); securely attached to the nail bar; sized to position the nail bar within 1 in. of the center of the drillhole; sized to allow tremie pipe insertion to the bottom of the drillhole; and sized to allow grout to freely flow up the drill hole. Install at intervals not to exceed 10 feet along nail length and a distance of 1.5 feet from each end of nail.

2.2.2 Nail Grout. Neat cement or sand/cement mixture with a minimum 3-day compressive strength of 1,500 psi and a minimum 28-day compressive strength of 4,000 psi, per AASHTO T106/ASTM C109.

2.2.3 Fine Aggregate. AASHTO M6/ASTM C33.

2.2.4 Portland Cement. AASHTO M85/ASTM C150, Type I, II, III, V, or Type I/II, from one manufacturer.

2.2.5 Admixtures. AASHTO M194/ASTM C494. Admixtures that control bleed, improve flowability, reduce water content, and retard set may be used in the grout subject to review and acceptance by the Engineer. Accelerators are not permitted. Expansive admixtures may only be utilized in grout used for filling sealed encapsulations. Admixtures shall be compatible with the grout and mixed in accordance with the manufacturer's recommendations.

2.2.6 Film Protection. Polyethylene film per AASHTO M171.

2.3 Bearing Plates, Nuts, and Welded Stud Shear Connectors.

2.3.1 Bearing Plates. AASHTO M183/ASTM A36, or ASTM A572 Grade 50.

2.3.2 Nuts. AASHTO M291/ASTM A563, Grade B, hexagonal, fitted with beveled washer or spherical seat to provide uniform bearing.

2.3.3 Welded Stud Shear Connectors. AASHTO Construction Specifications, Section 11.3.3.1.

2.4 Welded Wire Fabric. AASHTO M55/ASTM A185 or A497.

2.5 Reinforcing Steel. AASHTO M31/ASTM A615, Grade 60, deformed.

2.6 Geocomposite Strip Drain. Manufactured with a drainage core (e.g., geonet) and a drainage geotextile attached to or encapsulating the core. Drainage core to be manufactured from long chain synthetic polymers composed of at least 85 percent by mass of polypropylenes, polyester, polyamine, polyvinyl chloride, polyolefin, or polystyrene and having a minimum compressive strength of 40 psi when tested in accordance with ASTM D 1621 Procedure A. The drainage core with the geotextile fully encapsulating the core shall have a minimum flow rate of 0.1 gallons per second per foot of strip width under a gradient of 1.0 tested in accordance with ASTM D 4716.

2.7 Wall Drainage Network.

2.7.1 Pipe. ASTM 1785 Schedule 40 PVC solid wall; cell classification 12454-B or 12354- C, wall thickness SDR 35, with solvent weld or elastomeric joints.

2.7.2 Fittings. ASTM D3034, Cell classification 12454-B or C, wall thickness SDR 35, with solvent or elastomeric joints.

2.8 Temporary and Final (Permanent) Shotcrete Facing. All materials, methods, and control procedures shall be submitted for approval by the Engineer.

2.9 Joint Materials. Bond breaker material shall be polyethylene tape, coated paper, metal foil or similar type materials. The backup material shall be compressible, non-shrink, non-reactive with the sealant and non-absorptive material type such as extruded butyl or polychloroprene foam rubber. The joint sealant shall be an elastomeric, multi-component sealant, in accordance with Federal Specification TT-S-227, Type II. The sealant color shall match the final shotcrete surface color.

3.0 Contractor Qualifications.

3.1 The soil nail Contractor shall have completed at least 3 permanent soil nail retaining wall projects during the past 5 years totaling at least 10,000 ft² of wall face area and at least 500 permanent soil nails.

3.2 Provide a Missouri Registered Professional Engineer employed or retained by the soil nail Contractor, with experience in the design and construction of permanent soil nail retaining walls on at least 3 completed projects over the past 5 years to perform the design and supervise the work. The Contractor shall not use manufacturer's representatives to meet the requirements of this section. Provide on-site supervisors and drill operators with experience installing permanent

soil nails on at least 3 projects over the past 5 years.

3.3 For informational purposes only, the following is a list of companies, contact names and telephone numbers of specialty contractors that potentially meet the qualifications of Sections 3.1 and 3.2.

