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LANE RESTRICTIONS ON OHIO RIVER BRIDGE

The bridge rehabilitation work specified during Phase 1 construction on the US 41 southbound lanes over the Ohio River, 041-93-05000, and the corresponding lane restrictions over these structures as shown in the plans shall be completed and open to traffic on or before 115 calendar days from the initial time when these lane restrictions are put in place. The time for the construction of the temporary crossover north of this bridge as well as the shoulder reconstruction work adjacent to the Ohio River Bridges is not included in the 115 calendar days.

Lane restrictions on the Ohio River bridges, 041-93-05000, shall not be put in place until the permanent cameras, as shown in the plans, have been installed and are operational as directed by the Engineer. At least 14 calendar days prior to the placing lane restrictions over the Ohio River bridges, 041-93-05000, the Contractor shall have variable message boards in place, both north and south of the construction area, with the message "No Wide Loads" or something similar as directed by the Engineer.

If the necessary work is not completed and US 41 over the Ohio River bridges, 041-93-05000, is not reopened to unrestricted traffic within the number of calendar days for restriction, liquidated damages shall be assessed in accordance with 108.09, not as a penalty, but as damages sustained for each calendar day for which traffic on US 41 remains restricted in excess of the number shown.

Extension of restriction time, if required, shall be in accordance with 108.08.

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WIDE LOAD VEHICLE RESTRICTIONS

Wide load vehicles shall not be allowed to travel within the construction zone during Phase 1 construction when the maintenance of traffic is in place for the rehabilitation of the southbound bridge over the Ohio River.

During Phase 2 and Phase 3 construction periods, wide load vehicles shall also not be allowed to travel within the construction zone during the following timeframes:

- Northbound traffic: in the mornings, Monday through Friday, from 6:00 A.M. to 9:00 A.M.
- Southbound traffic: in the afternoons, Monday through Thursday, from 3:00 P.M. to 8:00 P.M.
- Both directions of traffic: Friday 2:00 P.M. to 10:00 P.M.

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ADJACENT PROJECT

Located along I-69 adjacent to this project will be a District Pavement Project (Contract R-36649, Des. No. 1298522). The Contractor shall coordinate sign placement with this adjacent project on I-69, in accordance with 105.07 to avoid conflicting or redundant maintenance of traffic signage. Any changes to conflicting or redundant signage shall be as approved by the Engineer.

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HYDRODEMOLITION

Description

This work shall consist of the preparation of the exposed bridge deck surface on the Eagle Creek Northbound and Southbound structures in accordance with 722, and shall involve milling and the use of hydrodemolition. Subsequent to the deck preparation, the work shall consist of constructing a latex modified Portland cement concrete overlay.

Materials

Materials shall be in accordance with 722.02.

Evaporation retardant shall be one of the products listed below. A Type D certification in accordance with 916 shall be furnished to the Engineer prior to use.

1. MasterKure ER 50, manufactured by BASF
2. Sika-Film, manufactured by Sika Corporation
3. Eucobar, manufactured by Euclid Chemical Company

Storage and Handling of Materials

Storage and handling of materials shall be in accordance with 722.03.

Construction Requirements

Removal of Existing Concrete Overlay

When an existing deck overlay is to be removed, the removal shall be performed with a milling machine. Removal in areas that are inaccessible to the milling machine, shall be done by chipping hammers or handchipping.

Deck Scarification

The deck surface shall be scarified by surface milling to an initial depth of 1/2 in. The milling operation shall be limited to the portion of the deck that is closed to traffic at any one time. After the initial surface milling, additional milling shall be required as directed and as shown in the plans.

Surface milling shall be performed with a milling machine capable of removal to the required depth. The equipment shall be self-propelled with sufficient power, traction and stability to maintain accurate depth of cut and slope. The equipment shall be capable of accurately and automatically establishing profile grades along each edge of the machine by referencing the existing bridge deck by means of a ski or matching shoe.

If the milling operation results in the snagging of the top mat of steel reinforcement, the milling operation shall be stopped and the depth of removal adjusted. Any damaged reinforcing bars shall be repaired as directed at no additional cost.

Concrete Bridge Deck Removal by Hydrodemolition

The purpose of this operation is to remove all unsound concrete and prepare the bridge deck surface, using hydrodemolition in accordance with 722.05 (a) 2., for new overlay placement. The hydrodemolition equipment shall be a self-propelled computerized robot that utilizes a high pressure water jet stream

capable of removing concrete as specified herein, as well as removing rust and concrete particles from exposed reinforcing steel.

After the deck scarification, the Contractor shall clean the milled deck surface in accordance with 722.05.

Prior to the commencement of the removal operation with hydrodemolition, the equipment shall be calibrated on an area of sound original deck concrete as designated by the Engineer. The Engineer will verify the following settings:

1. Water pressure gauge (13,000 psi minimum).
2. Water usage (55 gallons per minute, minimum)
3. Machine staging control (step)
4. Nozzle size
5. Nozzle speed (travel)

The equipment shall then be moved to a known delaminated area to verify that initial settings will remove all unsound concrete within the designated area. The initial settings may need to be adjusted, within the limits established above, in order to achieve total removal of unsound concrete. The Engineer shall be notified of the final equipment settings resulting from the calibration process.

After calibration of the equipment, concrete removal by hydrodemolition shall be conducted on the bridge deck. The removal will be verified as necessary, every 30 ft along the cutting path. The equipment settings will be documented by the Engineer. Calibration of the hydrodemolition equipment shall be conducted for every day of operation and, if necessary, re-calibrated to ensure removal of known areas of delaminated concrete as well as to guard against removal of sound concrete. Handchipping shall be used in areas that are inaccessible to the self-propelled hydrodemolition equipment. Handchipping tools may be hand or mechanically driven and operated.

The Contractor shall submit a plan for approval by the Engineer for control and filtering of all water discharged during hydrodemolition operations to produce visibly clear water prior to release to the surrounding environment. The Contractor shall block all drains on the deck and install dams to strain the runoff every 150 ft or less, along the drainage path. The dams shall be constructed from aggregate or straw having minimum dimensions of 6 in. in height, by 1 ft in width. The exposed bridge deck shall be used as a settlement basin for runoff. An additional settlement basin outside the limits of the bridge deck may be required if further straining is necessary.

The Contractor shall provide shielding to ensure containment of all dislodged concrete during hydrodemolition operations to prevent damage to surrounding property and from flying debris both on and under the work site.

Cleaning of the hydrodemolition debris and slurry shall be performed with a vacuum system equipped with fugitive dust control devices and capable of removing wet debris and water in the same pass. The vacuum equipment shall be capable of washing the deck with pressurized water during the vacuum operation to dislodge all debris and slurry from the bridge deck surface. Cleaning shall be done before any debris or slurry is allowed to dry on the bridge deck surface.

Additional Removal

After concrete bridge deck removal by hydrodemolition has been completed for the construction phase, the deck will undergo final sounding to assure that all unsound concrete has been removed. The prepared deck surface shall be completely dry prior to final sounding and will consist of as many successive soundings as required to ensure that all delaminated concrete has been removed. Additional concrete removal shall be performed by handchipping or hydrodemolition. Only handchipping tools shall be used when removing concrete within 1 inch of reinforcing steel.

Where the bond between the existing concrete and the reinforcing steel has been destroyed by handchipping, the concrete adjacent to the steel shall be removed to a minimum clearance of 1 in. around the periphery of the exposed steel.

Full Depth Repair of Bridge Floor

Where the deck is sound for less than half of its original depth, the concrete shall be removed full depth except for limited areas as determined by the Engineer. Forms for areas of up to 4 ft^2 may be suspended from wires attached to the reinforcing steel. For areas greater than 4 ft^2, the forms shall be supported from the structural members of the superstructure or by shoring from below. Exposed reinforcing steel shall not be damaged by the full depth removal operation. Any damaged reinforcing steel shall be repaired as directed with no additional payment. The removal area shall be thoroughly cleaned of all dirt, foreign materials and loose concrete to the extent necessary to produce a firm solid surface for adherence of the new concrete. A minimum 1 in. vertical surface shall remain, or be cut, 1 in. outside and around the entire periphery of each full depth removal area after removal of all loose and unsound concrete. Full depth patching of the bridge floor shall be conducted in accordance with 722.06 (a).

Preparation of Bridge Floor Prior to Overlay Placement

After completion of hydrodemolition and full depth repair of the bridge floor, but not more than 24 h prior to placement of the overly, the entire deck shall be cleaned in accordance with 722.05 (c).

Proportioning and Mixing

Proportioning and mixing of the latex modified concrete shall be in accordance with 722.04 and 722.08, respectively.

Placing and Finishing

Placement and finishing of the latex modified concrete overly shall be in accordance with 722.09.

Texturing and Curing

Texturing and curing shall be in accordance with 722.10 and 722.11, respectively.

Calibration of Continuous Mixers

Calibration of continuous mixers shall be in accordance with 722.12.

Method of Measurement

Removal of the existing overlay will be measured by the square yard of deck area regardless of the number of passes with the milling machine.

The surface milling operation for deck scarification will be measured by the square yard for the initial 1/2 in. depth. Surface milling below the initial 1/2 in. depth will be measured by the square yard for each increment up to 1/2 in. depth. Additional removal of unsound concrete by handchipping will not be measured.

Hydrodemolition of the bridge deck will be measured by the square yard.

Full depth patching will be measured in accordance with 722.14.

Additional removal of unsound concrete by handchipping will not be measured.

Overlay material used to fill surface irregularities will be measured in accordance with 722.14.

Bridge deck overlay will be measured in accordance with 722.14. If no specified thickness is shown on the plans, the specified thickness shall be 2.00 inches.

Epoxy resin adhesive and bond coat will not be measured for payment. Blasting, cleaning, finishing, texturing, and curing will not be measured for payment.

Basis of Payment

Removal of the existing overlay will be paid for at the contract unit price per square yard of bridge deck overlay, remove.

Surface milling will be paid for in accordance with 722.15 except as follows. The initial depth to be paid for as surface milling will be 1/2 in. The increments for additional surface removal will be up to 1/2 in., for each individual increment.

Hydrodemolition of the bridge deck will be paid for at the contact unit price per square yard.

Full depth patching will be paid for in accordance with 722.15.

Overlay material used to fill surface irregularities will be paid for at the contract unit price of $330 per cubic yard for bridge deck overlay, additional.

Bridge deck overlay will be paid for in accordance with 722.15.

Payment will be made under:

Pay Item	Pay Unit Symbol
Bridge Deck Overlay, Remove	SYS
Hydrodemolition	SYS

The cost of overlay removal by handchipping in areas adjacent to the curb or otherwise inaccessible to the power-operated mechanical milling machine shall be included in the cost of bridge deck overlay, remove. The cost of disposing of overlay removal residue, including water, dust, concrete and incidentals shall be included in the cost of bridge deck overlay, remove.

The cost of deck scarification by handchipping in areas adjacent to the curb or otherwise inaccessible to the power-operated mechanical milling machine shall be included in the cost of surface milling. The removal of surface milling residue, including water, dust, concrete and incidentals shall be included in the cost of surface milling.

The cost of the waste water control and disposal plan, waste water containment, testing, storing, transporting and disposal, and any incidentals related to the carrying out of the plan shall be included in the cost of hydrodemolition. If the waste water is found to have a pH of 12.5 or higher and thereby classified as hazardous, the additional costs associated with this classification will be paid for in accordance with 109.05. The initial equipment calibration, any re-calibration, equipment shielding, handchipping curb areas, handchipping unsound concrete, cleaning of debris and slurry, compressed air cleaning, water blasting, and sandblasting shall be included in the contract unit price for hydrodemolition.

The cost of bond coat, furnishing and placing the overlay material, and incidentals shall be included in the cost of bridge deck overlay. Coring of the bridge deck, patching core holes, and all corrective measures required in accordance with 722.11 shall be performed at no additional cost.

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REMOVAL OF PRESENT STRUCTURE AND DELIVERING SECTIONS TO PURDUE UNIVERSITY

Description

This work will include removing portions of the existing Northbound Eagle Creek structure. Designated sections of the existing bridge shall be removed, preserved, and delivered to Purdue University S-BRITE Center.

