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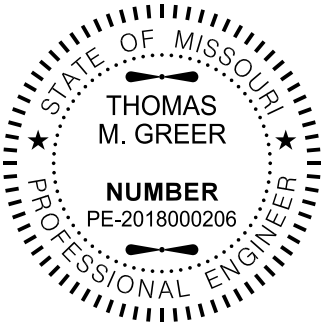

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 W. CAPITOL AVE.
JEFFERSON CITY, MO 65101
Phone (888) 275-6636

Burns & McDonnell Engineering Company, Inc.
9400 Ward Parkway Kansas City, MO 64114

Certificate of Authority # 000165
Consultant Phone # (816) 333-9400

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

JOB NO. JKU0099
Clay County, MO
Date Prepared: 1/6/2026

Addendums only, blank otherwise
Addendum No. #

Only the following items of the Job Special Provisions (Bridge) are authenticated by this seal:
A - N

A. CONSTRUCTION REQUIREMENTS

1.0 Description. This provision contains general construction requirements for this project.

2.0 Construction Requirements. The plans and the asbestos and lead inspection report(s) for the existing structure(s), a surveyor memo with utility pothole information, and the geotechnical report for the new structure(s) are included in the contract in the bridge electronic deliverables zip file for informational purposes only. Also provided in the bridge electronic deliverables zip file for informational purposes only is a conceptual construction phasing plan submitted to the railroad during the design phase.

2.1 In order to assure the least traffic interference, the work shall be scheduled so that the bridge closure is for the absolute minimum amount of time required to complete the work. The bridge shall not be closed until material is available for continuous construction and the contractor is prepared to diligently pursue the work until the closed bridge is opened to traffic.

2.2 Provisions shall be made to prevent any debris and material from falling onto the waterway and railroad. If determined necessary by the engineer, any debris and material that falls below the bridge outside the previously specified limits shall be removed as approved by the engineer at the contractor's expense. Traffic under the bridge shall be maintained in accordance with the contract documents.

2.3 Any damage sustained to the remaining structures (Bridge No. A4643 & Wall A7619) as a result of the contractor's operations shall be repaired or the material replaced as approved by the engineer at the contractor's expense.

2.4 Provisions shall be made to prevent damage to any existing utilities. Any damage sustained to the utilities as a result of the contractor's operations shall be the responsibility of the contractor. All costs of repair and disruption of service shall be as determined by the utility owners and as approved by the engineer.

3.0 Environmental Contact. Environmental Section may be contacted at the below address or phone number. The Missouri Department of Health may be contacted at (573) 751-6102.

MoDOT - Design Division - Environmental Section
P.O. Box 270
105 W. Capitol Ave., Jefferson City, MO 65102
Telephone: (573) 526-4778

3.1 Approved Smelter and Hazardous Waste Treatment, Storage and Disposal Facility. The following is the approved smelter and hazardous waste treatment, storage and disposal facility:

Doe Run Company - Resource Recycling Division - Buick Facility
Highway KK
Boss, MO 65440
Telephone: (573) 626-4813

4.0 Method of Measurement. No measurement will be made.

5.0 Basis of Payment. Payment for the above described work will be considered completely covered by the contract unit price for other items included in the contract.

B. RIGHT-OF-WAY AND ACCESS

1.0 Description. The contractor shall become acquainted with the right-of-way limits, wetland limits and available work and storage space at the site. Any additional working areas, storage spaces, and permitting required by the contractor shall be provided and paid for by the contractor. All bidders are required to visit the site in order to become acquainted with the proximity of buildings and other features along the project alignment, which shall be protected. By submission of a bid, the contractor acknowledges review of the site and acceptance of the existing site conditions.

2.0 Construction Requirements.

2.1 Levee Access Road. Notify KC Water, NKC Levee District and BNSF when levee access road West of bridge will be temporarily closed for equipment placement. At least one access road shall be maintained at all times.

The contractor must make every effort to minimize the quantity and duration of any equipment on top of the levee. Any plan to stage heavy equipment larger than a standard excavator or drill rig on the levee requires USACE review.

2.2 Structures, Levees and Railroad Protection. The contractor shall conduct all operations in a manner that the structures, billboards, levees and facilities of the railroad are protected from damage. Existing structures adjacent or below the bridge shall not be removed unless removal of such structures is indicated. Any damage sustained to the access roads, utilities, buildings, billboards, levees, facilities of the railroad or other features as a result of the contractor's operations, shall be repaired or the material replaced as determined by the engineer at the contractor's expense.

3.0 Method of Measurement. No measurement will be made.

4.0 Basis of Payment. Payment for the above described work will be considered completely covered by the contract unit price of other items.

C. REMOVAL OF EXISTING BRIDGE – BRIDGE NO. (A4642)

1.0 Description. This work shall consist of the removal of the existing Bridge No. A4642, partial removal of gravity block wall Bridge No. A7619, and removal of gravity block wall Bridge No. A8081 as detailed in the plans, described herein and as directed by the engineer. This work shall be in accordance with Sec 216 for removal of bridges. The scope of this item shall also include the removal and disposal of the overhead sign structure and miscellaneous appurtenant items. Plans of the existing bridge have been included for information.

2.0 Construction Requirements.

2.1 Demolition. The contractor shall prepare and submit a detailed plan for the removal of the existing bridge for review and acceptance by the engineer. The engineer’s acceptance of the plan will not relieve the contractor of the responsibility for obtaining satisfactory results. The contractor’s proposed plan may also be reviewed by other federal, state and local agencies. The contractor is advised that the review and approval process may be lengthy and shall be initiated well in advance of the scheduled date for commencement of removal operations.

2.1.1 The contractor shall conduct all removal operations without disruption of traffic on the existing SB Bridge No. A4643, except as may be specifically authorized by the engineer. Any damage sustained to Bridge No. A4643 or other existing facilities to be used in place resulting from the contractor's removal operation shall be repaired or replaced to the satisfaction of the engineer at the contractor's expense. The contractor shall take all necessary precautions to protect people and property from any debris from the removal operation.