Drill Tech Drilling and Shoring
Patrick Carr
Phone: (913) 669-7711

Keller
Greg Terri
Phone: (314) 802-2920

Subsurface Constructors
Lyle Simonton
Phone: (866) 421-2460

Berkel & Company
Adam Hurley
Phone: (913) 422-5125

Hayes Drilling
Luke Schuler
Phone: (913) 768-9500

4.0 Soil Nail Wall Design Requirements.

4.1 General.

4.1.1 Construct the soil nail wall as shown on the plans, the specifications, and as approved by the Engineer. As an alternate to the soil nail wall as shown on the plans, the Contractor has the option to use the concept shown in the plans and redesign the wall with adjustments to the nail type, length, spacing, diameter, corrosion protection class, temporary and permanent facing design (non shotcrete facing will be considered), and other potential cost reduction design items. Alternate design proposals shall be submitted at least 2 weeks prior to the bid date for evaluation and approval of the redesign concept. Sufficient design and plans shall be included in the proposal to allow the Engineer to approve the proposal for bidding purposes. The Engineer will review the proposal and approve or reject the proposal within 5 days of the bid submittal date.

4.1.2 Any Contractor proposed redesign of the soil nail walls shall use design procedures outlined in FHWA Report No. FHWA-NHI-14- 007, titled Geotechnical Engineering Circular No. 7, "Soil Nail Walls Reference Manual." Slope and external surcharge loads, seismic design coefficient, type of wall facing, corrosion protection requirements, easements, and right-of-way will be as shown on the plans and/or required by this Specification.

4.1.3 Provide Class A corrosion protection for soil nail bar using corrugated PVC or HDPE sheathing, with a nominal thickness of 0.04-inch and 0.06-inch, respectively. The inside of the sheathing should completely fill the annular space around the tendon and provide a minimum internal cover of 0.2-inch over the bar. The bearing plate, nut, headed studs, and washers shall also be epoxy coated or galvanized in accordance with FHWA-NHI-14-007.

4.1.4 Evaluation of global stability for the soil nail wall staged lift construction conditions shall be the responsibility of the Contractor's soil nail wall designer.

5.0 Submittals.

5.1 For any Contractor proposed redesign of the soil nail wall system that has been approved prior to bidding as outlined in Section 4.1.1, at least 21 days before the planned start of the wall excavation and verification test nail installation, submit all applicable sets of design calculations and working drawings to the Engineer for review and approval. Include all details, dimensions, ground profiles and cross-sections necessary to construct the soil nail wall. Also include the global stability calculations for the temporary conditions anticipated during construction and the permanent conditions. The Engineer shall approve or reject the Contractor's submittal of design calculations and working drawings within 14 days after submission. Successful verification testing results will be required prior to proceeding with production soil nail installation.

5.1.1 Working Drawings. Utility locations, right of way and other applicable information is available on the plans. Working drawings shall include, but not be limited to the following items:

(A) A plan view of the wall identifying:

- (1) A reference baseline and elevation datum.
- (2) The offset from the construction centerline or baseline to the face of the wall at the base at all changes in horizontal alignment.
- (3) Beginning and end of wall stations.
- (4) Right of way, permanent or temporary construction easement limits, location of all known active or abandoned existing utilities, adjacent structures, or other potential interferences. Any drainage structure or drainage pipe centerline behind, passing through, or passing under the wall.
- (5) Limit of the longest soil nails behind top of wall.
- (6) Plan locations of wall drainage network.

(B) An elevation view of the wall identifying:

- (1) The elevation at the top of the wall, at all horizontal and vertical break points, and at least every 25 feet along the wall.
- (2) Elevations at the wall base.
- (3) Beginning and end of wall stations.
- (4) The distance along the face of the wall to all steps in the wall base.
- (5) Wall elevation view showing nail locations and elevations; vertical and horizontal nail spacing; location of geocomposite drain strips; permanent shotcrete finish wall reinforcing details and expansion/contraction joints along the wall length.
- (6) Existing and finish grade profiles both behind and in front of the wall.
- (7) Locations and elevations of wall drainage network, including location of weep holes.