Construction Requirements

Removing Portions of the Existing Structure

Portions of the existing bridge shall be removed in accordance with 202 except as otherwise described herein.

Disassembly of Designated Sections

Portions of the existing structure are to be disassembled and delivered to Purdue University's S-BRITE Center. For more detailed exhibits of the girders and truss members to be delivered, the Contractor may contact:

Jason Lloyd
Purdue University
765-494-7081

The Contractor shall submit to the Engineer a written description of his removal, lifting, and transportation methods prior to beginning such operations. This submittal is not for approval by the Engineer, but only for the Engineer's information and comment. All calculations and drawings for lifting or temporary shoring shall be signed and sealed by a professional engineer and submitted with the work plan for review and comment.

All sections designated for the Purdue University S-BRITE Center shall be removed from the bridge with methods that will preserve the condition of the sections. Damage incurred from torch cutting is an acceptable type of damage. Damage incurred from shearing or dropping the section will not be acceptable, making it no longer useful to the S-BRITE Center. Care shall be taken in the demolition of the concrete deck, particularly if the deck is composite with the stringers, so that jack hammering does not impact damage the steel member. It will be acceptable to leave a section of the deck attached to the stringers in order to protect them, or all of the deck attached to the entire section.

The following sections shall be removed, preserved, and delivered:

1. One 40 ft length of superstructure removed from Span Q and R, or B and C that includes two girder lines with pin and hanger details. The girders shall be cut 14 ft 6 in. from the center of the hanger plate in span Q or C and 25 ft 6 in. from the center of the hanger plate in span R or B. One girder shall be a fascia girder and the other an interior girder with the cross framing between them kept intact.

2. One 40 ft length of superstructure removed from Span Q and R, or B and C that includes two girder lines with pin and hanger details. The girders shall be cut 14 ft 6 in. from the center of the hanger plate in span Q or C and 25 ft 6 in. from the center of the hanger plate in span R or B. Both girders shall be interior girders and the cross framing between shall kept intact.

3. Four pin and hanger details with 3 ft of girder on each side of the assembly. Cross framing shall be cut off 1 ft from the web plates.

Delivery to S-BRITE Center

Every effort shall be made to ensure the components are not damaged during removal and transport. The Contractor shall provide removal from the bridge, loading onto transportation, transportation to the S-BRITE Center, and unloading from transportation. If any of the sections are shipped upside down in order to facilitate shipment, they shall be rotated at the delivery location so that they are right side up before delivery is considered completed.

The designated sections shall be delivered to Purdue University S-BRITE Center at latitude and longitude, 40.409363, -86.949781. The location is south of the Purdue University Airport in West Lafayette, IN. The Contractor shall contact Jason Lloyd at 765-494-7081 or Robert Connor at 765-414-3992, a minimum five days before delivering the sections of the bridge to the S-BRITE Center. The offloading procedure and requirements shall be coordinated with Jason Lloyd or Robert Connor. The Contractor shall be responsible for all necessary permits to deliver the girders to Purdue.

Method of Measurement

No direct measurement will be made for removing portions of the existing structure. No direct measurement will be made for removal and delivery of the designated sections.

Basis of Payment

Removing portions of the existing structure will be paid for at the contract lump sum price for Present Structure, Remove Portions in accordance with 202.14. Removal and delivery of designated sections to Purdue University S-BRITE Center will be paid for at the contract lump sum price for Removal, and Delivery of Bridge Sections.

Payment will be made under:

Pay Item	Pay Unit Symbol
Removal, and Delivery of Bridge Sections.....	LS

The cost of transportation, handling, disposal, permitting, and any other incidentals necessary to complete the work described herein shall be included in the cost of the pay items.

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WATERWAY RESTRICTIONS

In-channel excavation shall not occur between April 1st and June 30th without the prior written approval of the Indiana Department of Natural Resources, Division of Fish and Wildlife.

The Contractor shall perform all construction activities from the existing roadway. Temporary runarounds, causeways or cofferdams in the waterway shall not be constructed. Demolition materials and debris shall be contained and not be allowed to fall into the waterway during construction.

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WETLAND RESTORATION PLAN

Description

This work shall include the re-grading of temporary equipment access areas under the US 41 Bridges at Eagle Creek, Ohio River Overflow and Cheatam Slough, as well as the furnishing and installing of seed mixtures within all disturbed wetland areas underneath these bridges.

The proposed project will impact an unknown acreage of emergent wetland area under the bridge structures for temporary equipment access during rehabilitation activities. Much of the wetland areas to be impacted were noted to have sparse plant growth or bare ground at the time of field investigation.

The Contractor shall be responsible for the restoration of the emergent wetland area after the project is completed. All erosion control devices implemented during the project shall remain in place until the restoration area becomes stabilized with permanent vegetation. The restoration of this area shall include, at a minimum, the restoring of ground elevations as shown on the plans, the complete removal of all trash and debris, if found, and the application of a native seed mix that is tolerable of moist to wet clayey loam soil conditions.

Materials

Seed Mixture D, modified

The recommended seed mix and application rates shall be as follows. This seed mix shall be applied at a rate of 16 lbs/acre.

Material	Application Rates
Fowl Mana Grass	1 oz/ac
Wetland Carex Species	3 oz/ac
Rice Cut Grass	2 oz/ac
Bullrush	2 oz/ac
Leptochloa Fasicularis	2 oz/ac
Prairie Wild Rye	2 oz/ac
Perennial Ryegrass	12 lb/ac
Jasper Red Fescue	2 lb/ac
“Fults” Puccinella Distans	2 oz/ac
Redtop	1 lb/ac
Fowl Mana Grass	1 oz/ac
Wetland Carex Species	3 oz/ac
Rice Cut Grass	2 oz/ac

Seed Mixture R

This seed mixture shall be applied at the rate of 205 lb/ac consisting of 115 lb/ac of low endophyte Kentucky 31 Fescue, 75 lb/ac perennial

ryegrass, and 15 lb/ac Jasper Red Fescue. Fertilizer and mulching material, where specified or directed, shall be applied in accordance with 621.05.

Construction Requirements

Disturbed wetland areas shall require earthwork in accordance with 203 in order to re-establish original grades. Once graded, erosion control blankets and native seed shall be placed along the disturbed areas, and the blankets staked in place. This will provide erosion control and suitable substrate for the seed to germinate.

Care, Inspection and Replacement

The treatment of plant materials along with post-installation and replacement shall be in accordance with 622.18(a) and (b).

Method of Measurement

Seed mixtures and erosion control blankets will be measured in accordance with 621.13.

Basis of Payment

Seed mixtures and erosion control blankets will be measured in accordance with 621.14.

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COAST GUARD PERMIT

The precautionary measures as noted in the United States Coast Guard Permit letter dated October 13, 2016 shall be followed during the rehabilitation of the Southbound Ohio River Bridge.

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CORED HOLE IN CONCRETE

~~This work shall consist of coring a hole through the existing west wingwall at both end bents at the Southbound Cheatam Slough and Ohio River Overflow structures as shown on the plans. The purpose of this hole is to provide an opening for the proposed end bent drain pipe to outlet. The cored hole in concrete will be measured and paid for as each.~~

Description

This work shall consist of coring a hole through the existing west wingwall at both end bents at the Southbound Cheatam Slough and Ohio River Overflow structures as shown on the plans. The purpose of this hole is to provide an opening for the proposed end bent drain pipe to outlet.

Materials

Materials shall consist of the equipment necessary to core a hole in the existing wingwall as detailed in the contract documents

Construction Requirements

Coring of the existing wingwalls shall be performed as detailed in the contract documents

Method of Measurement

Cored Hole in Concrete will be measured per the number of holes cored in concrete per the contract documents

Basis of Payment

Cored Hole in Concrete will be paid for at the contract unit price per each hole cored

Payment will be made under:

Pay Item	Pay Unit Symbol
Cored Hole in Concrete	EACH

The cost of coring a hole in concrete, including the necessary material, labor, and equipment shall be included in the cost of Cored Hole in Concrete.

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EAGLE CREEK COPING REMOVAL

The existing copings on the Eagle Creek Northbound and Southbound structures shall be removed and replaced as specified in the contract documents. As an option, the Contractor will be allowed to clean and straighten all, or portions of the existing reinforcing steel within the copings. Reinforcement that is cleaned and straightened shall be as approved by the Engineer. Reinforcement that is not approved by the Engineer shall be replaced with new reinforcing steel utilizing field drilled holes and dowels as specified in the contract documents. The cost of cleaning and straightening all, or portions of the existing reinforcement shall be included in the Cost of Present Structure, Remove Portions in accordance with 202.03 (b).

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CONCRETE CURB PATCHING

This work shall consist of patching the existing concrete curbs, which are located on the existing Southbound Ohio River Bridge. Patching of the concrete curbs shall be in accordance with 710. An estimated quantity of patching is shown on the plans. Additional patching may be required as determined by the Engineer. The specific locations of the necessary patching shall be as determined by the Engineer. The concrete curb patching will be paid for as Patching Concrete Structures in accordance with 710.07.

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METAL DECK FORMS

There are no permanent metal deck forms present on the current six bridges along US 41 Northbound and Southbound. The contractor shall have the option of utilizing permanent metal deck forms on all of the structures with the exception of US 41 Southbound bridges over Cheatam Slough and Ohio River Overflow. These two existing bridges are concrete beams with no apparent connection points allowing for the installation of the permanent metal deck forms. The Contractor shall plan his erection scheme accordingly assuming that the permanent metal deck forms will not be capable of being installed at these two bridges.

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EMBEDDED GALVANIC ANODES

Description

This work shall consist of the furnishing and placing galvanic anodes in accordance with 105.03.

Materials

The galvanic anodes shall be the Galvashield XP, CORR-STOPS CI, or Sentinel GL. These materials may be purchased from the following suppliers:

Galashield XP	Vector Corrosion Technologies 417 Main Ave. Fargo, ND 58103 (701) 280-9697
CORR-STOPS CI	BASF Construction Chemicals, LLC 889 Valley Park Drive Shakapee, MN 55379 (800) 443-9517
Sentinel GL	The Euclid Chemical Company 19218 Redwood Road Cleveland, OH 44110 (800) 321-7628

The basis of acceptance shall be a type C certification.

Construction Requirements

Galvanic anodes shall be installed along the perimeter of the repair or interface with typical spacing of 24 in. but not more than 28 in., and in accordance with the manufacturer's recommendations. The Contractor shall provide sufficient clearance between anodes and substrate to allow the repair material to encase the anode.

The galvanic anodes shall be secured as close as possible to the patch edge using the anode tie wires. The tie wires shall be wrapped around the cleaned reinforcing steel and twisted tight to allow little or no free movement.

If the anode is tied onto a single bar, or if less than 1 in. of concrete cover is expected, the anode shall be placed beneath the bar and secured to clean reinforcing steel.

If sufficient concrete cover exists, the anode may be placed at the intersection between two bars and secured to each clean bar.

Electrical Continuity: The Contractor shall confirm the electrical connection between anode tie wire and reinforcing steel by measuring DC resistance, in ohms, with a multi-meter. The Contractor shall confirm electrical continuity of the exposed reinforcing steel within the repair area. If necessary, electrical continuity shall be established with steel tie wire.

Electrical continuity is acceptable if the DC resistance measured with multi-meter is less than 1 ohm.

Method of Measurement

Embedded galvanic anodes will be measured by the number of anodes installed, complete in place.

Basis of Payment

Embedded galvanic anodes will be paid for at the contract unit price per each, complete in place.

Payment will be made under:

Pay Item	Pay Unit Symbol
Embedded Galvanic Anode	EACH

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TEMPORARY PANEL BRIDGE

Description

This work shall consist of furnishing and installing a fully-engineered Temporary Steel Panel Bridge of modular galvanized steel construction in accordance with 105.03.

Materials

Materials shall be in accordance with 711.02, 713.02, and as follows:

All material shall be of recent manufacture and shall be 100% domestic origin and fabricated in the United States. Certificates of compliance for each shipment shall be submitted identifying the manufacture date and attesting to its required domestic content and fabrication.