2.2 Existing Binwall A7619. Contractor shall become acquainted with existing Binwall A7619 and the necessary work in the vicinity of said wall as detailed in the plans. Contractor shall perform all bridge and pavement removal activities without damage to the existing wall. Any damage sustained to the wall shall be repaired or replaced to the satisfaction of the engineer at the contractor's expense.

2.3 Utilities. Prior to commencing removal activities, the contractor shall verify the location of existing utilities and adjacent facilities. The removal work shall be performed in such a manner so as not to cause any settlement or damage to the existing utilities and/or adjacent facilities. Any damage to existing utilities and/or adjacent facilities shall be repaired at the contractor's expense in a manner satisfactory to the engineer.

2.3.1 Presently there are power lines north of the existing bridge. Prior to the start of removal work by the contractor, the contractor shall ensure the power lines will not present a hazard to the contractor's operations, nor shall the contractor's operation present a hazard to the power lines.

2.3.2 No active utilities are known to be attached on the existing Bridge No. A4642.

2.4 Material Disposal. All material disposals shall be in accordance with Sec 202. Any permit or license require for deposal of material shall be in accordance with Sec 107.

3.0 Method of Measurement. No measurement will be made.

4.0 Basis of Payment. Payment for the above described work will be considered completely covered by the contract lump sum price for "Removal of Bridges (A4642)".

D. DEMOLITION PROCEDURES AND CONSIDERATIONS

1.0 Description. This work shall consist of the most feasible and effective method for removal of the existing bridge structure, particularly the concrete piers, as a combination of dismantling and demolition. The depth of demolition or removal shall be in accordance with Sec 216 for removal of bridges unless otherwise shown in the contract plans or as required by engineer.

2.0 Removal Requirements.

2.1 The steel, concrete and associated materials of the existing bridge may be transported in pieces and demolished further at a non-wetland site. The superstructure shall be demolished in stages and removed.

2.2 Definition of Demolition Terms.

(a) Demolition materials shall describe all non-concrete excavated materials, including but not limited to, any liquids, wood, steel, earth excavations, cleared vegetation and refuse. Demolition materials shall become the property of the contractor and shall be

removed from the project site. Demolition materials shall not be buried or burned on the site.

(b) Disposal debris refers to mass concrete rubble that is to be removed. The term "concrete" as used herein shall be interpreted to mean both reinforced and unreinforced mass concrete.

(c) Mucking is defined as the removal of demolition materials, disposal of debris or muck from the demolition location to the final disposal site.

2.2.1 Concrete rubble resulting from the demolition, shall be regarded as disposal debris, as defined above. No concrete rubble shall remain on the site. All such rubble shall become the property of the contractor and shall be removed and placed in a non-wetland site.

2.2.2 Exposed, non-concrete projections (e.g., exposed rebar, steel sheet piling, timber piling, etc.) shall be regarded as demolition materials, as defined above, and shall be severed and removed by any safe, practicable means and disposed of properly in a non-wetland site.

2.3 General Requirements. The project shall require the demolition of reinforced concrete, structural steel and the severance of metal. Precautions to avoid damage and control debris shall be taken.

2.3.1 Methods used for steel severance fall into five categories as shown below.

(a) Standard shearing or sawing.

(b) Standard oxyacetylene torches.

(c) Ultrathermic cutting rods.

(d) Prime cut rods.

(e) Burning bars.

The contractor shall not elect to use blast demolition with linear shape charges or other methods.

2.3.2 The contractor shall use any safe means to remove the existing bridge, provided that nearby structures remain secure and provided that provided the road, rail and motor vehicle traffic is not delayed without approval of the appropriate federal, state and local agencies.

2.3.3 All reinforcement and embedded metals may not be detailed on the reference drawings. Reinforcement supports, form ties and other embedded items not shown on the reference drawings may exist in the concrete. The contractor shall be responsible for making allowances for the embedded items.

2.4 Mucking. Concrete rubble, except as noted above, shall be regarded as disposal debris when displaced from original position in the structure. The department does not specify any limits on the muck size (i.e., the size of rubble blocks). Exposed, non-concrete projections shall be severed and removed by any safe, practicable means and disposed off-site. All cutting of non-concrete materials and all work with hand-held tools, which may be necessary for muck removal, shall be considered as incidental items to mucking.

2.8 Removal of Demolition Materials and Refuse. All demolition materials and refuse, except as specified above, resulting from demolition operations for this contract shall be promptly removed from the site and before completion of the work under these specifications.

3.0 Method of Measurement. No measurement will be made.

4.0 Basis of Payment. Payment for the above described work will be considered completely covered by the contract lump sum price for "Removal of Bridges (A4642)".

E. DYNAMIC PILE TESTING

1.0 General.

1.1 Scope of Work. Scope of work shall include furnishing all labor, equipment and analysis associated with dynamic testing of driven piles as specified in this special provision. Dynamic pile restrike testing is not required on this project, and references to restrike testing in this special provision will not apply.

1.2 Performance and Design Requirements. Performance and design conditions for dynamic testing of driven piles shall be in accordance with section 4.0 of this special provision.

1.3 Approved Manufacturers. For the following hardware and software components, only the listed manufacturer is recognized as providing the level of quality required. If the contractor wants to propose a non-listed manufacturer that is considered to provide an equivalent level of quality, this manufacturer shall be identified and supporting documentation provided. Acceptance of the manufacturer as a substitute will be at the discretion of the engineer.

Component	Product	Manufacturer
Pile Driving Modeling - Wave Equation Software	GRLWEAP	Pile Dynamics, Inc.
Pile Driving Monitoring - Hardware & Software	Pile Driving Analyzer - Model PAK	Pile Dynamics, Inc.
Pile Driving Analysis – Signal Matching Software	CAPWAP	Pile Dynamics, Inc.

1.4 Test Requirements. Dynamic pile testing shall be conducted in accordance with the standard test method indicated below.