(C) General notes for constructing the wall including construction sequencing or other special construction requirements.

(D) Soil nail wall typical sections including stage excavation lift elevations, wall and excavation face batter, nail spacing and inclination, nail bar sizes and corrosion protection details.

(E) A typical detail of production and test nails defining the nail length, minimum drill hole

diameter, inclination, and test nail bonded and unbonded test lengths.

- (F) Details, dimensions, and schedules for all nails, reinforcing steel, wire mesh, bearing plates with headed studs, etc. and/or attachment devices for shotcrete and cast-in-place concrete.
- (G) Dimensions and schedules for all reinforcing steel including reinforcing bar bending details.
- (H) Details for terminating wall and adjacent slope construction.

5.2 The working drawings and any calculations associated with a Contractor proposed wall redesign shall be signed, sealed, and stamped by a registered Professional Engineer in the state of Missouri. The Engineer will approve or reject the Contractor's submittals within 14 days after the receipt of the complete submission. The Contractor will not begin construction or incorporate materials into the work until the submittal requirements are satisfied and found acceptable to the Engineer.

5.3 Soil Nail Wall Construction Plan. The Contractor is responsible for providing the necessary survey and alignment control during the excavation for each lift, locating drillholes and verifying limits of wall installation. At least 21 days before starting soil nail work, submit a Soil Nail Wall Construction Plan to the Engineer that includes the following:

- (A) The start date and proposed detailed wall construction sequence.
- (B) Proposed methods and equipment for excavating soil to the staged excavation lifts indicated on the approved working drawings, including the proposed grade elevations for each excavation lift shown on the wall elevation view.
- (C) Measures to ensure wall and slope stability during various stages of wall construction and excavation, information on space requirements for installation equipment, temporary shoring plans (if applicable), information on provisions for working in the proximity of underground facilities or utilities (if applicable).
- (D) Drilling and grouting methods and equipment, including any variation of these along the wall alignment.
- (E) Nail grout mix design, including compressive strength test results (per AASHTO T106/ASTM C109) supplied by a qualified independent testing lab verifying the specified minimum 3-day and 28-day grout compressive strengths. Previous test results for the same grout mix completed within one year of the start of grouting may be submitted for verification of the required compressive strengths.
- (F) Nail grout placement procedures and equipment.
- (G) Shotcrete facing mix design, materials, application methods, and support testing methods.
- (H) Soil nail testing program design, test methods, equipment setup, and reporting procedures.
- (I) Identification number and certified calibration records for each test jack and pressure gauge and load cell to be used. Jack and pressure gauge shall be calibrated as a unit. Calibration records shall include the date tested, the device identification number, and the calibration test results and shall be certified for an accuracy of at least 2 percent of the applied certification loads by a qualified independent testing laboratory within 180 days prior to submittal.
- (J) Manufacturer Certificate of Compliance for the soil nail ultimate strength, nail bar steel, Portland cement, centralizers, bearing plates, headed studs, nuts, washers, and corrosion protection.
- (K) The Engineer shall approve or reject the Contractor's Construction Plan within 14 days after the submission. Approval of the Construction Plan does not relieve the

Contractor of his responsibility for the successful completion of the work.

5.4 The working drawings shall be revised when plan dimensions are revised due to field conditions or for other reasons. Within 10 days after completion of the work, as-built drawings shall be submitted to the Engineer. Revised design calculations shall be signed and sealed by the Contractor's engineer registered in the State of Missouri for all Contractor proposed and implemented design changes made during the construction of the wall.

6.0 Storage and Handling. Store and handle soil nail bars and nail head components in a manner to avoid damage or corrosion. Replace bars and nail head components exhibiting abrasions, cuts, welds, weld splatter, corrosion, or pitting. Repair or replace any bars or nail head components exhibiting damage to corrosion protection.

7.0 Excavation.

7.1 Remove trees at top of slope as shown on the plans and directed by the Engineer and smooth-grade top of wall area. Mechanically scale back rock block outcrops protruding above the slope surface to align with graded slope surface to be soil nailed. Limited grading of the existing soil slope surface is anticipated and shall be approved by the Engineer.