The upper and lower chords of a panel shall be fabricated from hot-rolled steel channels. Verticals and diagonals shall be fabricated from rectangular hollow sections, channels, or flat bars. Truss panels shall be 10 ft long from center of pinhole to center of pinhole and 7.15 ft tall from center of pinhole to center of pinhole. The overall width of a truss panel shall not exceed 6.54 in. Male forgings used for pin connections shall be solid and of one-piece construction. The minimum metal thickness shall be 0.25 in.

The floorbeams or transoms shall be fabricated from wide flanged sections. Vertical cross-bracing shall be incorporated between the floorbeams in every other bay. Bracing shall be at each end of the floorbeams and prevent horizontal loads from being transferred from the floorbeams into the truss members.

The deck system shall be comprised of orthotropic units. Each unit shall be 10 ft long and have a steel deck plate welded to the longitudinal stringers. The driving surface shall be a plain galvanized steel surface. The driving surface shall receive an aggregate epoxy overlay, which shall be applied by the Contractor. Curbs shall be 6 in. tall and shall be shop welded to a deck unit. Transversely in a deck unit are four round tube diaphragms of 3 in. diameter.

Member material properties shall meet or exceed the following:

Trusses or Panels including chords, diagonals, and verticals
- AASHTO M223 Grade 65 (ASTM A572 Gr 65)
- Ultimate tensile strength 80,000 p.s.i.
- Yield 65,000 p.s.i.
- Elongation 17% of 8 in. Gauge Length

Deck Stringers, Floorbeams, Truss Braces, Sway Braces, Raker Braces, verticals and diagonals located in heavy truss units
- AASHTO M223 Grade 50 (ASTM A572 Gr 50)
- Ultimate tensile strength 65,000 p.s.i.
- Yield 50,000 p.s.i.
- Elongation 18% of 8 in. Gauge Length

Panel Connecting Pins
- ASTM A193 Grade B7
- Ultimate tensile strength shall be a minimum of 125,000 p.s.i

Bolts
- AASHTO M164 minimum acceptable bolt diameters
- Chord Bolt – 1.25 in.
- Deck Bolt – 0.75 in.

All other bolts – 1.0 in.

All Additional Parts
AASHTO M183 Grade 36 (ASTM A36)
Ultimate tensile strength 58,000 or 80,000 p.s.i.
Yield 36,000 p.s.i.
Elongation 20% of 8 in. Gauge Length

Construction Requirements

Construction shall be in accordance with the applicable portions of 711 and as follows:

Workmanship, fabrication, Quality Assurance Systems, and shop connections shall be in accordance with the American Society of Steel Construction for Simple Bridges, AISC, American Welding Society, AWS,. D.1.5 Bridge welding codes, American Association of State and Highway Transportation Officials, AASHTO, Bridge Design Code, and the International Standard for quality control, ISO9001-2008, and shall be fabricated in the United States of America. Welding shall be performed by properly certified operators. The bridge shall be fabricated by a fabricator who is currently certified by the American Institute of Steel Construction to have the personnel, organization, experience, capability, and commitment to produce fabricated structural steel for the category "Advanced Major Steel Bridges Category".

All major components shall be hot-dipped galvanized in accordance with AASHTO M111 and ASTM A123.

The interior circumference of the pin holes of the trusses or panels shall be coated with hot dip galvanizing.

All bolts and pins shall be hot dipped or spun galvanized.

The deck units shall be 10 ft long by 6 ft wide.

Panel pins shall be tapered at both ends and locked in place by external snap rings.

Sway braces shall provide bolted connections with double shear planes.

All parts shall be available from a domestic stock for a period of 10 years.

Span lengths shall be as shown on the plans. No geometric modification of the pier or the back wall structures will be accepted unless submitted and approved by the Engineer at least 10 days before the bid date.

The clear roadway width on the structure between curbs shall be as shown on the plans.

Truss configurations shall be as detailed in the contract documents.

The design Live Load shall be in accordance with AASHTO HL93.

The Live Load Deflection shall be a minimum of L/800.

If the Contractor elects to brace their coping forms off of the temporary structure, the Contractor shall coordinate with the supplier prior to setting forms.

Upon award of the contract, the truss manufacturer shall furnish to the Engineer, through the Contractor, eight sets of drawings and calculations signed and sealed by an Indiana Professional Engineer, in accordance with 105.02.

Delivery and Erection

Delivery of the bridge shall be arranged by the supplier and shall be delivered to the job site, or a location specified by the Contractor.

The Contractor shall be responsible for unloading the structure at the time of arrival. The Contractor shall notify the Engineer 24 hours in advance of the expected time of arrival.

The supplier shall supply a construction advisor to assist the Contractor in the construction of the bridge. This advisor shall be present on a daily basis to ensure that the bridge is constructed and erected properly. The construction advisor shall be present when erected spans are used as working platforms for the demolition of additional spans.

The use of any construction equipment on the new bridge shall be approved in advance by the bridge supplier. These approvals shall be submitted to the Engineer for final approval.

The installation of the temporary steel panel bridge shall be by a cantilevered launch utilizing procedures developed by the bridge manufacturer, which shall be signed and sealed by an Indiana Professional Engineer and submitted for approval to the Department.

Truss Removal

At the completion of the project, The Contractor shall be responsible for disassembling the structure and returning it to the supplier. All portions of the existing bridge structure shall be returned per the supplier's guidelines.

The Contractor shall also remove the concrete end bents and piers that serve as the substructure of the temporary bridge. All the piles shall be removed down to 1 ft below the natural ground surface in accordance with 202.03.

Maintenance

The Contractor shall be responsible for the upkeep and maintenance of the temporary structure and deck while it is in service. Areas of damage shall be repaired prior to return of the temporary structure to its owner.

Method of Measurement

The Temporary Bridge will be measured in accordance with 713.09.

Basis of Payment

The Temporary Bridge will be paid for in accordance with 713.10.

The cost of shipping, deck surface, rental of the temporary bridge, including all materials necessary to erect and install, as well as maintain the structure while it is in service, removal of the temporary bridge, substructure and piling as well as all necessary incidentals shall be included in the cost of the pay item.

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BEARING ASSEMBLY, ELASTOMERIC

Description

This work shall consist of furnishing and installing bearing assemblies in accordance with 726.

Materials

Materials shall be in accordance with the 726.02.

Construction Requirements

Elastomeric bearings shall be installed in accordance with 726.03

Method of Measurement

Elastomeric bearing pads for new steel girders will not be measured for payment.

Elastomeric bearing pads for existing steel girders and prestressed beams will be measured by the number of devices installed in place.

Basis of Payment

Elastomeric bearing pads for new steel girders will not be paid for separately, but shall be included in the cost of structural steel in accordance with 711.

Elastomeric bearing pads for existing steel girders and prestressed beams will be paid for at the contract unit price per each device, complete and in place.

Payment will be made under:

Pay Item	**Pay Unit Symbol**
Bearing Assembly, Elastomeric	EACH

The cost of the elastomeric bearing pads, top plates, retainer angles, shim plates, bolts, and lock washers shall be included in the cost of Bearing Assembly, Elastomeric for the existing steel girders and prestressed beams.

The cost of the threaded anchor rods with nuts and washers, retainer angles and shim plates shall be included in the lump sum pay item Structural Steel for the proposed steel girders.

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PAYMENT FOR MISCELLANEOUS BRIDGE ITEMS

There are several items or activities that are shown on the plans, where a specific pay item has not been identified. The cost of the following items as shown on the plans will be paid for as specified below.

The cost of the Type I-A joint shall be included in the pay item "Reinforced Concrete Bridge Approach 12 in."

The cost of the two layers of 6 Mil. Polyethylene, which is located below the concrete approach slab, shall be included in the pay item "Reinforced Concrete Bridge Approach, 12 in."

The cost of the expanded polystyrene, in the various area of the substructure as shown on the plans, shall be included in the pay item "Concrete Class A in Substructure."

The excavation required for the placement of coarse aggregate at the bridge end bents, which is beyond the limits of the foundation excavation unclassified shall be included the pay item "Aggregate for End Bent Backfill".

The cost of the 4 in. diameter schedule 40 PVC pipe sleeve, which is used in the semi-integral end bents, shall be included in the pay item "Epoxy Coated Reinforcing Bars."

The cost of the polychloropene joint membrane, medium weight roofing felt and the high density plastic bearing strip, which are located in the end bents as shown on the plans, shall be included in the pay item "Concrete Class A in Substructure".

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ASPHALT WATERPROOFING OVERLAY

Description

This work shall consist of the construction of the overlay on the Southbound Ohio River Bridge in accordance with 105.03.

Materials

The bridge deck overlay shall be an Asphalt Waterproofing Mix, AWM. AWM is a highly elastomeric, polymer- modified, impermeable asphalt mixture that is designed to be a one-step, waterproof, wearing course system for bridge-deck overlays and the adjacent approaches. Aggregates shall conform to all requirements for Type 3, 9.5 mm nominal maximum aggregate size, NMAS, Surface mixture, unless specifically modified herein.

1. Aggregate. The Contractor shall provide polish-resistant coarse and fine aggregate conforming to 401.03 for a Type 3 surface mixture. The Contractor shall not use mineral aggregates that are inherently porous, such as blast-furnace slag, expanded shale, porous limestone, and lightweight aggregates, in this mixture.

2. AWM Binder. The Contractor shall provide a performance-graded (PG) binder which conforms to AASHTO M 320 with a high temperature of 169 °F or higher and a low temperature of -18 °F or lower. In addition, ensure that the AWM binder conforms to the following criteria:

Test	**Criteria**
Multiple Stress Creep Recovery (AASHTO TP70) (147 °F, 3.2 kPa)	75%

3. Edge Sealant. The Contractor shall provide a solvent-free material for edge sealant as recommended by the producer of the thermoplastic polymer modifier utilized in the AWM. The Contractor shall ensure the material is a highly thixotropic edge sealant that dries to a soft consistency and will not dry out, crack, or split under vibration or slight movement of opposing surfaces. The Contractor shall ensure the material is capable of bonding to metal, wood, masonry, plastics, and elastomers without the use of a primer.

4. Adhesive Tack Coat. The Contractor shall provide a solvent-free material for adhesive tack coat as recommended by the producer of the thermoplastic polymer modifier utilized in the AWM.

5. Joint Sealant. The Contractor shall provide a solvent-free material for joint sealant as recommended by the AWM material supplier. The Contractor shall ensure the material is capable of bonding to metal, wood, masonry, plastics, and elastomers without the use of a primer.

6. AWM Representative. The Contractor shall ensure a technical representative from the material supplier for the AWM is present during the initial construction activities (trial demonstration and set-up period) and available upon the request of the Engineer.

7. Patching. The materials required for patching of the existing bridge deck shall be in accordance with 722.

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Construction Requirements

The Contractor shall place AWM at a minimum thickness of 2.0 in. directly on the prepared surface using a conventional paver and rollers. This material shall be applied according to the lines, grades, and typical cross-sections in the plans or as established by the Engineer.

1. Preparation of Mixture. The Contractor shall ensure the AWM contains no reclaimed materials.

2. Job-Mix Formula (JMF). The Contractor shall formulate and submit a JMF conforming to the material suppliers recommended gradation limits and the following total binder content.

% Total binder (including PG binder and thermoplastic polymer)	7.25-9.25	± 0.5

3. Mix Design Criteria. Using a compaction effort of N_{des} = 50 gyrations and a compaction temperature recommended by the material supplier, the Contractor shall perform and submit a laboratory mix design conforming to the following mixture specifications.

Test	**Criteria**
% Air Voids (AV) (AASHTO R 35)	1.0 ± 1.0
% Voids-in-Mineral Aggregate (VMA) (AASHTO R 35)	16.0 (min)
Permeability (ASTM D 5084)	<1 x 10^{-9} m/s
Flexural Beam Fatigue (ASTM D7460) (750 microstrains, 10Hz, 1.5 ± 0.5 %AV, 15°C)	250,000 cycles (min) (average of two samples)
APA @ 8,000 Loading Cycles (AASHTO TP 63)	<3 mm

The Department will not require AWM blends previously documented as satisfying the flexural beam fatigue specification to be tested again for flexural beam fatigue. Also, the Department will not require flexural beam fatigue testing for projects with a total AWM quantity of less than 1000 tons. Mix design criteria testing which cannot be performed by the Department shall be performed by a third party laboratory.