Standard Test Method	Designation	Conducted By
High-Strain Dynamic Testing of Piles	ASTM D 4945	Contractor

1.5 Qualifications. The contractor shall perform dynamic pile testing utilizing the services of an independent dynamic pile testing consultant and qualified personnel. An engineer with a minimum of three years of dynamic pile testing and analysis experience or who has achieved Basic or better certification under the High-Strain Dynamic Pile Testing Examination and Certification process of the Pile Driving Contractors Association and Foundation QA shall perform pile driving monitoring. An engineer with a minimum of five years of dynamic pile testing and analysis experience or who has achieved Advanced or better certification under the High-Strain Dynamic Pile Testing Examination and Certification process of the Pile Driving Contractors Association and Foundation QA shall perform pile driving modeling and pile driving analyses.

2.0 Execution.

2.1 Pile Driving Modeling. The contractor shall perform preconstruction wave equation analyses and prepare a summary report of the results. The wave equation analyses shall be used to assess the ability of all proposed pile driving systems to install piles to the required capacity and the desired penetration depth within allowable driving stresses. The report shall include a drivability graph relating pile capacity, blow count and driving stresses to depth. The report shall include a bearing graph relating the pile capacity to the pile driving resistance. The bearing graph shall indicate blow count versus capacity and stroke. The report shall also contain a constant capacity analysis or inspectors chart to assist the engineer in determining the required driving resistance at other field observed strokes. The contractor shall perform wave equation analyses in accordance with section 4.0 of this special provision. Acceptability of the wave equation report and the adequacy of analyses will be determined by the engineer.

2.1.1 Approval by the engineer of the proposed pile driving system will be based upon the wave equation analyses indicating that the proposed system can develop the specified pile capacity at a maximum equivalent pile driving rate of 10 blows per inch in soil and 20 blows per inch at the end of driving to seat pile in soft rock or penetrate to refusal on hard rock, and within allowable driving stresses per *AASHTO LRFD Bridge Construction Specifications*, Section 4.4.1. With approval of the engineer, a pile driving rate greater than 20 blows per inch may be acceptable if a smaller hammer or shorter stroke is needed to keep pile driving stresses within the allowable range when seating pile in rock. The contractor shall provide preliminary pile driving criteria based on wave equation analyses and any anticipated capacity changes after driving, set-up or relaxation, subject to revision based upon field measurements.

2.1.2 If any changes or modifications are made to the approved pile driving system, additional wave equation analyses in accordance with section 2.1 of this special provision shall be required.

2.2 High-Strain Dynamic Pile Testing.

2.2.1 The contractor shall perform dynamic pile testing at the locations and frequency required in accordance with section 4.0 of this special provision.

2.2.2 Dynamic pile testing involves monitoring the response of a pile subjected to heavy impact applied by the pile hammer at the pile head. The testing shall provide information on the driving stresses, pile capacity, structural integrity and hammer efficiency.

2.2.3 The contractor shall engage an independent dynamic pile testing consultant and qualified personnel in accordance with section 1.5 of this special provision. Prior to testing, the engineer will review and approve the proposed independent dynamic pile testing consultant, the experience and qualifications of assigned personnel, details of the method of testing, a list of equipment, and the method of analysis of test results. The contractor shall provide all available details of the subsurface conditions, pile dimensions and properties, and pile driving systems to the independent dynamic pile testing consultant.

2.2.4 All field testing and measurements shall be made in the presence of the engineer.

2.3 Field Testing.

2.3.1 Equipment. Dynamic pile testing field measurements shall be carried out using approved equipment, software and recording equipment. The data collected at the end of initial driving and the beginning of restrike shall be analyzed using approved signal matching techniques and software.

2.3.2 Monitoring During Driving. During pile driving, piles shall be instrumented and monitored with testing equipment satisfying the requirements of section 1.3 of this special provision.

2.3.2.1 The contractor shall install two sets of strain transducers and accelerometers near the top of each pile to be tested and shall use a compatible measuring and recording system to record the data during driving.

2.3.2.2 The equipment required to be attached to the pile shall be appropriately positioned and fixed to the approval of the engineer.

2.3.2.3 The hammer and all site equipment used shall be capable of delivering an impact force sufficient to mobilize the specified pile capacity indicated in section 4.0 of this special provision without damaging the pile.

2.3.2.4 The testing equipment shall monitor pile stresses during driving to prevent pile damage and ensure pile integrity and capacity. If the testing equipment indicates overstressing or damage to the pile, the contractor shall immediately discontinue driving and notify the engineer.

2.3.2.5 If the testing equipment determines that pile stresses during driving exceed acceptable levels, a new pile driving system, modifications to existing system or new pile installation procedures shall be proposed by the contractor. Approval by the engineer of any proposed changes to the pile driving system or pile installation procedures will be based upon the results of additional wave equation analyses in accordance with section 2.1.2 of this special provision.

2.3.3 Preparation of the Pile Head. The preparation of the pile head for the application of dynamic test load shall involve, where appropriate, trimming the head, cleaning, and building up the pile using materials that shall, at the time of testing, safely withstand the impact stresses. The impact surface shall be flat and at right angles to the pile axis.

2.3.4 Dynamic Measurement and Analysis. Monitoring of pile driving shall begin when pile driving begins. The data shall be recorded and processed immediately in the field by the pile driving monitoring equipment and software. Unless monitoring indicates that additional driving will damage the pile, pile driving and monitoring shall continue until both the specified pile tip elevation and the specified pile capacity are reached. For each pile tested, pile driving analysis using signal matching techniques shall be performed for a selected blow at the end of driving to determine the relative capacities from end bearing and skin friction along the pile.

2.3.4.1 Restrike tests shall be performed at the frequency indicated in section 4.0 of this special provision. The time interval between end of initial driving and beginning of restrike shall be in accordance with section 4.0 of this special provision. During restrike, the pile shall be instrumented and monitored similar to during initial driving. For each restrike test, pile driving analysis using signal matching techniques shall be performed for a selected blow from the beginning of restrike to determine the relative capacities from end bearing and skin friction along the pile.