7.2 The height of exposed unsupported final excavation face cut should not exceed the vertical nail spacing plus the required reinforcing lap or the short-term stand-up height of the ground, whichever is less. Taller heights may be permitted in locations with sound limestone for the upper tier construction upon visual inspection. Complete excavation to the final wall excavation line and apply shotcrete in the same work shift, unless otherwise approved by the Engineer. Application of the shotcrete may be delayed up to 12 hours after initial exposure if the Contractor can demonstrate that the delay will not adversely affect the excavation face stability.

7.3 Excavation of the next-lower lift shall not proceed until nail installation, drain strips, reinforced initial shotcrete facing placement, attachment of bearing plates and nuts, and nail testing have been completed and accepted in the current lift. Nail grout and shotcrete shall have cured for at least 72 hours or attained at least their specified 3-day compressive strength and nail testing completed and accepted before excavating the next underlying lift.

7.4 The Engineer shall be notified immediately if raveling or local instability of the final wall face excavation occurs. Unstable areas shall be temporarily stabilized by means of buttressing the exposed facing with an earth berm or other methods. Work in unstable areas shall be suspended until remedial measures are developed.

7.5 Loose soil and debris accumulation in the roadway ditch shall be excavated and removed to ensure positive Route C drainage below the proposed soil nail wall.

8.0 Nail Installation. Provide nail length and drillhole diameter necessary to develop the load capacity to satisfy the acceptance criteria for the design load required. Drill holes for the soil nails at the locations, elevations, orientations, and lengths shown on the approved working drawings. Select drilling equipment and methods suitable for the ground conditions and in accordance with the accepted installation methods submitted by the Contractor. The use of drilling muds or other fluids to remove cuttings will not be allowed. If caving ground is encountered, use cased drilling methods to support the sides of the drillholes. The use of self-drilling nail bars (also known as hollow, self-grouting or pressure-grouted nail bars) will not be allowed. Provide nail bars as shown

in the working drawings. Provide centralizers sized to position the bar within 1 in. of the center of the drillhole. Position centralizers as shown on the working drawings.

9.0 Grouting.

9.1 Grout the drillhole immediately after completion of drilling and installation of the nail bar. Inject the grout at the lowest point of each drillhole through a grout tube, casing, hollow-stem auger, or drill rods. Keep the outlet end of the conduit delivering grout below the surface of the grout as the conduit is withdrawn to prevent the creation of voids. Completely fill the drillhole in one continuous operation. Cold joints in the grout column are not allowed except at the top of the test bond length of proof tested production nails.

9.2 Test nail grout according to AASHTO T106/ASTM C109 at a frequency of one test per mix design and minimum of one test for every 10 cy of grout placed and at least one test per crew shift. Provide grout cube test results to the Engineer within 24 hours of testing.

10.0 Nail Testing.

10.1 Design and perform successful verification testing of designated sacrificial test nails in each soil strata encountered at locations recommended by the Contractor and approved by the Engineer. Perform successful proof tests on production nails at locations recommended by the Contractor and approved by the Engineer. Testing of any nail shall not be performed until the nail grout and shotcrete facing have cured for at least 72 hours or attained at least their specified 3-day compressive strength.

10.2 Testing equipment shall include 2 dial gauges, dial gauge support, jack and pressure gauge, electronic load cell, and a reaction frame. The pressure gauge shall be graduated in 75 psi increments or less. Measure the nail head movement with a minimum of 2 dial gauges capable of measuring to 0.001 in.

11.0 Verification Testing of Sacrificial Nails. Perform verification testing prior to installation of production nails to confirm the appropriateness of the Contractor's drilling and installation methods and verify the required nail pullout resistance. Verification test nail design and testing procedures shall be done according to FHWA-NHI-14-007.

12.0 Proof Testing of Production Nails. Perform successful proof testing on no less than 5 percent of the production soil nails in each nail row or a minimum of 1 per row, whichever is greater. The Engineer shall approve the locations and number of proof tests prior to nail installation in each row. Proof test nail design and testing procedures shall be done according to FHWA-NHI-14-007.

13.0 Test Nail Acceptance Criterion. Verification and proof test nails shall be evaluated according to the acceptance criterion listed in FHWA-NHI-14-007.