4. Surface Preparation. Prior to the project, the Contractor shall review the existing bridge deck(s) and approach pavement with a technical representative from the material supplier for the AWM and Department personnel to develop a strategy for repairing distressed areas and preparing the surface for the Edge Sealant, Adhesive Tack Coat, and the AWM.

A sound surface shall be required prior to the placement of the Edge Sealant, Adhesive Tack Coat, and the AWM over the PCC bridge deck and approach pavement.

As directed by the Engineer, the Contractor shall repair any moderately or highly "D-cracked" areas, high-severity "punch-outs," "blow-ups," and other severe distresses with a doweled, full-depth patch. The Contractor shall ensure the patching procedure is in accordance with the applicable requirements of 722.

Prior to the placement of the AWM over asphalt pavement and as directed by the Engineer, the Contractor shall fill large surface deformities, greater than 3 in. deep and 4 ft. in diameter, with an approved asphalt mixture.

Immediately prior to placing the AWM, the Contractor shall thoroughly clean the surface of all vegetation, loose materials, dirt, mud, and objectionable materials. The Contractor shall ensure the surface is dry. During placement of the AWM, the Contractor shall fill smaller pavement deformities in the underlying bridge deck and approach pavement with the AWM.

Prior to the placement of the Edge Sealant, Adhesive Tack Coat, and the AWM all surfaces shall be completely dry.

5. Application of Edge Sealant. The Contractor shall apply edge sealant, at 4 in. to 6 in. wide and approximately 0.03 in. thick, before and after AWM application in accordance with the guidelines from the material supplier for the AWM. The Contractor shall apply the sealant to all perimeter surfaces adjacent to the AWM, such as curbs, parapet walls, headers, drains, scuppers, and joints, in order to reduce moisture infiltration into the AWM. The Contractor shall apply edge sealant to all longitudinal or transverse joints in the AWM that have cooled below 140 °F. When practical, the Contractor shall apply the edge sealant the day before or as early as possible on the day of paving to maximize drying time.

6. Application of Adhesive Tack Coat. The Contractor shall cold-apply an adhesive tack coat to the existing pavement at a rate to achieve an undiluted residue of 0.10 to 0.15 gal/sq yd. For milled surfaces, the Contractor shall apply the tack coat at a rate to achieve an undiluted residue of 0.15 gal/sq yd. For smaller projects as defined by the Engineer, the Contractor shall cold-apply the tack coat by hand with a brush, roller, or hand-wand sprayer. Ensure the surface is free of all dust, dirt, oil, grease, and other contaminants. The Contractor shall allow the adhesive tack coat to cure for a period of at least 40 minutes, or until the tack coat is dry, depending on local conditions.

7. Application of Joint Sealant. For continuous paving operations over existing bridge/pavement joints, the Contractor shall saw-cut a construction joint, 1.0 in. to 1.5 in. wide, in the AWM and fill the joint with joint sealant as directed by the technical representative from the material supplier for the AWM or by the Engineer. The Contractor shall ensure the surface is free of all dust, dirt, oil, grease, and other contaminants. The Contractor shall not apply the sealant on a wet surface. The joint sealant shall be allowed to cure for at least 12 hours before opening to traffic.

8. Production, Transport, and Placement of AWM. The Contractor shall ensure the existing surface temperature is a minimum of 50 °F and rising at the time of AWM placement.

The Contractor shall produce, place, and compact AWM at the temperatures recommended by the producer of the thermoplastic polymer modifier utilized in the AWM.

9. Compaction of AWM.

   a. Rollers. The Contractor shall compact the AWM only with steel, double-drum drive rollers in the static mode. The Contractor shall provide breakdown rollers with a static weight of approximately eight tons. The Contractor shall provide finish rollers with a static weight of four to eight tons and a maximum drum width of 60 in. The Contractor shall provide a small one-ton roller to compact smaller areas such as headers, scuppers, expansion joints that cannot accommodate a full-size roller.

   b. Opening to Traffic. The Contractor shall open lanes to traffic when the AWM pavement reaches 120 °F or a minimum of 1 hour after compaction is completed.

10. Trial Demonstration. At least two days prior to beginning mainline paving, the Contractor shall demonstrate that satisfactory production and placement of AWM is possible. The Contractor shall furnish at least 365 sq yds for the trial demonstration. The Engineer will determine the location, outside of the driving lanes, and exact quantity of the trial placement. The Contractor shall perform a minimum of one volumetric analysis (two gyratory specimens and two G_{mm} tests), one total binder content determination, and one gradation determination. The Contractor shall document that the AWM satisfies the applicable requirements of Sections 3.2 and 3.3 of this note for total binder content, gradation, AV, and VMA prior to beginning mainline paving. The thickness of the trial AWM shall be 2.0 in.

The Contractor shall use the paver and rollers to be used on the project to construct the trial placement. The Contractor shall obtain and test a minimum of four roadway cores from the trial placement according to standard sampling and testing procedure ITM No. 580-ICT, Sampling HMA. The Contractor shall ensure the density of each core is within the range of 96.0 ±2.0 percent of the theoretical maximum density prior to beginning mainline paving.

The Contractor shall furnish additional 365 sq yds production lots until achieving mixture properties that satisfy the requirements above. The Contractor shall construct additional trial sections until establishing a rolling pattern that provides the density specified above.

The Contractor shall furnish an additional 365 sq yds production lot and construct a new trial placement whenever a change in the mix design, compaction method, or compaction equipment occurs. When directed by the Engineer, the Contractor shall remove and replace trial sections with unacceptable results.

11. Acceptance Sampling and Testing. The Department will accept AWM as follows:

a. Definitions for Sub lot, Lot, and Minimum Level of Testing. The following revisions to 401.07 shall be made:

For projects with a total AWM quantity of less than 4000 tons, the Department will define a sub lot as 250 tons and a lot as 1,000 tons. For these projects, the Department will define the setup period as the first 250 tons of production. For projects with a total AWM quantity of 4,000 tons or more, the Department will define a sub lot, a lot, and the setup period according to 401.07. In either case, the Department will perform a minimum of one complete set of acceptance tests each day that any AWM is produced.

b. Total Binder Content and Gradation. The Contractor shall perform one evaluation per sub lot according to 401.07. By the end of the setup period, the Contractor shall establish a JMF conforming to the total binder content and gradation limits from Section 3.2 of this note. The Department will allow the established JMF to vary within the production tolerances from Section 3.2 of this note provided the percent passing each sieve remains within the gradation limits and the total binder content remains within the specified range.

c. AV. The Contractor shall prepare and analyze one set of two gyratory specimens per sub lot according to 401.09. By the end of the setup period, the Contractor shall test the AWM to document that the average AV value of each set of specimens conforms to the limits from Section 3.3 of this note.

d. VMA. The Contractor shall prepare and analyze one set of two gyratory specimens per sub lot according to 401.09. By the end of the setup period, the Contractor shall test the AWM to document that the average VMA value of each set of specimens conforms to a minimum of 16.0 percent.

e. Density. For each sub lot of production after the setup period, the Engineer shall randomly select locations for four cores from the bridge approach areas, not the bridge deck itself, in order to preserve the integrity of the AWM over the bridge deck. The Contractor shall obtain and furnish the cores to the Engineer according to 401.09. The Department will test the cores to ensure the following criteria are satisfied:

1. The density of each core is between 94.0 and 98.0 percent of the G_{mm} value for that sub lot; and,

2. The average density of the four cores is a minimum of 96.0 percent of the G_{mm} value for that sub lot.

f. Unsatisfactory Work Based on Laboratory Data. When the total binder content, gradation, AV, VMA, or density value from any test after the setup period fails to satisfy the applicable requirements of this note, the Contractor shall cease all shipments to the project. The Contractor shall adjust procedures or mixture composition until all properties satisfy the applicable requirements of this note. The Contractor shall Document acceptable materials and work before restarting operations.

g. Verification Sampling and Testing. The Department will verify AWM as follows. Using the definition for a lot from Section 3.11.1 of this note, the Department will perform a minimum of one verification test for total binder content, gradation, AV, and VMA for each lot according to 401.09. Test results exceeding the tolerance limits provided in 402.09 will be considered as a failed material and adjudicated in accordance with 105.03.

When the verification tests are not within the tolerances given in 402.09, The Contractor shall cease all shipments to the project. The Contractor shall adjust procedures or mixture composition until the differences are within the tolerances given in 402.09. Document compliance with these tolerances before restarting operations.

Method of Measurement

The AWM will be measured by the square yard of bridge deck overlay placed at the specified thickness. Up to 730 square yards of AWM shall be used in the trial demonstration. Quantities exceeding 730 square yards will not be measured for payment. Saw-cutting of joints will not be measured but shall be included in this work.

Bridge Deck Patching, Partial Depth will be measured in accordance with 722.14.

Basis of Payment

The AWM used for the bridge deck overlay will be paid for at the contract unit price per square yard as bridge deck overlay in accordance with 722.15. The AWM used for the trial demonstration will be paid for at the contract unit price per square yard, not to exceed 730 square yards.

Bridge Deck Patching, Partial Depth will be paid for in accordance with 722.15.

The cost of surface preparation (except patching), edge sealant, adhesive tack coat, joint sealant, furnishing and placing the AWM, saw-cutting of joints, and necessary incidentals shall be included in the cost of bridge deck overlay.

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PRE-COMPRESSED FOAM JOINT

Description

This work shall consist of the following items required for the expansion joint removal and replacement on the Southbound Ohio River Bridge, in accordance with 105.03.

Materials

Materials shall be in accordance with 702.03, 722.02, 724.02 and as follows:

1. Class "C" Modified Concrete. The Contractor shall use either "C1" or "C2" from table below.

INGREDIENT PROPORTIONS AND REQUIREMENTS FOR CLASSES OF CONCRETE

Class of Concrete	Approximate Percent Fine to Total Aggregate		Maximum Free Water by W/C Ratio (lb/lb)	28-Day Compressive Strength(1) (psi)	Slump(2) (inches)	Minimum Cement Factor (lb/yd^3)	Air Content (%)
	Gravel	Stone					
C1(3) *w/ Type I Cement*	36	40	0.33	4,000(4)	7 max.	800	6 ± 2
C2(3) *w/ Type III Cement*	36	40	0.38	4,000(4)	7 max.	705	6 ± 2

1) The Department may direct non-payment, additional construction, or removal and replacement for concrete for which test cylinders indicate low compressive strength and follow-up investigations indicate inadequate strength. The Department may require some classes to attain the required compressive strength in less than 28 days.

(2) The Engineer will allow slumps less than the minimum provided concrete is workable.

(3) Use a high range water reducer (Type F or G)

(4) The Department will require 3,000 psi compressive strength before opening to traffic and 4,000 psi at 28 days.

2. Structural Steel. The Contractor shall use new, commercial grade steel suitable for welding. The Engineer will base acceptance on visual inspection. For armored edges that make up the 4 in. neoprene joint, structural steel shall conform to the requirements of AASHTO M183, AASHTO M223 Grade 50, or AASHTO M222. To be approved, armored edge extrusions shall be embedded.

3. Stud Anchors. The armored edge stud anchors shall be 3/4 in. x 6 in. embedded stud shear connectors conforming to ASTM A108, Grade 1015.

4. Steel Reinforcement shall be Grade 60 in accordance with 703.

5. Epoxy Bond Coat shall be in accordance with 909.11.

6. Pre-Compressed Horizontal Expansion Joint System shall have a cellular, or micro-cell, polyurethane foam impregnated with a

hydrophobic acrylic emulsion, or a hydrophobic polymer. The polyurethane foam external facing shall be factory coated and cured with highway-grade, fuel resistant silicone or a highway-grade elastomeric coating at a width greater than the maximum joint expansion.

7. Neoprene Strip Seals shall be in accordance with 906 and as shown on the plans. Strip seal properties shall meet the requirements of ASTM D2240, ASTM D412, and ASTM D385.