2.3.4.2 The restrike test shall be performed with a warmed-up hammer and shall consist of striking the pile for 20 blows or until the pile penetrates an additional 3 inches whichever occurs first unless testing equipment indicates overstressing or damage to the pile. If such overstressing or damage to the pile is indicated, the contractor shall immediately discontinue driving and notify the engineer. In the event initial restrike testing indicates a pile capacity below the specified capacity additional driving may be required as directed by the engineer.

2.3.4.3 The engineer may request use of pile driving monitoring equipment and software on additional piles if inconclusive results are obtained or unusual driving conditions are encountered.

2.3.4.4 Pile bearing capacity and integrity shall be evaluated based on the standard procedure used in practice.

2.3.4.5 Tabular records of the dynamic pile testing field measurements obtained at the end of initial driving and at the beginning of restrike shall be immediately provided to the engineer by the contractor.

2.3.5 Results.

2.3.5.1 Preliminary Reports. The contractor shall prepare a preliminary report for each pile tested for review by the engineer. Each report shall contain tabular as well as graphical presentation of the dynamic test results versus depth. Each report shall also indicate the pile driving criteria for the additional piles to be installed at the substructure unit of the pile tested. Each preliminary report shall include the following:

(a) The maximum force applied to the pile head.

(b) The maximum pile head velocity.

(c) The maximum energy imparted to the pile.

(d) The assumed soil damping factor and wave speed.

(e) Static capacity estimate.

(f) The maximum compressive and tensile forces in the pile.

(g) Pile integrity.

(h) Blows per inch.

(i) Stroke.

(j) Summary results of pile driving analysis from selected blow analyzed using signal matching techniques and software.

2.3.5.2 Summary Report. The contractor shall prepare a summary report of all piles tested for review by the engineer. The report shall include the results of hammer performance, pile driving stresses, and pile capacity during initial driving and restrike for all piles tested. The report shall also include the following:

(a) Date of testing and date of pile installation.

(b) Pile identification number and location.

(c) All information given in preliminary reports as follows:

(1) Length of pile below commencing surface.

(2) Total length of pile, including projection above commencing surface at time of test.

(3) Length of pile from instrumentation position to tip.

(d) Hammer type, drop and other relevant details.

(e) Blow selected for signal matching analysis.

(f) Maximum compressive and tensile stresses, stroke, and capacity versus penetration depth.

(g) Temporary compression.

(h) Pile integrity and location of damage, if any.

(i) Force/velocity versus time trace.

(j) Force/velocity match curve.

(k) Resistance distribution along the pile.

(l) Detailed graphical and tabular results from blow analyzed using signal matching techniques and software.

3.0 Schedule of Contract Submittals.

Item Number	Submittal Item	Type	Calendar Days	Event/Date	Liquidated Damages Apply
1	Proposed independent dynamic pile testing consultant, and a listing of assigned personnel and their experience and qualifications.	DOCS	45 Before	Start of pile driving monitoring	No
2	Details of the components, method of testing, pile driving equipment and materials to be used, and the results of wave equations analyses.	DOCS	15 Before	Start of pile driving monitoring	No
3	Two copies of each Preliminary Report as defined in section 2.3.5.1 of this special provision	DOCS	3 After	Completion of each field test	No
4	Four copies of the Summary Report as defined in section 2.3.5.2 of this special provision	DOCS	7 After	Completion of all field tests	No

4.0 High-Strain Dynamic Pile Testing Specification.

Item	Requirement
Wave Equation Analysis	Minimum of one and sufficient additional analyses as needed to define performance for all combinations of piles, driving systems and subsurface conditions anticipated.
Dynamic Testing Pile Capacity	Nominal Axial Pile Compressive Resistance or 2.25 times the Design Bearing shown on the plans or as required by engineer
End of Initial Driving Test Frequency	As shown in the contract plans
Restrike Test Frequency	As shown in the contract plans
Time Interval between End of Initial Driving and Restrike	Minimum of 7 days or as required by the engineer
Pile Driving Analyses using Signal Matching Techniques	For each End of Initial Driving Test and each Restrike Test

5.0 Method of Measurement. Dynamic pile testing will be measured per each.

6.0 Basis of Payment. Payment for the above described work, including all material, equipment, tools, labor and any other incidental work necessary to complete this item, will be considered completely covered by the contract unit price for “Dynamic Pile Testing”.

F. LIGHTWEIGHT CELLULAR CONCRETE FILL

1.0 General.

1.1 Scope of Work. Scope of work shall include furnishing all labor, equipment, and materials associated with Lightweight Cellular Concrete Fill (LCC) as specified in this special provision. LCC shall be placed to the limits indicated on the plans or as determined by the engineer. See MSE Wall A9617 plans for additional notes regarding placement of LCC.

2.0 Material. Possible materials and their source for lightweight fill are as follows:

The LCC fill used for this project shall be Class II cellular concrete with a cast unit weight of 30 pcf and minimum 28-day compressive strength of 80 psi and Class III cellular concrete with a cast unit weight of 36 pcf and minimum 28-day compressive strength of 120 psi.

Elastizell of St. Louis
410 10th Street
Valley Park, Missouri 63088
https://elastizell.com/
Phone: (636) 225-4311

Nettles Construction
2850 Fairfax Trafficway
Kansas City, KS 66115
www.WestproConstruction.com
Phone (816) 561-7667

Geofill Cellular Concrete

1501 Abbott Ct
Lincolnshire, IL 60069
www.geofill.com
Phone (888) 820-3455

Aerix Industries
5902 McIntyre St.
Golden, CO 80403
www.aerixindustries.com
Phone (888) 235-5015

Cellular Concrete Inc
25385 Highway 169
Zimmerman, MN 55398
www.cellularconcreteinc.com
Phone (952) 960-9588

CellFill, LLC
802 Industrial C
Grove, OK 74344
www.cellfill.com
Phone (844) 235-5345

3.0 Construction Requirements. None of the above materials have an automatic approval for use on this project. At least four weeks prior to use, the contractor shall submit to the engineer for review the type of material recommended for use as LCC fill material, source of supply, methods of handling and transporting to the job site, method of placement and/or construction within the embankments, specifications for the LCC fill material, and methods for obtaining and confirming the material and design properties shown either in this job special provision or on the plans. The contractor shall abide by all environmental rules and regulations for transporting and placing the lightweight fill material and shall provide to the engineer any executed documents necessary for environmental clearance. If the material specifications and method of placement within the embankment are satisfactory to the engineer, the LCC fill material will be approved for use.