14.0 Test Nail Rejection.

14.1 If a test nail does not satisfy the acceptance criterion:

14.1.1 For verification test nails, the Engineer will evaluate the results of each verification test and provide recommendations for acceptance or modification of design if necessary. Installation methods that do not satisfy the nail testing requirements shall be rejected. The Contractor shall

propose alternative methods and install replacement verification test nails.

14.1.2 For proof test nails, the Contractor's engineer shall evaluate the results of each proof test and provide recommendations to the Engineer for review. The Engineer may require the Contractor to replace some or all of the installed production nails between a failed proof test nail and the adjacent passing proof test nail. Alternatively, the Engineer may require the installation and testing of additional proof test nails to verify that adjacent previously installed production nails have sufficient load carrying capacity.

15.0 Construction Records.

15.1 Provide original hard copy of soil nail wall construction records within 24 hours of completing each lift. Include the following in the construction records.

- (A)** Names of Soil Nail Wall Contractor, Superintendent, Nozzleman, Drill Rig Operator, Project Manager and Design Engineer.
- (B)** Wall number, MoDOT contract number.
- (C)** Soil nail locations, diameters, lengths and inclinations, bar types, sizes and grades, corrosion protection and temporary casing information.
- (D)** Date and time drilling begins and ends, soil nail bar is placed, grout and shotcrete application.
- (E)** Grout volume, temperature, flow, and density records.
- (F)** Ground and surface water conditions and elevations, if applicable.
- (G)** Weather conditions including air temperature at time of grout and shotcrete placement.
- (H)** All other pertinent details related to soil nail wall construction.

16.0 Wall Drainage Network.

16.1 A positive wall drainage network shall be provided for the full length of the soil nail wall.

16.2 Install and secure all elements of the wall drainage network as shown on the working drawings. The drainage network shall consist of installing geocomposite drain strips, prefabricated drain connections, and connector pipes (weepholes) as shown on the working drawings.

16.2.1 Geocomposite Drain Strips. Install geocomposite drain strips as shown on the working drawings. The drain strips shall be at least 12 in. wide and placed with the geotextile side against the ground. Secure the strips to the soil or rock face and prevent shotcrete from contaminating the geotextile. Drain strips will be vertically continuous. Make splices with a 12 in. minimum overlap such that the flow of water is not impeded.

16.2.2 Weep Holes. Install a minimum 2" PVC pipe weep hole through the bottom of soil nail wall at each drain strip location. Connect the weep pipe on both sides of the drain strip to the drain strip with a prefabricated drain grate to allow drainage from the drain strip into the pipe. Extend the PVC pipe beyond the final face of wall as approved by the Engineer. Details shall be shown on the working drawings.

17.0 Temporary and Final (Permanent) Shotcrete Facings.

17.1 Provide temporary and final shotcrete facings in accordance with approved methods at locations shown on the plans. Where shotcrete is used to complete the top ungrouted zone of the nail drill hole near the face, position the nozzle into the mouth of the drill hole to completely fill the void.

17.2 Clean loose material, mud, rebound, and other foreign matter from all surfaces to receive shotcrete. Install approved depth gauges or guide wires to indicate the thickness of the shotcrete layers. Install geocomposite strip drains and other drainage components as shown on the approved working drawings. Moisten all surfaces to receive shotcrete.

17.3 Install steel reinforcement (welded wire and reinforcing bars) as shown on the approved working drawings. Use spacers or chairs to properly position the reinforcement within the shotcrete layer. Secure the reinforcement to prevent dislodgment during the application of the shotcrete.

17.4 Final Face Finish. Shotcrete finish shall be broom, wood float, rubber float, steel trowel, or rough screeded finish as shown on the working drawings and approved by the Engineer.

17.5 Attachment of Nail Head Bearing Plate and Nut. Attach a bearing plate, washers, and nut to each nail head as shown on the working drawings. While the shotcrete facing is still plastic and before its initial set, uniformly seat the plate on the shotcrete by hand-wrench tightening the nut. Where uniform contact between the plate and the shotcrete cannot be provided, set the plate in a bed of grout. After grout has set for 24 hours, hand-wrench tighten the nut. Ensure bearing plates with headed studs are located within the tolerances shown on the working drawings.