Construction Requirements

Construction shall be in accordance with the applicable portions of 722, 724 and as follows:

3.1 Equipment

- Hammers. The Contractor shall invide power driven hammers lighter than nominal 45 lb class.
- Sawing Equipment. Sawing equipment shall be a concrete saw capable of sawing concrete to the specified depth.
- Hydraulic Impact Equipment. Hydraulic Impact Equipment with a maximum rated striking Energy of 360 ft-lbs are allowed only in areas of concrete removal more than 6 in. away from boundaries of surface areas to remain in service. The Contractor shall provide information to the Engineer on the equipment they wish to utilize to ensure compliance with this note.

3.2 Remove Existing Materials. Remove existing expansion dam, bridge end, armored edges and specified areas of concrete as shown on the attached sketches. Remove debris or expansion joint filler as directed by the Engineer. Clean and leave all existing steel reinforcement encountered in place. Damaged steel reinforcement will be repaired/replaced as directed by the Engineer at no additional cost to the Department. Dispose of all removed material entirely away from the job site. This work is incidental to the contract unit price for "Expansion Joint Replacement" or “Armored Edge for Concrete”.

3.3 Place New Concrete and Armored Edges. After all specified existing materials have been removed; place new armored edges to match the grade of the proposed overlay or to match the original grade (See attached detail drawings). Place the new Class “M” concrete to the scarified grade and finish to receive the new overlay or place the new Class “M” concrete to the original grade and finish with broom strokes drawn transversely from curb to curb.

All new structural steel shall be cleaned and painted in accordance with requirements of 619, except that surfaces to come in contact with concrete are not to be painted.

Blast clean all areas of existing concrete and structural steel to come in contact with new concrete until free of all laitance and deleterious substances immediately prior to the placement of the Class "M" concrete. The surface areas of existing concrete to come in contact with the new Class "M" concrete are to be coated with an epoxy bond coat immediately prior to placing new concrete in accordance with 909.11. The interfaces of the new and old concrete shall be as nearly vertical and horizontal as possible.

3.4 Additional Steel Reinforcement. Furnish for replacement, as directed by the Engineer, 700 ft of #4 steel reinforcing bars in 35’ lengths. Place these bars in areas deemed by the Engineer to require additional reinforcement. Field cutting and bending is permitted. Do not place any additional steel reinforcement above the height of the top row of stud anchors on the armored edges. Ensure that all exposed steel reinforcement is tied in accordance with 703.06 prior to pouring the new Class “M” concrete. Deliver unused bars to the Local KYTC Maintenance Barn. Payment will be made in accordance with 703.

3.5 Stage Construction. Installation of concrete and armored edges in two, or more if specified, stages shall be necessary. Join the armored edges at or near the centerline of the roadway or lane line, field weld and grind smooth.

3.6 Pre-Compressed Horizontal Expansion Joint System. System shall be supplied in pre-compressed sticks for easy installation. System shall be installed in accordance with manufacturer’s recommendations concerning approved adhesives, welds between sticks and appurtenances, and adhesion to concrete deck or armored edges. Joint seal is to be installed 1/2 in. recessed from the surface.

3.7 Shop Plans. Shop plans will not be required. The Contractor shall be responsible for obtaining field measurements and supplying properly sized materials to complete the work.

Method of Measurement

Pre-Compressed Foam Joints will be measured by the linear foot from gutter line to gutter line along the centerline of joint.

Steel Reinforcement will be measured in accordance with 703.07.

Basis of Payment

Pre-Compressed Foam Joints will be paid for at the contract unit price per linear foot, complete in place.

Steel Reinforcement will be paid for in accordance with 703.08.

Payment will be made under:

Pay Item	Pay Unit Symbol
Pre-Compressed Foam Joint	LFT

The cost of the removing specified existing materials, furnishing and installing the new armored edges, concrete, pre-compressed foam joint seal and all necessary incidentals shall be included in the cost of this work, except the overlay material, within the specified pay limits as specified and as shown on plans.

DRAFT – Not For Construction

REMOVE AND REPLACE GIRDER BEARINGS

Description

This work shall consist removing and replacing the girder bearings on the Southbound Ohio River Bridge in accordance with 105.03.

Materials

Materials shall be in accordance with 711.02, 726.02 and as follows.

1. Structural Steel. Contractor shall use AASHTO M270 (ASTM A709) Grade 50 steel, which meets the Charpy V-notch toughness requirements specified in the plans.

2. Weld Material. Contractor shall comply with the ANSI/AASHTO/AWS D1.5 Bridge Welding Code with modifications and additions as specified in the Plans. All welds shall be E70XX.

3. Elastomeric Bearing Pad. Contractor shall furnish elastomeric bearing pads conforming to the design and dimensions as specified in the Plans and to the AASHTO Standard Specifications for Highway Bridges, Division II, Section 18. Pads shall be low temperature Grade 3 with durometer hardness of 50 or 60 and shall be subjected to the load testing requirements corresponding to Design Method B.

4. Paint. Contractor shall match the color of the existing paint. All paint supplied must be contained in the current Approved Materials List in accordance with 909.

Construction Requirements

Construction shall be in accordance with the applicable portions of 711, 726, and the following:

1. Existing Dimensions. The Contractor shall verify all dimensions, including thickness of parts, with field measurements prior to ordering materials or fabricating steel.

2. Shop Plans. Shop plans will only be required for the temporary support system. The Contractor shall be responsible for obtaining field measurements and supplying the properly sized materials to complete the work.

3. Jacking Plan. The Contractor shall submit a jacking plan, temporary support system calculations, and working drawings for approval prior to starting work. The design shall be stamped by a professional engineer licensed in the State of Indiana. The girders shall be lifted a distance no more than that required to snugly fit the new bearing assembly in place plus 1/4 in. To prevent deck cracking, jack all girders concurrently and limit differential movement between girder lines to 1/8 in. For each girder the total estimated design loads to be supported are:

Dead Load	60 kip
Live Load	62 kip
Total	122 kip (per girder line)

The Contractor’s jacking system shall be designed to support a minimum of 200% of these loads. Before jacking operations begin, temporary

stiffener angles for the girder webs shall be installed above the jack locations, as shown on the plans. No holes shall be drilled in the flanges of the girders or floorbeams for installation of the jacking frame. Any holes drilled in the webs of the girders for temporary bracing connections shall have bolts installed in the holes after the connection is removed. Jacking and supporting the steel girder ends shall be incidental to the contract unit price for "Jacking and Supporting, Girders".

4. Jacking Details. The schematic of the temporary support system shown on the plans is one feasible alternative for jacking the girders. Final design shall be the responsibility of the Contractor. Alternative methods may require additional analysis of existing members by the Contractor as deemed necessary by the Engineer during review of the jacking plan.

5. Maintenance of Traffic. Maintain and control traffic in accordance with 801.

6. Work Sequence. All work to complete the bearing replacement and girder repair shall be performed prior to the joint replacement and overlay replacement.

7. River Navigation. All work involving removal and installation of structural elements beneath the bridge deck shall cease when there is approaching river traffic. The work shall not resume until the river traffic is clear of the bridge area. The Contractor shall advise the Coast Guard of the Contractor's proposed schedule of work at least 14 days prior to the commencement of any field operations. The notification shall be addressed to:

Commander
2nd Coast Guard District
1430 Olive Street
St. Louis. Missouri 63103
Phone: (314) 425-4607

8. Remove Existing Material. Remove the existing bearing assembly to the limits shown on the drawings for the bearing removal. Remove existing steel by grinding, cutting or other methods approved by the Engineer that do not damage the adjacent structural steel. Use of cutting torches will not be allowed. Dispose of all removed material complete away from the job site. This work shall be incidental to the contract unit price for "Jack and Support Girder".

9. Field Prepare Existing Surfaces. Existing areas of the bridge to be welded to or in contact with new steel shall be cleaned of all dirt, rust and foreign matter using hand cleaning methods before installing the new steel. Hand methods for field cleaning shall consist of scraping and wire brushing. No blast cleaning will be allowed.

10. Install Bearing Assembly. Install girder bearing assemblies as shown on the plans and as directed by the Engineer. Protect the elastomeric pad and vulcanized bonds on the cover plates from heat. The bearing assembly shall meet the fabrication, testing, and installation requirements of the AASHTO Standard Specification, Division II, and Section 18.

11. Welding Specifications. All welding and welding materials shall conform to Joint Specifications ANSI/AASHTO/AWS D1.5M-D1.5-2008 Bridge Welding Code". Modifications and additions as stated on the plans or special note for welding steel bridges shall supersede the ANSI/AASHTO/AWS specification. Nondestructive testing by the Contractor will not be required. Welding procedures shall be submitted to the Engineer and approved prior to the start of fabrication and retrofit. The cost of welding, welding materials, straightening, altering, and burning new or existing steel shall be included in the contract unit price for "Remove and Replace Girder Bearings".

12. Prohibited Field Welding. Except as shown on the plans, no welding of any nature shall be performed on the bridge without written consent of the Director, KYTC Division of Maintenance and INDOT Director of Bridges, or an authorized representative from both KYTC and INDOT, and then only in the manner and at the locations designated in the authorization.

13. Mill Test Reports. Notarized test reports shall be furnished in triplicate to the Department showing that all the materials used for these repairs conform to the requirements of the Specifications.

14. Painting. Clean and paint new and existing steel surfaces in accordance with 619. Components to be cleaned and painted include all new structural steel surfaces, including bolts, and all existing steel stringer surfaces within 12 in. of the work limits for the bearing replacement. All areas of new or existing structural steel on which the pant has been damaged by the Contractor with weld burns or by other means during construction or after final painting shall be wire brushed cleaned and spot painted as directed by the Engineer. Cleaning and painting of all new and existing structural steel shall be considered incidental to the contract unit price for "Remove and Replace Girder Bearings".

15. Damage to the Structure. The Contractor shall bear full responsibility and expense for any and all damage to the structure, including truss members, during the repair and retrofit work; even to the removal and replacement of truss members and fallen spans, should the damage result from the Contractor's actions.

Method of Measurement

Elastomeric Bearing Assemblies will be measured by the number of complete assemblies installed.

Jacking and Supporting, Girders will be measured in accordance with 711.72.

Basis of Payment

Elastomeric Bearing Assemblies will be paid for at the contract unit price per each, complete in place.

Jacking and Supporting, Girders will be paid for in accordance with 711.73.

Payment will be made under:

Pay Item	Pay Unit Symbol

Bearing Assembly Elastomeric …… EACH

The cost of preparing the interface surfaces for welding and painting, furnishing and installing new bearing assemblies, painting the steel surface as specified in this note, and all other materials, labor, equipment, tools, and incidentals necessary to complete this work shall be included in the Elastomeric Bearing Assembly pay item.

DRAFT – Not For Construction

REPLACING STEEL FINGER EXPANSION JOINTS

Description

This work shall consist of removing and replacing the finger expansion joints on the Southbound Ohio River Bridge in accordance with 105.03.

Materials

Materials shall be in accordance with 724.02 and as follows:

1. Class "C" Modified Concrete. Use either "C1" or "C2".

INGREDIENT PROPORTIONS AND REQUIREMENTS FOR CLASSES OF CONCRETE

Class of Concrete	Approximate Percent Fine to Total Aggregate		Maximum Free Water by W/C Ratio (lb/lb)	28-Day Compressive Strength[1] (psi)	Slump[2] (inches)	Minimum Cement Factor (lb/yd^3)	Air Content (%)
	Gravel	Stone					
C1[3] *w/ Type I Cement*	36	40	0.33	4,000[4]	7 max.	800	6 ± 2
C2[3] *w/ Type III Cement*	36	40	0.38	4,000[4]	7 max.	705	6 ± 2

1) The Department may direct non-payment, additional construction, or removal and replacement for concrete for which test cylinders indicate low compressive strength and follow-up investigations indicate inadequate strength. The Department may require some classes to attain the required compressive strength in less than 28 days.

(2) The Engineer will allow slumps less than the minimum provided concrete is workable.

(3) Use a high range water reducer (Type F or G)

(4) The Department will require 3,000 psi compressive strength before opening to traffic and 4,000 psi at 28 days.