Additional construction requirements for LCC fill are included in the plans for MSE Wall Bridge No. A9617.

4.0 Method of Measurement. No measurement will be made

5.0 Basis of Payment. Payment for complying with this job special provision shall include all costs incurred for acquiring, handling, transporting, placing the lightweight fill material in the embankments and any other incidental work necessary to complete this item. The cost of the lightweight fill within the limits noted on the retaining wall plan details, complete in place, will be considered completely covered by the contract price unit price for “MSE Wall Systems with Lightweight Fill”.

G. FORM LINERS

1.0 Description. This work item shall consist of constructing the form liner aesthetic treatment on mechanically stabilized earth (MSE) wall systems as shown on the plans and described in this special provision.

2.0 Materials.

2.1 Shop Drawings. Contractor shall provide complete shop drawings of all aesthetic treatments.

2.2 Formwork. Formwork for aesthetic treatment of concrete facing panels for the MSE wall systems shall be a type that produces uniform results consistent in both, pattern and depth of relief with the project design aesthetics. The contractor shall be responsible to coordinate the aesthetic treatments of all components to meet the design aesthetic criteria described herein and as shown on plans. No mixing of pattern numbers or manufacturers will be permitted. The form liner pattern shall be one of the patterns listed on the plans or approved equal.

2.3 Form Ties. Wall form ties shall be placed in a uniform pattern. In surface areas receiving the aesthetic treatment form liner, all form ties shall be placed in the simulated stone surface. Form ties shall be fiberglass ties that shall hold the forms in the correct alignment. The color of the ties shall closely match the concrete wall color. Ties shall be ground flush with the surface of concrete prior to pressure washing.

2.4 Form Release Agent. Form release agents shall be the manufacturer's standard non-staining, non-petroleum based and compatible with surface sealer finish coating. Form release agents shall be applied to all surfaces of the form liner at the manufacturer's recommended rate.

2.5 Gaskets. Closed cell compressible neoprene of such thickness as is appropriate to assure leakage prevention shall be used to prevent joint leakage. One face shall be coated with an adhesive tape to assure proper positioning at the time of form closure. The neoprene shall be sufficiently compressible as to assure virtual "zero" separation of the forms as a result of the use of this product.

2.6 Aggregates.

2.6.1 Aggregate Source. The aggregate incorporated into the concrete mix of all aesthetic concrete MSE Wall components shall be from the same source. The purpose for this provision is to ensure uniformity of materials and color once areas are pressure washed and aggregates become exposed. Single-source shall be interpreted as one contiguous rock quarry, gravel pit or dredging location. This provision in no way alters the specification requirements for aggregate quality specified in other sections of the project specifications.

2.6.2 Aggregate Gradation. Concrete mixes supplied for the construction of the aesthetic treatments shall be in accordance with the following requirements. The concrete aggregate for the aesthetic treatment mix shall be Gradation E in accordance with Sec 1005 for any areas where aesthetic treatment is formed monolithically with the structure. This requirement for aggregate size is necessary to permit concrete mixture to flow freely and fill completely into reveals and form liner proposed in the aesthetic treatment. Gradation E aggregate shall meet the aggregate source requirements.

2.7 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 pressure washed concrete surface color.

3.0 Construction Requirements.

3.1 Reveals and Texture. All reveals and texture shall be continuous from element to element through construction joints and around corners. Techniques shall be utilized to ensure true continuous texture between separate elements. Sand blasting will not be permitted for cleaning concrete surface, as sand blasting will reduce the special surface texture specified. Pressure washing with water is the preferred method of removing laitance. Pressure washing cleaning shall provide a minimum pressure of 3000 psi at a rate of 3 to 4 gallons per minute (11.4 to 15.1 L/min) using a fan nozzle held perpendicular to the surface at a distance of 2 to 3 feet. The completed surface shall be free of blemishes, discolorations, surface voids and conspicuous form marks to the satisfaction of the engineer.

3.2 Sample Test Panels. Sample test panels shall be constructed to demonstrate the contractor's workmanship for all form liner textures and patterns as shown on the plans. The sample test panels may also be used for demonstration special surface finish if approved by the engineer. The architectural surface treatment of the finished work shall achieve the same final effect as demonstrated on the approved sample test panels. The materials used in construction of the sample test panels shall be in accordance with all standards as listed in this specification and the plans. The concrete mix shall be consistent with the project specifications and criteria. The minimum size of the sample test panels shall be 6 x 6 feet x 8 inches. The form liner finish shall be demonstrated in a vertical strip covering one-half to three-quarters of the sample test panel(s).

3.3 Patches. Holes and defects in concrete surface shall be filled within 48 hours of when the forms are removed. The same patching materials and techniques shall be used that were approved on sample test panels. The patches shall be made with a stiff mortar made with the same material sources as the concrete. The mortar mix proportions shall be adjusted so the dry patch matches the dry adjacent concrete. White cement shall be added to the mortar mix if necessary to lighten the mortar mix.

3.4 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 plans. 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.

4.0 Method of Measurement. Final measurement will not be made except for authorized changes during construction or where significant errors are found in the contract quantity. The revision or correction will be computed and added to or deducted from the contract quantity.

4.1 Form Liners on MSE Wall Systems. No measurement of ashlar stone form liners on MSE wall systems shall be made.

5.0 Basis of Payment.

5.1 Form Liners on MSE Wall Systems. Payment for the above described work, including all material, additional concrete, equipment, labor and any other incidental work necessary to complete the ashlar stone form liner, will be considered completely covered by the contract unit price for "MSE Wall Systems with Lightweight Fill".