17.6 Shotcrete Facing Tolerances. Construction tolerances for the shotcrete facing from plan location and plan dimensions are as follows:

Horizontal location of welded wire mesh; reinforcing bars, and headed studs:	+/- 0.4 in.
Location of headed studs on bearing plate:	+/- ¼ in.
Spacing between reinforcing bars:	+/- 1 in.
Reinforcing lap, from specified dimension:	+/- 1 in.
Minimum thickness of shotcrete:	- 0.6 in.
Planeness of finish face surface-gap under 10-ft straightedge:	+/- 0.6 in.
Nail head bearing plate deviation from parallel to wall face:	+/- 10 degrees

17.7 Defective Shotcrete. The Engineer will have the authority to accept or reject the shotcrete work. Shotcrete work that is not in accordance to the project specifications may be rejected either during the shotcrete application process, on the basis of completed work. Shotcrete surface defects shall be repaired as soon as possible after placement. Shotcrete that exhibits segregation, honeycombing, laminations, voids, or sand pockets shall be repaired or replaced at the Contractor's expense. In-place shotcrete determined not to meet the specified strength requirement will be subject to remediation as approved by the Engineer.

17.8 Weather Limitations.

17.8.1 The shotcrete shall be protected if placed when the ambient temperature is below 40° F and falling or when likely to be subject to freezing temperatures before gaining sufficient strength. Cold Weather protection shall be maintained until the compressive strength of the shotcrete is greater than 725 psi. Cold weather protection includes blankets, heating under tents or other means acceptable to the Engineer. The temperature of the shotcrete mix, when deposited, shall

be not less than 50° F or more than 85° F. The air in contact with the shotcrete surfaces shall be maintained at temperatures above 32° F for a minimum of 7 days.

17.8.2 If the prevailing ambient temperature conditions (relative humidity, wind speed, air temperature and direct exposure to sunlight) are such that the shotcrete develops plastic shrinkage and/or early drying shrinkage cracking, shotcrete application shall be suspended. The Contractor shall reschedule the work to a time when more favorable ambient conditions prevail or adopt corrective measures, such as installation of sun screens, wind breaks, or fogging devices to protect the work. Newly placed shotcrete exposed to rain that washes out cement or otherwise make the shotcrete unacceptable shall be repaired or replaced at the Contractor's expense.

17.9 Direct shotcrete at right angles to the receiving surface except when shooting around reinforcement. Apply shotcrete in a circular fashion to build up the required layer thickness. Apply shotcrete in a steady uninterrupted flow. If the flow becomes intermittent, direct the flow away from the work area until it becomes steady. Make the surface of each shotcrete layer uniform and free of sags, drips, or runs. Limit the layer thickness of each shotcrete application to 2 inches. Thicker applications may be approved if the soil nail contractor can demonstrate that no sloughing or sagging is occurring. If additional thickness is required, broom or scarify the applied surface and allow the layer to harden. Dampen the surface before applying an additional layer.

17.10 Remove laitance, loose material, and rebound. Promptly remove rebound from the work area. Remove hardened overspray and rebound from adjacent surfaces, including exposed reinforcement.

Protect surfaces not intended for shotcrete placement against deposit of rebound or overspray or impact from nozzle stream.

17.11 Taper construction joints at a 1 to 1 slope. The entire joint shall be thoroughly cleaned and wetted prior to application of additional shotcrete. Continue reinforcement through construction joint.

18.0 Displacement Monitoring.

18.1 Install survey markers to monitor horizontal and vertical displacements along the soil nail wall. Install survey markers along the top of the soil nail wall in the initial shotcrete facing and final shotcrete or facing while shotcreting the initial soil nail wall lift and along the top of the finished wall immediately after placement and initial concrete/shotcrete set. Space markers a maximum of 25 feet apart.