2. Structural Steel. The Contractor shall use AASHTO M270 Grade 50 steel, which meets the Charpy V-notch toughness requirements specified in the plans, unless noted otherwise. Stainless steel countersunk cap screws shall conform to ASTM F593 Type 316. Stainless steel nuts shall conform to ASTM A320. Expansion joint drain pipes shall conform to ASTM A53 NPS 6 hot-dipped galvanized steel pipe.

3. Hot-Dipped Galvanizing. The finger expansion joint assemblies shall be hot-dipped galvanized in accordance with ASTM A123. Any areas of damaged galvanizing shall be painted with galvanizing repair paint in accordance with ASTM A780.

4. Stud Anchors. Headed stud anchors shall be ASTM A108, Grade 1015, automatic end welded.

5. Weld Material. Comply with the ANSI/AASHTO/AWS D1.5 Bridge Welding Code with modifications and additions as specified in the Plans. All

welds shall be E70XX.

6. Epoxy Bond Coat shall be in accordance 909.11.

7. Steel Reinforcement shall be Epoxy Coated Grade 60 in accordance with 703.

Construction Requirements

Replacement of the steel finger joints shall be in accordance with the applicable portions of 711, 724 and as follows:

3.1 Equipment

- Hammers. The Contractor shall provide power driven hammers lighter than nominal 45 lb class.
- Sawing Equipment. Sawing equipment shall be a concrete saw capable of sawing concrete to the specified depth.
- Hydraulic Impact Equipment. Hydraulic Impact Equipment with a maximum rated striking Energy of 360 ft-lbs are allowed only in areas of concrete removal more than 6 in. away from boundaries of surface areas to remain in service. The Contractor shall provide information to the Engineer on the equipment they wish to utilize to ensure compliance with this note.

3.2 Existing Dimensions. The Contractor shall verify all dimensions with field measurements prior to ordering materials or fabricating steel. Each steel finger expansion joint assembly shall conform to the actual cross-slopes and grades of the existing finger joint assemblies.

3.3 Sequence of Construction. At the specified locations drill crack arrest holes in specified stringers and repair diaphragm connectors prior to replacing the finger expansion joint assemblies.

3.4 Shop Plans. Shop plans shall be required for the finger expansion joint assemblies. The Contractor shall be responsible for obtaining field measurements and supplying the properly sized materials to complete the work. Field measurements that do not match plan dimensions shall be noted in the working drawings.

3.5 Maintenance of Traffic. Maintain and control traffic in accordance with 801. For purposes of this specification, a construction phase shall be considered installing lane closures, partial removal of existing finger expansion joint assemblies in the closure, setting new finger expansion joint assemblies and finger plates, placing concrete, and removal of traffic control upon the concrete reaching the specified strength requirements.

3.6 River Navigation. All work involving removal and installation of structural elements beneath the bridge deck shall cease when there is approaching river traffic. The work shall not resume until the river traffic is clear of the bridge area. The Contractor shall advise the Coast Guard of the Contractor's proposed schedule of work at least 14 days prior to the commencement of any field operations. The notification shall be addressed to:

Commander
2nd Coast Guard District
1430 Olive Street

St. Louis. Missouri 63103
Phone: (314) 425-4607

3.7 Remove Existing Materials. Remove the existing expansion devices and specified areas of concrete as shown on the attached sketches. Remove debris as directed by the Engineer. Dispose of all removed material entirely away from the job site. This work shall be incidental to the contract unit price for "Remove and Replace Finger Expansion Joint".

The Contractor shall clean and leave all existing steel reinforcement encountered in place. Blast clean all areas of existing concrete and structural steel to come in contact with new concrete until free of all laitance and deleterious substances immediately prior to the placement of the Class "M" concrete. The interfaces of the new and old concrete shall be as nearly vertical and horizontal as possible. Paint shall be fully removed in the vicinity of new shear stud anchors to allow for proper welding.

3.8 Place New Finger Expansion Joint Assemblies. After all specified existing materials have been removed, place new finger expansion joint assemblies to match the grade and cross-slope of the bridge deck. The assemblies shall be set and adjusted to grade as shown in the plans, or in accordance with an alternative method as detailed in the approved working drawings.

3.9 Place New Concrete. Place steel reinforcement, including replacing any existing reinforcement damaged during removal of the concrete deck. The surface areas of existing or previously placed concrete to come in contact with new Class "M" concrete shall be coated with an epoxy bond coat immediately prior to placing new concrete in accordance with 909.11. Place the new Class "M" concrete to the grade matching the top of the existing overlay, and finish with broom strokes drawn transversely from curb to curb. Concrete placed under the connection plates shall be vibrated until it is just forced through the 1/2 in. diameter vent holes in the bulkhead plate. Cast any bridge railing removed as part of the joint removal. Upon hardening of the concrete railing patching, replace and weld removed portions of the railing expansion plates.

3.10 Phase Construction. The finger-joint construction occurs in two phases; Left Southbound Lane and Right Southbound Lane. The entire finger expansion joint assemblies shall be constructed half width from gutterline to center of bridge.

3.11 Welding Specifications. All welding and welding materials shall conform to Joint Specifications ANSI/AASHTO/AWS D1.5M-D1.5-2008 Bridge Welding Code". Modifications and additions as stated on the plans or special note for welding steel bridges shall supersede the ANSI/AASHTO/AWS specification. Nondestructive testing by the Contractor will not be required. Welding procedures shall be submitted to the Engineer and approved prior to the start of fabrication and retrofit. The cost of welding, welding materials, straightening, altering, and burning new or existing steel shall be included in the contract unit price for "Remove and Replace Finger Expansion Joint".

3.12 Mill Test Reports. Notarized test reports shall be furnished in triplicate to the Department showing that all the materials used for these repairs conform to the requirements of the Specifications.

3.13 Painting. Clean and paint new and existing steel surfaces in accordance with 619. Components to be cleaned and painted include all existing steel girder, steel stringer, and steel diaphragm surfaces within 12 in. of the new concrete diaphragms. All areas of new or existing structural steel on which the paint has been damaged by the Contractor with weld burns or by other means during construction or after final painting shall be wire brushed cleaned and spot painted as directed by the Engineer. Cleaning and painting of existing structural steel shall be considered incidental to the cost for "Remove and Replace Finger Expansion Joint".

Method of Measurement

Replacement of Finger Expansion Joint will be measured by the linear foot along and parallel to the plane of the finished joint surface.

Basis of Payment

Replacement of Finger Expansion Joint will be paid for at the contract unit price per linear foot, complete in place.

Partial payment for work performed during each phase of construction will be paid as the percentage of Finger Expansion Joint installed during that phase of work.

Phase 1 = 50%
Phase 2 = 50%
Total = 8 Each

Payment will be made under:

Pay Item	Pay Unit Symbol
Expansion Joint Sliding Plate	LFT

The cost of removal of the concrete deck and existing expansion joint assembly, fabrication and installation of the new expansion joint assembly (including the drainage system to the limits shown on the plans), retrofits to the existing steel stringers and diaphragms, new steel reinforcement, forming and placing Class "C" Modified Concrete, painting the steel surfaces as specified in this note, and all other materials, labor, equipment, tools, and incidentals necessary to complete the work shall be included in the cost of the Expansion Joint Sliding Plate pay item.

DRAFT – Not For Construction

BRIDGE DECK AND SCUPPER CLEANING

Description

This work shall consist of providing all labor, materials, tools and equipment to clean the concrete decks and scuppers of the Northbound and Southbound Ohio River Bridges in accordance with 105.03.

Materials

Not applicable.

Construction Requirements

Bridge deck cleaning shall be in accordance with the applicable portions of 619 and 722 and as follows:

1. Cleaning Sequence. The cleaning operations of the Northbound Bridge shall occur prior to placing three lanes of traffic on the bridge. The Southbound Bridge shall be cleaned no more than one week prior to overlay operations. The bridge scuppers shall be cleaned after the deck cleaning operations.

2. Cleaning Deck. The deck cleaning shall be performed with mechanical sweeping and vacuum trucks. The Contractor shall properly dispose of all debris.

3. Cleaning Bridge Scuppers. The Contractor shall use pry bars/ rods to loosen debris in scuppers while capturing debris by vacuum. The Contractor shall properly dispose of all debris in accordance with 202.

4. Maintenance of Traffic. Maintain and control traffic in accordance with 801.

Method of Measurement

Scupper cleaning will be measured by the number of drains cleaned.

Bridge deck cleaning will not be measured for payment.

Basis of Payment

The accepted quantities of scupper cleaning will be paid for at the contract unit price per each drain cleaned.

Bridge deck cleaning shall be included in the cost of Maintaining Traffic in accordance with 801.18.

Payment will be made under:

Pay Item	Pay Unit Symbol
Clean Drains	EACH

The cost of cleaning of the scuppers and all other materials, labor, equipment, tools and incidentals necessary to complete this work shall be included in the Clean Drains pay item.

The cost of cleaning of the deck, all other materials, labor, equipment, tools and incidentals necessary to complete the work shall be included in the cost of Maintaining Traffic.

DRAFT – Not For Construction

FIELD CUTTING FOR JACKING STIFFENER INSTALLATION

Transverse stiffener angles are required to be installed on each side of the existing girders prior to the jacking frames being installed on the Southbound Ohio River Bridge. The angles being supplied as stiffeners shall be cut to provide a tight fit. If field cutting is required to achieve a tight fit, the cost of field cutting will not be paid for directly, but will be included in the cost of Structural Steel.

DRAFT – Not For Construction

THRIE BEAM GUARDRAIL

This work shall include all steel railing, steel posts, bolts, plates, connections, labor, equipment, shop drawings, expansion joint assemblies at joints greater than 2 in., guardrail transitions and any other incidentals necessary for the Thrie Beam Guardrail on the Southbound Ohio River Bridge in accordance with 601.

Payment will be made under:

Pay Item	**Pay Units**
Guardrail, Thrie Beam	LFT

DRAFT – Not For Construction

INCIDENT MANAGEMENT

The Contractor is advised that the Department will be implementing Incident Management initiatives on this project. This concept requires coordination between key project personnel and the various agencies responding to crashes and incidents within and adjacent to the limits of the project. This system makes the best use of the assets available to obtain access to the incident scene for emergency vehicles as quickly as possible and return traffic flows to normal with the least inconvenience to the motoring public. This system will also better facilitate responses to injured workers within the project area.

The most valuable component in Incident Management is coordination. Coordination of resources on the job as well as coordination between all the emergency services providers is a must for efficient response in emergency situations. Prior to the award of this contract, the Department will establish an Incident Management Task Force comprised of many of the agencies that will likely be involved in the event of an emergency within or adjacent to the work zone.

The Incident Management Task Force facilitated by the Department is responsible for establishing policies and procedures that specifically address the detection, verification, response, management, and clearance of incidents within or adjacent to the work zone.

The Contractor Incident Management Liaison shall coordinate all incident response requirements per the Indiana Design Manual, Chapter 81, Traffic Incident Management Plan with:

Ms. Kimberly Peters
Incident Management Program Director
Indianapolis Traffic Management Business Unit
8620 East 21st Street
Indianapolis, Indiana 46219
Telephone: 317-605-4798
Fax: 317-898-0897
E-mail: kpeters@indot.in.gov

The Incident Management Liaison shall prepare and distribute Incident Management Maps, as approved by the Engineer, to agencies identified by the Incident Management Task Force. Maps shall be updated at a minimum of once per change of phase in maintenance of traffic plan or at the discretion of the Incident Management Task Force. The maps shall be no larger than 11 in. by 17 in., in color, to scale, and include at a minimum the following:

1. Outline of the roadway geometry
2. Open travel lanes/ramps colored in green
3. Closed travel lanes/ramps with active construction in orange
4. Closed travel lanes/ramps accessible to emergency traffic in red
5. Temporary emergency vehicle access points with identifiers defined by the Engineer
6. Rally points for emergency vehicle escorts into the work area with identifiers defined by the Engineer
7. Control points as designated by the Engineer, including but not limited to mile markers, block numbers, and stationing
8. Emergency road closure, diversion, points with identifiers defined by the Engineer

9. Diversion equipment locations with quantities
10. All entrance and exit ramps shall be uniquely identified and labeled

The Incident Management Liaison shall meet with the Department Incident Management Task Force prior to any changes in the maintenance of traffic pattern to coordinate computer aided dispatch response plans.