H. MASS CONCRETE

1.0 Description.

1.1 Definition. Mass concrete is defined as any large volume of cast-in-place concrete with dimensions large enough to require that measures be taken to cope with the generation of heat and attendant volume changes to minimize cracking.

1.2 Determination of Mass Concrete. When the minimum dimension of the concrete exceeds five (5) feet, the provisions for the placement of mass concrete shall be required.

Cement shall be Type I, ,II, IL, IP or IS.

Use of fly ash or slag cement may be used as a substitute in accordance with Section 501.14.

Maximum water to cementitious material ratio shall be 0.44.

Air entrainment shall be used with an air content of 6% (+/- 2%). To improve workability and aid in air entrainment, water reducing or retarding admixtures may be used in accordance with the contract documents.

2.0 Construction Requirements. The Contractor shall submit the mix design for the mass concrete in accordance with Section 501.3.

When placing mass concrete, the maximum concrete temperature at time of placement shall not exceed 70°F and shall not be less than 40°F. The maximum concrete temperature at the time of placement may be modified by the detailed plan, when supported by thermal analysis. In no case shall the maximum concrete temperature at time of placement exceed 90°F. The maximum temperature within the mass concrete after concrete is placed shall not exceed 160°F. The maximum temperature shall be evaluated at each temperature sensor location placed.

The Contractor shall assure that the maximum temperature differential between any point between the center and surface of the concrete element does not exceed 35°F. The Contractor shall maintain records of the temperature differential and shall immediately apply corrective measures when the temperature differential nears 5°F below the limits stated above. This may be accomplished through a combination of the following:

(a) Selection of concrete ingredients to minimize the heat generated by hydration of the cement.

(b) Cooling component materials to reduce the temperature of the concrete while in its plastic state.

(c) Insulating the forms and the surface of the concrete to prevent heat loss.

(d) Controlling the rate of placing the concrete.

(e) Placement of concrete at times of day when the ambient temperature is lowest or highest.

(f) Providing supplemental heat at the surface of the concrete to prevent heat loss.

(g) Other acceptable methods which may be developed by the Contractor.

Temperature logging shall be started one day before concrete is placed. This is to assure that the initial concrete temperature is captured, and so that the temperature sensors are not forgotten to be turned on and working properly.

The duration of thermal control of each placement shall begin when concrete is first placed into the formwork. Thermal control shall be maintained until the temperature of the interior is within the maximum temperature differential limit (stated above) of the average ambient air temperature. The average ambient air temperature shall be determined by averaging the daily high and low temperatures over the preceding seven calendar days.

Prior to placing any concrete covered by the Special Provision, the Contractor shall submit to the Engineer a detailed thermal control plan, prepared by a licensed engineer specializing in thermal control of concrete members. The plan shall include calculations covering how these temperature differentials will be determined and how the restrictions are to be achieved. The plan shall be submitted at least 30 calendar days before the planned pour and updated for the actual temperatures on the day of the pour.

No concrete covered by this Special Provision shall be placed until the Contractor's temperature differential plan is reviewed and accepted by the Engineer. Approval of the detailed plan does not relieve the Contractor from meeting the requirements of this specification.

The Contractor shall install within the concrete placed in each mass concrete pour and in the surrounding environment of the concrete, temperature sensing devices of a type approved by and at locations as designated by the Engineer. These devices shall be accurate to within plus or minus 2°F within the temperature range of 32°F to 185°F. The temperature shall be recorded automatically by an approved strip-chart recorder furnished by the Contractor. The monitoring equipment shall be capable of continuously recording a minimum of one reading per hour for the entire duration of thermal control.

Unless otherwise specified or required in the thermal control plan, place one temperature sensor at the center of largest portion of placement and one sensor at a depth 2 to 3 inches at center of exterior surface that is nearest to the center of the placement. The sensing system shall contain as a minimum two independent sets of sensing devices in order to assure readings if one of the systems fail. The ambient air temperature sensors shall be located at the project site, in a fully shaded location in the vicinity of the mass concrete being placed and away from artificial heat sources.

3.0 Method of Measurement. No measurement will be made.

4.0 Basis of Payment. No separate payment will be made for compliance with this special provision. The cost of furnishing all equipment, materials, and labor and performing all work required for placement and curing of mass concrete, as prescribed above and as shown on the plans, will not be paid for separately and all costs therefore shall be included in the contract price bid for other items of work.

I. COLD WEATHER CONCRETING IN MASSIVE BENTS AND PIERS

1.0 Description. This work shall consist of constructing massive concrete bents and piers in cold weather.

2.0 Construction Requirements.

2.1 When curing any mass concrete pour (as determined in JSP Mass Concrete), cold weather concreting in Sec 703 shall be modified by the below requirements. Provisions shall be made in these sections to insert a thermal probe by installation of a galvanized steel conduit or other methods as approved by the engineer.

(a) When curing is complete on any mass concrete pour, the temperature of the surrounding air shall be reduced gradually at a rate not exceeding 25°F (14°C) in 24 hours, until 14 days after placement.

(b) If insulated forms are used for curing, the insulated forms shall not be removed until the temperature differential between the center of the concrete mass and surrounding air does not exceed 20°F (11°C). The insulated forms will not be required to be left in place beyond 14 days after placement.

3.0 Method of Measurement. No measurement will be made.

4.0 Basis of Payment. Payment for the above described work, including all material, equipment, labor and any other incidental work necessary to complete this item, will be considered completely covered by the contract unit price for the concrete.

J. DRAINAGE SYSTEM (ON STRUCTURE)

1.0 Description.

1.1 This work shall consist of furnishing, fabricating and installing the drainage items necessary to complete the entire drainage system as shown on the contract plans.

1.2 Detailed shop drawings of the drainage system shall be prepared and submitted to Fabrication@modot.mo.gov for approval . Shop drawings shall be in accordance with Sec 1080. Catalog data may be furnished for components that are standard manufactured items in lieu of detailed drawings, provided that governing dimensions are given.