18.2 Total horizontal and vertical displacement of the soil nail wall shall be limited to the following relationship:

$$\delta_i = \frac{H}{500} \quad \text{or} \quad \delta_i = \frac{H}{333} \quad \text{for fine grained soils}$$

Where:

δ_i = Deflection (vertical or
horizontal) (feet)

H = Height of the wall (feet)

18.3 Survey the markers one time per day during soil nail wall construction to record lateral and vertical movements. Monitoring shall continue once every week following completion of the final

shotcrete finish wall construction for a period of two months. An electronic copy of the survey data in Microsoft Excel format shall be submitted to the Engineer for review on the day following the readings.

18.4 Should the wall experience displacement exceeding the specified limits, the contractor shall notify the engineer and take immediate corrective measures to control additional displacement.

18.5 Bridge abutment, piers, roadway pavement, and bridge approach pavement within 50 feet of the wall shall be monitored for vertical and horizontal movement in a manner approved by the Engineer within an accuracy of 0.01 in. Monitoring of adjacent structures will be done by a licensed surveyor and approved by the Engineer. A monitoring plan, including the locations of measurement points and the frequency of recording measurements shall be submitted to the Engineer for approval as part of the Soil Nail Wall Installation Plan. Monitoring shall begin with a base-line measurement recorded no more than 10 calendar days prior to the start of any excavation or any shoring, or similar ancillary features. In addition to monitoring for movement, the condition of the adjacent structure, including cracks and crack widths, before and after construction of the soil nail wall, shall be documented by visual inspection, photographs, and/or video.

19.0 Pre-Production Shotcrete Field Trials.

19.1 In the presence of the Engineer, fabricate a minimum of two test panels per proposed nozzle operator using the same nozzle operator, equipment, materials, mixture proportions, and procedures to be used during the production work. Fabricate two panels for the initial facing shotcrete and two panels for the final facing shotcrete. Install the same reinforcement (reinforcing steel or welded-wire fabric) that will be used during production work in one panel of the initial facing shotcrete and one panel of the final facing shotcrete to evaluate proper steel encasement. Fabricate the test panels with a minimum shotcrete thickness equal to the respective production thickness and in accordance with the requirements of ASTM C1140.

19.2 From the test panels without the reinforcement, obtain a minimum of five, 3-inch diameter cores and test for compressive strength in accordance with ASTM C1140. Test two cores at 3 days and two cores at 28 days. Note: An extra core sample is available, if needed, for further testing.

19.3 Sawcut the test panels with the reinforcement into "quarters" to evaluate the quality of the in-place shotcrete and steel encapsulation. Costs for corrective measures and additional investigation to verify shotcrete acceptance are at the contractor's expense.

20.0 Production Shotcrete Testing.

20.1 Fabricate one shotcrete test panel for every 50 cubic yards of final facing shotcrete placed, but not less than once during each shift shotcrete is placed. Panels shall have minimum dimensions of 24 inches x 24 inches x 4 inches thick and shall be gunned in the same position as the completed work. Panels shall be field cured in the same manner as the production work. Obtain four, 3-inch diameter cores from each panel and test for compressive strength in accordance with ASTM C1140 and ASTM C42. Test two core samples at 3 days and two at 28 days. Promptly forward all test data to the Engineer. Testing of the 28-day cores may be waived if the required minimum 28-day strength is obtained at 3 days. If the quality of shotcrete is questionable in the opinion of the Engineer, the Engineer may direct the contractor to saw or core the panel to determine the shotcrete quality and if remedial action is necessary. Costs for

corrective measures and additional investigation to verify shotcrete acceptance are at the contractor's expense.

21.0 Reinforcing Steel. Submit all order lists and bending diagrams, fabricate reinforcing steel, ship and protect material, place, fasten, and splice reinforcing steel according to Section 706 of the Missouri Standard Specifications for Highway Construction. This requirement will not apply to soil nail reinforcement and corresponding attachments used for connecting the reinforcement to the wall.

22.0 Joints. Joints shall be sealed when the sealant, air and concrete temperatures are above 40°F. Joints shall be primed and filled flush with joint sealant in accordance with the manufacturer's recommendation. All construction control and expansion joints shall occur within the vertical joints as shown in the elevation views on the working drawings. All vertical expansion joints shall be filled with preformed fiber expansion joint filler covered with bond break tape and sealed with elastomeric, multi-component sealant.