The Contractor shall designate a person or persons capable of coordinating the Contractor's resources who shall be available and on call 24 hours a day/seven days a week. If necessary, in the event of an incident, the designee shall have a response time of less than 30 minutes to the site to oversee the use of the Contractor's resources to help resolve an incident. The designee shall also be prepared to contact any necessary Contractor's personnel outside normal working hours.

In the event of a major incident which construction operations are underway, the Contractor's personnel may be required to assist in urgently establishing road or ramp closures to isolate incident scenes. Also, the Contractor's heavy equipment may be required to assist in moving wreckage or debris from the travel lanes and realigning temporary barriers to facilitate reopening the road to normal traffic. The Incident Management Liaison shall coordinate these activities with the law enforcement or fire department officials on the scene and the Department's Indianapolis Traffic Management Center as needed.

To facilitate with closures during an emergency situation, the Contractor shall supply safety drums to be located as directed by the Department Traffic Management Business Unit.

This work shall be included in the cost of Maintaining Traffic.

DRAFT – Not For Construction

LANE CLOSURE RESTRICTION

A temporary lane closure along either direction of U.S. 41 will be needed for installation of the temporary bridges or shoulder widening during Phase 0 and Phase 1 maintenance of traffic as shown on the plans.

The temporary lane closure shall be restricted to occur only during the following timeframes:

- Sunday night from 6:00 P.M. to 6:00 A.M. on Monday
- Friday night from 11:00 P.M. to 9:00 A.M. on Saturday
- Saturday night from 6:00 P.M. to 9:00 A.M. on Sunday

- In the evenings, Monday through Thursday, during Phase 0 and Phase 1 when the Ohio River Bridge has 2 lanes of traffic on each bridge from 8:00 P.M. to 6:00 A.M.

- In the evenings, Monday through Thursday, during Phase 1 when the Ohio River Bridge is restricted and has 3 lanes of traffic on the northbound structure from 11:00 P.M. to 6:00 A.M.

The Contractor shall schedule and limit his work in such a manner that when reopening the existing travel lane in the morning, the top surface of the newly placed asphalt for the shoulder is equal to or less than two inches of the existing adjacent roadway pavement surface in accordance with 401.14.

DRAFT – Not For Construction

PORTABLE CHANGEABLE MESSAGE SIGN CONTROLLED BY INDOT TMC

Description

The Contractor shall design, furnish, install, test, and maintain portable changeable message signs, PCMS, in accordance with 105.03. These PCMS shall be controlled by the Department's Transportation Management Center, TMC to provide variable end-of-queue warning messages along U.S. 41 and along I-69.

Materials

The PCMS manufacturer and model shall be as approved by the Department. Each PCMS shall include an ARIES Field Processor and Communication Device. Each PCMS shall meet the Advanced Traffic Management System, ATMS, / Automated Traveler Information System, ATIS, compatibility clause contained herein.

To maintain compatibility with the Department's statewide ATMS / ATIS and field elements, Aries Field Processors shall be furnished, installed, and tested as described below. The following configurations of ARIES Field Processors shall be used at the identified locations shown in these Special Provisions.

ATMS / ATIS Compatibility Clause: The Contractor shall confirm the compatibility with the Department's ATMS and ATIS. All questions relating to compatibility shall be directed to:

Jessica Kruger
Technology Support Director
7701 E. Melton Rd. Borman TMC
Gary, Indiana 46403

Phone: (219) 938-2019 ext.14126
E-Mail: jessicakruger@indot.in.gov

In the event that a device is not ATMS or ATIS compatible, the Contractor shall obtain a written commitment letter from the device manufacturer ensuring technical support to the Department in integrating their equipment, communications, and its operation with ATMS and ATIS. Iron Mountain Systems, Inc., a Consultant to the Department will have the responsibility of integrating the device operation with ATMS or ATIS as required; however, technical expertise, on the part of the vendor, shall be required for Iron Mountain Systems to successfully complete the task. The equipment manufacturer shall include factory level support to Iron Mountain Systems during the integration process; this effort should be inclusive in their bid. This may include engineering support to Iron Mountain Systems while at the equipment manufacturer's facility, if required. There will be no requirement for the Manufacturer to conduct an on-site visit to the equipment deployment site for integration; however, Iron Mountain Systems may be required to visit the Manufacturer's facility to resolve integration issues at Iron Mountain Systems expense. Iron Mountain Systems will be responsible for costs incurred by Iron Mountain Systems personnel and travel; however, costs for Manufacturer's personnel and facilities shall be incurred by the Manufacturer. To protect proprietary information about the equipment, Iron Mountain Systems will enter into a non-disclosure with the Manufacturer, as required.

ARIES Field Processor: There shall be an ARIES Field Process for each PCMS controlled by TMC. The ARIES Field Processor shall be specified and configured as follows:

It shall be an Iron Mountain Systems, Inc. Model AFPM-CMS-XXX-010; where XXX is determined by the selected PCMS vendor and it shall operate from a 9 - 30 Volt DC electrical subsystem.

Communication Device: Each PCMS controlled by TMC shall have a communication device. The device shall consist of a static IP assigned that has a serial and Ethernet connections for end equipment and external antenna port. There shall be an external antenna installed that is compatible with the communication device. The device shall have unlimited data plan.

Construction Requirements

The Contractor shall contact the Engineer for the PCMS deployment locations. Four signs shall be placed for use along U.S. 41 and I-69, with one additional sign available as a back-up. The additional sign shall be stored at a location identified by the Engineer. All signal, telephone, and power interconnects shall be protected against lightning.

The Contractor shall maintain all signs in good working condition. If a sign becomes inoperable the Contractor shall replace it with the spare within 2 hours. The Contractor shall repair the inoperable sign within 48 hours and place it in the spare sign location. If a sign is moved the Contractor shall notify TMC.

Method of Measurement

Portable changeable message sign will be measured in accordance with 801.17. ARIES field processor for PCMS will be measured in accordance with 801.17. The communications device will not be measured.

Basis of Payment

Payment will be made in accordance with 801.18.

The cost of all equipment, materials, transportation, placement, repair, and incidentals as described above shall be included in the cost of the pay items. The cost of the communication device shall be included in the cost of the portable changeable message sign.

DRAFT – Not For Construction

MAINTENANCE OF FLEXIBLE TUBULAR MARKERS

As shown on the plans, flexible tubular markers shall be placed between opposing directions of traffic during the construction of this project as part of the maintenance of traffic operations. In accordance with 105.13 and 801.03, the Contractor shall inspect and maintain these flexible tubular markers continuously throughout the length of this project. The condition of the flexible tubular markers shall be maintained in acceptable condition in accordance with 105.13 and 801.03. When a flexible tubular marker is hit and dislodged from its intended location, the Contractor shall correct the non-compliant occurrence and remedy the situation in accordance with 105.14. Damages will be assessed for failure to maintain the flexible tubular markers in their intended location and condition in accordance with 105.14 and 801.03. This work shall be included in the cost of Maintaining Traffic.

DRAFT – Not For Construction

~~SIGN, GROUND MOUNTED, RESET~~

~~The Standard Specifications are revised as follows:~~

~~SECTION 802, AFTER LINE 8, INSERT AS FOLLOWS:~~

~~*Existing ground mounted signs to be reset shall be removed without damage, stored and re-installed as shown on the plans.*~~

~~SECTION 802, AFTER LINE 280, INSERT AS FOLLOWS:~~

~~*Existing ground mounted signs reset will be measured by the number of signs removed and reinstalled, complete in place.*~~

~~SECTION 802, BEGIN LINE 305, INSERT AS FOLLOWS:~~

~~*Existing ground mounted signs reset will be paid for at the contract unit price per each.*~~

~~SECTION 802, AFTER LINE 354, INSERT AS FOLLOWS:~~

~~*Sign, Ground Mounted, Reset ..... EACH*~~

~~SECTION 802, AFTER LINE 415, INSERT AS FOLLOWS:~~

~~*The cost of existing ground mounted sign removal, existing post removal, and storage shall be included in the cost of sign resetting. Existing signs or posts that are damaged by the Contractor shall be replaced with no additional payment.*~~

DRAFT – Not For Construction

RESETTING BRIDGE LIGHT POLES

~~The existing light poles on the Northbound and Southbound Ohio River Overflow bridges as well as the Southbound Eagle Creek bridge shall be removed and reset on top of the proposed concrete barrier rail as shown on the plans. The cost of the removal, storage and reinstallation and all other incidentals pertaining to this work shall be included in the cost of resetting the existing bridge light poles in accordance with 807.19. The cost of the base plate and the anchor bolts shall also be included in the cost of this item.~~

Description

This work shall consist of removing and resetting the existing light poles on the Northbound and Southbound Ohio River Overflow bridges as well as the Southbound Eagle Creek bridge.

Materials

The AR-22 anchor bolts shall have a galvanized thread, hex bolt and cut washer.

Construction Requirements

The existing bridge lights poles shall be removed in accordance with 202 from the existing bridges. The base plate which is attached to the light pole shall remain intact. The existing light pole and base plate shall be stored and not damaged.

Before setting the new anchor bolts into the proposed concrete bridge railing, the Contractor shall field verify the bolt pattern based upon the existing base plate.

The Contractor shall reset the existing light poles on top of the proposed concrete barrier rail as shown on the plans.

Method of Measurement

The resetting of the existing bridge light poles will be measured by the number of light poles installed, complete in place.

Basis of Payment

The resetting of the existing bridge light poles will be paid for at the contract unit price per each complete in place.

Payment will be made under:

Pay Item	Pay Unit Symbol
Light Pole Steel, Relocate	Each

The cost of the removal, storage and reinstallation and all other incidentals pertaining to this work shall be included in the cost of resetting the existing bridge light poles in accordance with 807.19. The cost of the anchor bolts shall also be included in the cost of this item.

DRAFT – Not For Construction

EXISTING LIGHTING CONDUIT

The Contractor shall be aware that the existing highway lighting conduit is located in close proximity behind the existing guardrail, on the roadway shoulders. As shown on the plans, lighting on the bridges will be replaced and out of service when construction is taking place on that particular bridge. Highway lighting along the roadway shall be operational for the duration of construction. The Contractor shall verify the existing horizontal and vertical location of the existing lighting conduit prior to the removal and replacement of the existing guardrail. Damage to the conduit or connectors, which are located in the roadway shoulders, shall be repaired or replaced as approved by the Engineer. The cost of this work shall be included in the cost of w-beam guardrail.

DRAFT – Not For Construction

WRECKER SERVICE

Description

The work shall consist of furnishing two towing vehicles and operators to serve as a wrecker service within and immediately adjacent to the work zone of the Ohio River Bridge. The purpose of these units is to provide aggressive intervention when a lane-restricting incident that restricts the flow of traffic or presents a hazard on a travel lane or paved shoulder occurs within the coverage area.

Their work shall include on demand responsive service within the coverage area. The wreckers shall be a free service for the motoring public and the wrecker operator shall be knowledgeable of this. The wrecker operators shall only work as wrecker operators and shall not participate in any construction activities.

Materials

Wreckers shall be equipped and maintained as described herein in accordance with the provisions set forth in the Indiana Vehicle Code and consistent with industry standards and practices. Towing vehicles shall be registered as a RECOVERY VEHICLE with the Indiana BMV and at a minimum meet the equipment provisions of IC 9-18-13-3 and IC 24-4-6-2 except as specified below. The wrecker shall be a flat bed configuration capable of towing two vehicles. In addition to the industry standard equipment for recovery vehicles the wrecker shall also be equipped with the following items:

- A rubber coated push bumper
- An activated cellular phone, type B allowing contact with the Engineer and the Contractor
- A Citizens Band Radio
- Two 50 lb bags of oil dry
- Push broom
- Flat blade shovel
- 10 traffic cones
- One standard case of 30 minute highway flares
- Fist aid kit
- Two 20 lb type A, B, C fire extinguishers
- 2.5 ton floor jack and tire irons
- 5 gallon water container filled with water
- 5 gallon USDOT approved container with unleaded gasoline
- 5 gallon USDOT approved container with diesel fuel

All wreckers meeting the definition of a commercial motor vehicle per 49CFR 390.5 which are used for this contract shall meet or exceed the Federal Motor Carrier Safety Regulations as applicable. They are also required to present each vehicle used to the Indiana State Police Commercial Vehicle Enforcement Division for a current inspection, 49CFR 396.17c, prior to being used on this contract. Arrangements for such inspections shall be the sole responsibility of the wrecker company or wrecker owner. The current FMCSR's may be located on the internet at:
http://www.fmcsa.dot.gov/rules-regulations/rules-regulations.htm

Copies of said inspection(s) for all wreckers used on the job shall be provided to the Engineer. All wreckers used for this contract shall have magnetic or permanent letters placed upon the two sides of the vehicle that read "FREEWAY SERVICE PATROL." The letters shall be reflective. The Engineer will approve the color of such letters.