2.0 Materials.

2.1 Scupper outlets and grates shall be equivalent to Neenah R-3951. Castings shall be cast gray iron in accordance with Sec 614. A fabricated outlet and grate of similar size and in accordance with the requirements for ASTM A709 Grade 36 steel may be submitted for approval. Castings shall be coated with a prime coat of the coating system as specified on the bridge plans to provide a minimum dry film thickness of 5 mils or may be galvanized in accordance with ASTM A385. Steel outlets and grates shall be coated as described above or galvanized in accordance with ASTM A123.

2.2 Reinforced fiberglass pipe, collection basins and fittings shall be a Reinforced Thermosetting Resin Pipe (RTRP) system in accordance with the requirements of ASTM D2996. The RTRP system shall have a minimum short time rupture strength hoop tensile stress of 30,000 psi. The RTRP system shall be pigmented resin throughout the wall. The color of the RTRP system shall be concrete gray or as specified on the bridge plans. The RTRP system shall not be coated with paint, gel-coat or any other exterior coating.

2.3 The contractor shall furnish a manufacturer's certification to the engineer for each lot furnished, certifying that the materials supplied are in accordance with all requirements specified. The certification shall include results of all required tests. Acceptance of the material will be based on the manufacturer's certification and upon results of such tests as may be performed by the engineer. The certification shall show the quantity and lot number that is represented.

3.0 Construction Requirements.

3.1 All connections shown on the plans to facilitate future removal for maintenance cleanout or flushing shall be made with a threaded gasket coupler system, bolted gasket flange system or a female to male threaded PVC plug. Adhesive bonded joints will be permitted for runs of pipe between such connections.

3.2 Runs of pipe shall be supported at a spacing of not greater than the lesser of those as recommended by the manufacturer of the pipe or as shown on the bridge plans. Supports that have point contact or narrow supporting areas shall be avoided. Standard sling, clamp, clevis hangers and shoe supports designed for use with steel pipe may be used. Minimum hanger thickness shall be 3/16 inch with the minimum strap width for the pipe sizes shown in the table below. Straps shall have 120 degree minimum contact with the pipe. Pipe supported on a surface with less than 120 degrees of contact shall have a split fiberglass pipe protective sleeve bonded in place with adhesive. All new steel, hangers and miscellaneous hardware for drainage system shall be ASTM A709 Grade 36 steel except as noted on the bridge plans. All new steel, hangers and miscellaneous hardware for drainage system shall be galvanized in accordance with ASTM A153 except as noted on the bridge plans.

Pipe Size inches (mm)	Minimum Strap Width inches
3	1.25
4	1.25
6	1.50
8	1.75
10	1.75
12	2.00
14	2.00

3.3 The slab drain with grate and RTRP system shall be handled and installed in accordance with guidelines and procedures as recommended by the manufacturer.

3.4 When the drainage system continues between superstructure units and/or between the superstructure and substructure units, the drainage system shall have allowance for the expected differential expansion and contraction movements as recommended by the manufacturer. Runs of pipe shall not exceed 200 feet in length.

4.0 Method of Measurement. No measurement will be made.

5.0 Basis of Payment. Payment for the above described work, including all material, equipment, labor and any other incidental work necessary to complete this item will be considered completely covered by the contract lump sum price for Drainage System (On Structure).

K. FOUNDATION INSPECTION HOLES

1.0 Description. The Contractor shall provide foundation inspection holes as indicated in the plans.

2.0 General Requirements.

2.1 Sec 701.4.11 is amended as follows: The second sentence is deleted and the following substituted therefor:

At least 20 days prior to drilled shaft construction the contractor shall drill one NX size core at the center of each rock socket to a depth of 10 feet or twice the diameter of the rock socket, whichever is greater, below the bottom of the rock socket.

2.2 ***Sec 701.4.11.1 is amened to include the following paragraph:***

All information regarding the log of excavated material as described herein shall not only be delivered to the engineer but also the Commission's geotechnical engineer.

3.0 Method of Measurement. Per Sec 701.6.5.

4.0 Basis of Payment. Per Sec 701.7.6.

L. USACE REQUIRED CONTRACTOR DIPP SUBMITTALS

1.0 Description. Work for the Project will occur within and adjacent to the North Kansas City Levee Unit, Lower Section (Levee). Contractor provided Drilling and Invasive Program Plan (DIPP) submittals are required for approval from the USACE Kansas City District and NKC Levee District.

2.0 General Requirements.

2.1 The USACE Kansas City District and NKC Levee District require additional Drilling and Invasive Program Plan (DIPP) submittals to be provided by the Contractor per ER 1110-1-1807 ("Drilling and Invasive Activities at Dams and Levees") effective 1 June 2023.

An approved DIPP is required prior to any of the following listed drilling or invasive activities:

(a) Foundation Inspection Holes

(b) Drilled Shaft Installation

(c) MSE Wall Bridge No. A9617

The MSE Wall Bridge No. A9617 DIPP shall include the supplier provided wall design.

The USACE Section 408 permit for the overall design of the replacement bridge assumes minimal grading and gravel fill in staging areas adjacent to the levee. If any excavation is required for Contractor staging areas, submit an excavation-only DIPP for site preparation for USACE review and approval.

2.2 USACE provided guidance on DIPP is available online:

https://www.nwk.usace.army.mil/Missions/Engineering-Division/Geotechnical-Branch/Geotechnical-Design-and-Dam-Safety/

NKCLD should be contacted to provide example DIPP submittals.

2.2 USACE has indicated the following estimated review durations:

(a) For conventional DIPP submittals, anticipate 60-90 days for review. Assumes USACE Risk Management Center (RMC) review is required. Assumes one resubmittal returned 1 week after comments received.

(b) For excavation-only DIPP, anticipate 60 days for review. Assumes no USACE Risk Management Center (RMC) review required. Assumes one resubmittal returned 1 week after comments received.

The MSE Wall Bridge No. A9617 DIPP may be feasible for excavation-only DIPP depending on the Contractor means and methods, subject to determination by the USACE.