23.0 Acceptance. Material for the soil nail retaining wall will be accepted based on the manufacturer production certification or from production records. Construction of the soil nail retaining wall will be accepted based on visual inspection, soil nail testing and records, wall monitoring records, and the relevant production testing records.

24.0 Measurement and Payment. Soil nail retaining wall has been measured for payment to the nearest square foot of shotcrete on the plans and shown as lump sum. No adjustment in the measured quantity of shotcrete or other wall related quantities will be permitted for additional wall area required to meet the minimum wall elevations, additional shotcrete needed to fill voids created by irregularities in the cut face, excavation overbreak, inadvertent excavation beyond the plan final wall face excavation line, or failure to construct the facing to the specified line and grade and tolerances.

25.0 Final measurement of the soil nail wall 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. No measurement will be made for temporary shoring necessary to construct the wall. No separate payment will be made for providing working drawings, machine scaling and slope excavation, shotcrete, reinforcing steel, soil nail bars and attachment hardware, wall drainage network, tree removal, displacement monitoring, and nail verification and proof testing.

26.0 The accepted quantity of soil nail wall, complete in place, will be considered completely covered at the contract lump price for Soil Nail Wall. An approved Contractor redesign, constructed, and accepted soil nail wall system will be considered completely covered at the contract lump sum price for Soil Nail Wall.

L. Water Quality Control Measures in Consideration of Sensitive Species

1.0 Description. The St. Francis River serves as habitat for sensitive species, some of which are federally-listed threatened or endangered.

2.0 Restrictions. To avoid any negative impacts to these species and their habitat, water quality shall be protected from construction and maintenance impacts.

2.1 Erosion and sediment controls must be utilized to ensure no runoff or material enters streams and other water bodies from incidental roadway construction.

2.2 Material, water or residue shall not be allowed to enter the stream or floodplain. This shall include, but is not limited to, grading, hydro-blasting, cold milling, sandblasting, scraping, paving, or over-coating.

2.3 Vehicles or equipment around the stream shall be inspected daily, prior to use, for leaks or other potential water quality hazards. Any leaks or other water quality hazards on equipment shall be repaired and cleaned off of the equipment prior to use around the stream.

2.4 When possible, the use of equipment should be restricted to existing gravel bars or work pads placed so that habitat and/or mussel beds are not impacted.

2.5 No staging, storage, or refueling of equipment shall be allowed within 300 feet of bridge A8795.

3.0 Basis of Payment. No direct payment will be made to the Contractor to recover the cost of labor, materials, or equipment required to comply with the above requirements.

M. Fiber Reinforced Matrix

1.0 Description. This work shall consist of furnishing and placing a fiber reinforced matrix (FRM) on slopes or ditches for short-term protection of seeded areas at locations shown on the plans or as directed by the engineer.

2.0 Material. FRMs shall be used as designated in the contract or as approved by the engineer. The contractor shall provide a FRM that meets the specifications provided in MoDOT's Engineering and Policy Guide, Section 806.1.9 Fiber Reinforced Matrix.

3.0 Construction Requirements. FRMs shall be installed and maintained according to the manufacturer's recommendations.

4.0 Method of Measurement. Measurement of FRM will be made to the nearest acre of surface area covered.

5.0 Basis of Payment. All labor, equipment, and materials necessary for compliance with this provision will be paid for at the contract unit bid price for Item 805-99.19, Misc. Fiber Reinforced Matrix, per tenth of an acre.

N. Prime Contractor Requirements JSP-16-09

1.0 The limitation in Sec 108.1.1 of the Missouri Standard Specifications for Highway Construction that "the contractor's organization shall perform work amounting to not less than 40 percent of the total contract cost" is waived for this project. Instead, for the purposes of constructing this project only, the less restrictive terms of the Federal Highway Administration's rule at Title 23 Code of Federal Regulations (CFR) § 635.116(a) shall apply, so that the contractor must perform project work with its own organization equal to not less than 30 percent of the total original contract price. All other provisions in Sec 108.1.1 et seq. of the Missouri Standard Specifications for Highway Construction shall remain in full force and effect, and shall continue to

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govern the contractor and its subcontractors, in accordance with the provisions of Title 23 CFR § 635.116.