The Commission cannot guarantee review durations or outcomes for third-party agencies, including the USACE, RMC, and NKCLD. All stated review times are estimates only and subject to change at the discretion of the reviewing agencies. The Commission assumes no responsibility or liability for delays, comments, or conditions resulting from external reviews.

2.3 The contractor shall submit with the Drilled Shaft Installation DIPP a plan to verify the annulus between temporary and permanent casing is completely backfilled, such as by cross-hole sonic logging testing or other approved method.

4.0 Method of Measurement. No measurement will be made.

5.0 Basis of Payment. Payment for the above described work will be considered completely covered by the contract unit price for other items included in the contract.

M. GALVANIZED PERMANENT SHEET PILE WALL

1.0 Description. The Contractor shall provide permanent sheet pile wall as indicated in the plans. This work item shall consist of all material, testing, equipment, labor and any other incidental work necessary for furnishing and installing the galvanized permanent sheet pile wall.

2.0 Materials.

2.1 Furnish new interlock-type steel sheet piling including any connections and corner pieces as necessary conforming to ASTM A328 and with the section depth, thickness, and modulus, the plans specify. The sheet pile supplier shall submit certified mill test reports in accordance with Sec 1080.2.4.

2.2 Fabric Reinforced Elastomeric Mat: Fabric reinforced elastomeric shall consist of a fabric and an elastomer compound. The elastomer compound shall be either Polychloroprene according to Table X1 of AASHTO M 251 having a minimum Hardness (Durometer) of 50 or Ethylene Propylene Diene Monomer (EPDM) according to Sec 1073.7 Standard Specifications. The composite of the fabric and elastomer compound shall have a minimum tensile strength of 700 x 700 lb/in. (122.6 x 122.6 N/mm) according to ASTM D 378. The minimum elongation at ultimate

tensile strength shall be 30 percent according to ASTM D 412. The minimum thickness of the fabric reinforced elastomeric shall be 1/8 in. (3 mm).

2.3 Galvanizing. All permanent steel sheet piling, including interlocks, corner pieces, and connections, shall be hot-dip galvanized after fabrication in accordance with ASTM A123/A123M.

Galvanizing of sheet pile interlocks shall be controlled to prevent excessive zinc buildup that interferes with proper engagement and driving of the piles. Cleaning or light dressing of interlocks after galvanizing shall be permitted, provided the remaining coating thickness meets ASTM A123 requirements.

Repair of damaged or uncoated areas shall be in accordance with ASTM A780.

3.0 Construction Requirements.

3.1 Driving System. Furnish a sheet pile driving system capable of driving the sheet piles to the required minimum tip elevation shown on the plans. The engineer may order the contractor to remove a pile driving system component from service if it causes insufficient energy transfer or damages the sheet piles. Do not return a component to service until the Engineer determines that it has been satisfactorily repaired or adjusted. Drive sheet piles with diesel, air, steam, gravity, hydraulic, or vibratory hammers.

3.2 Cut-Offs. Cut off sheet piles at the elevations the plans show or as the Engineer directs. Pile cut-offs become the contractor's property. Dispose of cut-offs not incorporated into the work.

3.3 Protection of Galvanized Coating. Handle, store, and install galvanized sheet piles in a manner that minimizes damage to the zinc coating. Equipment that causes excessive abrasion, gouging, or peeling of the galvanizing will not be permitted. Repair coating damage exceeding 2 percent of the exposed surface area per piece in accordance with ASTM A780.

The Contractor may apply a pre-approved temporary interlock lubricant after galvanizing to facilitate driving. Lubricant shall not adversely affect the galvanized coating or long-term performance.

3.4 Cutting of Galvanized Sheet Piles. Flame cutting or torch cutting of galvanized sheet piles shall only be permitted when performed in accordance with applicable OSHA safety requirements, including ventilation and respiratory protection to control zinc fumes.

The Contractor shall be solely responsible for worker safety during cutting operations.

All areas where galvanizing is damaged or removed due to cutting shall be repaired in accordance with ASTM A780.

4.0 Method of Measurement. No measurement will be made. Plan quantities will be paid regardless of actual length and height of sheet pile installed.

5.0 Basis of Payment. Payment for the above described work will be considered completely covered by the contract unit price for:

Item Number	Item Name	Units
712-99.04	Galvanized Permanent Sheet Pile Wall	Sq. Foot

N. GEOMEMBRANE

1.0 Description. Place geomembrane to form an impermeable barrier at the locations designated in the Contract Documents.

2.0 Materials.

2.1 Provide a polypropylene geomembrane geomembrane that has the minimum, minimum average roll values (MARV) shown

GEOMEMBRANE MINIMUM AVERAGE ROLL VALUES		
Property	**Test Method**	**Requirement**
Thickness		30 mils
Puncture Resistance	ASTM D 4833	40 lbs.
Tensile Strength	ASTM D 638	78 lbs./in.

3.0 Construction Requirements.

3.1 Do not remove the geomembrane from its package and expose it to sunlight or the elements more than 10 days before it is placed and covered.

3.2 Place the geomembrane as shown in the Contract Documents, with the longitudinal axis of the roll perpendicular to the centerline of the roadway. Overlap the geomembrane with a minimum of 24 inches at the joints, with the uphill layer placed on top of the downhill layer of geomembrane.

3.3 No direct construction equipment traffic allowed on the exposed geomembrane.

3.4 If the geomembrane is damaged by tears, punctures, or contamination from hydrocarbon spill, do not patch the damaged areas, replace the entire section of the geomembrane.

Place the geomembrane on uniform, low-abrasion surface in a manner that does not puncture or tear the geomembrane.

3.5 Place a 3” sand layer of the cushioning material over the geomembrane to protect from puncture by subgrade aggregate and compaction equipment.

4.0 Method of Measurement. No measurement will be made.

5.0 Basis of Payment. Payment for the above described work will be considered completely covered by the contract price for “MSE Wall Systems with Lightweight Fill”.