Personnel

The operators of these units shall be qualified to provide safe, reasonable operation of the wrecker equipment. The operators shall also have completed an American Red Cross basic first-aid course and an eight hour hazardous material first responder training class. The operators shall wear an ANSI/ISEA Performance Class 2 or 3 approved safety vest at all times when outside of the vehicle. The operator shall also wear clothing consistent with OSHA requirements for towing and recovery operators. The attire shall be professional in appearance. The operator's first name shall be displayed on the clothing or on an obvious identification card worn so it is readily visible to the public or a unique truck number shall be prominently displayed on the front, sides, and rear of the truck. In their performance of duties as a wrecker, the operators are acting as agents of the State of Indiana and therefore shall conduct themselves in a respectful and courteous manner when interacting with the general public and other emergency services agencies. Inappropriate behavior will not be tolerated. Under absolutely no circumstances will any operator be allowed to accept gratuities or compensation from the public during the course of their work.

Operation

One wrecker shall be stationed just south of the Ohio River Bridge while the other wrecker shall be stationed just north of the bridge. Both wreckers shall coordinate with each other to determine who best to respond to incidents that occur in either the northbound or southbound directions along the Ohio River bridge and immediate work zone area.

Each wrecker unit shall maintain a shift log for each shift worked. The log sheet shall be used to document all activity including; debris removal, and motorist assists. The original log shall be filed by date at the on-site office. Designated drop off areas shall be established for the placement of vehicles removed from the coverage area. The Engineer shall approve towing drop off areas and wrecker staging locations. The wrecker shall only relocate vehicles to these designated areas. In cases where a vehicle will need further towing assistance, a private third party towing service shall be arranged by owner of the towed vehicle. The wrecker operator shall not recommend or contact any wrecker service directly, but may contact a wrecker service specifically requested by the motorist being assisted.

In the case of a flat tire, the wreck operator will assist in or perform the installation of an inflated spare tire on the vehicle. When no inflated spare is readily available, the vehicle will be towed to the designed drop off area.

The wrecker shall assist in cleaning up incident scenes. This shall include at minimum spreading oil dry, sweeping debris from the roadway, repositioning traffic control devices, or any other activity that will reduce the closure time. In order to reduce the duration of any emergency road closure, incident response activities shall be conducted simultaneously, rather than sequentially, whenever possible.

Construction Requirements

Both wreckers shall be stationed on location Monday through Friday between the hours of 6:00 A.M. to 9:00 A.M. and between 3:00 P.M. to 6:00 P.M. when construction is occurring on the Ohio River Bridge.

Change or Cancellation of this Service

After an initial minimum two-week period this service may be changed or cancelled by the Engineer. However, if continued, the minimum requirement will be one wrecker 4 hours per day Monday through Friday.

Method of Measurement

The tow trucks will be measured by number of hours each truck is utilized on the jobsite.

Basis of Payment

The tow trucks will be paid for at the contract unit price per hour that each truck is required and made available on the jobsite.

Payment for this work will be made as follows:

Pay Item Pay	Unit Symbol
Tow Truck	HR

The cost of labor, equipment, materials, and all other incidentals necessary for providing a tow truck on the job site, including the cost of the operator, and any other incidental items required to remove any stalled or wrecked vehicles, shall be included in the cost of the pay item.

DRAFT – Not For Construction

CCTV ASSEMBLY, CAMERA INTERFACE, RACK MOUNT

Description

This work shall consist of providing an interface for each camera assembly installed in accordance with 105.03. This interface shall provide an assortment of power, data, local camera setup, and communications capability. At sites where space is not ideal for maintenance or the cabinet is not co-located with the pole, a second camera interface shall be installed at the pole location.

Materials

The Camera Interface shall be a Treehaven RoadWay Vision Systems Field Box Model RVSFB120R for the rack mount and RVSFB120RNET for the field box or approved equivalent. The Contractor shall obtain approval from the Engineer prior to installing an equivalent device.

Contact information:

Treehaven Technologies, Inc.
282 Treehaven Avenue
Powell, OH 43065-8510
614-791-8843

The camera interface box shall meet the following specifications:

1. Input voltage 120 VAC 50/60 Hz
2. Input current 1.5 A
3. Dome power output 24 V, 50/60 Hz, 1.25 A
4. Heater power output 24 V, 50/60 Hz 5 A
5. Operational temperature range:
   a. Rack Mount -10oF to +140oF
   b. Field Box: -40oF to +185oF
6. Video input connector BNC, 75 Ohms
7. Monitor output connector BNC, 75 Ohms
8. Joystick RS-422 interface
9. Laptop RS-232 interface
10. Remote control RS-422 interface

The camera interface box shall have the following features:

1. Surge suppression on data, video and power supply lines
2. Manual switch to select local or remote PTZ control
   a. The Rack Mount unit shall be mountable in a 19 in. wide rack

Construction Requirements

The Camera Interface unit shall be installed in accordance with the manufacturer's instructions and as shown on the plans. All materials shall be installed in a neat and professional manner. All installation services shall comply with all warranty provisions and warranty contract maintenance services in accordance with these specifications. All installation services shall comply with all local and state, electrical codes, and Motorola R-56 requirements. Layout and installation of cables to the camera interface box shall be dressed and shall not interfere with access to other devices and wiring in the cabinet. Changes to the camera interface box installation as required to satisfy field conditions shall be approved by the Department ITS

Engineer. Camera interface shall be rack mounted in the ITS equipment cabinet. The method of mounting shall be as approved by the Department ITS Engineer.

Method of Measurement

The Camera Interfaces will be measured by the number of units furnished and installed, complete and in place, after passing component and subsystem testing.

Basis of Payment

Camera Interfaces will be paid for at the contract unit price per each.

Payment will be made under:

Pay Item	**Pay Unit Symbol**
CCTV ASSEMBLY, CAMERA INTERFACE, RACK MOUNTED	EACH

The cost of materials, labor, equipment, transportation, placement, and all incidentals shall be included in the cost of the pay item.

DRAFT – Not For Construction

CCTV HYBRID COMPOSITE CABLE

Description

This work shall consist of furnishing and installing CCTV Hybrid Composite Cables for connecting CCTV Assemblies to the Camera Interface. Cables shall be a hybrid composite design that allows for both analog and digital data streams from current and future cameras of the Department's choosing. The Department will provide the exact specifications of the analog/digital hybrid cable design after the project has been awarded.

Materials

CCTV Hybrid Composite cables shall be a hybrid digital/analog composite cable that meets the requirements of the Treehaven Technologies camera interface, the CCTV assembly, and the Department's plans for future upgrades to a digital camera interface. This cable shall be the Treehaven Model: 13/C Composite Cable.

Applicable Specifications:	UL/NEC/CEC, CATV or CM.
Flame Resistance:	UL 1581 Vertical Tray.

Cables shall be a suitable length to allow installation between equipment without exceeding the minimum bend radius as specified by the manufacturer. Connectors shall be installed as necessary, and shall match the connector interface requirements for the equipment being connected and for the future equipment connections planned by the Department. Adapters will not be acceptable.

Construction Requirements

CCTV Hybrid Composite cables shall be installed in accordance with the manufacturer's instructions and as shown on the plans. All materials shall be installed in a neat and professional manner. All installation services will comply with all warranty provisions and warranty contract maintenance services in accordance with these specifications. All installation services shall comply with all local and state electrical codes, and Motorola R-56 requirements. Coordinate layout and installation of cables with other installations. Revise locations and elevations from those indicated as required to suit field conditions and as approved by the Engineer.

All unused connectors shall be made weathertight and neatly organized.

Method of Measurement

CCTV Hybrid Composite Cabling will not be measured for payment.

Basis of Payment

CCTV Hybrid Composite Cabling will not be paid for separately, and shall be considered incidental to the installation of the CCTV Assembly.

This includes all material, cable, terminations, connectors, coordination with the Department for the number and type of cables required in the CCTV hybrid composite cable, and incidentals necessary to complete the work.

DRAFT – Not For Construction

CCTV ASSEMBLY

Description

This work shall consist of providing a CCTV Assembly at each site shown on the plans in accordance with 105.03. The CCTV Assembly shall include the camera, lowering system and hybrid composite cable for each assembly.

Materials

The CCTV Assembly shall consist of the following components:

1. One camera with Pan Tilt Zoom
2. One hybrid camera lowering system as described elsewhere in the provisions.
3. CCTV Hybrid Composite Cable as described elsewhere in the provisions.

The CCTV camera shall be a WTI Model: Sidewinder H.264 Standard Definition Model Number SW720-24-H.264-SD.

The contact information for the cameras and associated equipment is as follows:

Mr. Perry Wolfe
P.T. Wolfe Associates Inc.
2017 Garey Rd.
NE Junction City, OH 43748
Telephone: 740-987-2550
Fax: 740-987-2477
Mobile Phone: 740-503-2148

Construction Requirements

CCTV Assemblies shall be installed in accordance with the manufacturer's instructions and as shown on the plans. All materials shall be installed in a neat and professional manner. All installation services shall comply with all warranty provisions and warranty contract maintenance services in accordance with these specifications. All installation services shall comply with all local and state electrical codes, and Motorola R-56 requirements. All wiring entry to the CCTV Assembly shall use watertight fittings. All wiring entry and exits shall be made at the side or underneath components; no exposed top entry or exits are allowed. This requirement extends to all enclosures, junction boxes, support arms, or any other externally exposed devices.

Method of Measurement

The CCTV will be measured by the number of units furnished and installed, complete and in place, and after passing component and subsystem testing.

Basis of Payment

CCTV Assemblies will be paid for at the contract unit price per each.

Payment will be made under:

Pay Item	Pay Unit Symbol
CCTV ASSEMBLY	EACH

The unit price shall include the color camera, zoom lenses, environmental enclosure, pan/tilt unit, housing, dome, parapet mount, and all mounting hardware, support arms, connections, CCTV hybrid composite cable, lowering device, and incidentals necessary to complete the work. CCTV support towers/foundations will be paid for separately.

DRAFT – Not For Construction

DRAFT – Not For Construction

HYBRID CAMERA LOWERING SYSTEM

Description

This work shall consist of furnishing and installing Hybrid Camera Lowering Systems complete with all components in accordance with 105.03.

Design Criteria

The camera lowering system shall be designed to support and lower a standard closed circuit television camera, lens, housing, pan-tilt-zoom mechanism, cabling, connectors, and other supporting components without damage or causing degradation of camera operations. The camera lowering device and the tower are interdependent upon each other and thus, shall be considered a single unit or system. The lowering system shall consist of a contact unit, self-aligning divided support arm, an adapter for attachment to a tower, and a camera connection box. The divided support arm and receiver brackets shall be designed to self-align the contact unit during installation and ensure the contact unit cannot twist under high wind conditions. The camera- lowering device shall withstand wind forces of 100 mph with a 30% gust factor using a 1.65 safety factor. The lowering device shall effectively operate within a temperature range of -40 to 191˚F. The lowering device manufacturer shall furnish independent laboratory testing documents certifying adherence to the stated wind force criteria utilizing, as a minimum effective projected area EPA, the actual EPA or an EPA greater than that of the camera system to be attached. The camera-lowering device to be furnished shall be the product of manufacturers with a minimum of two years of experience in the successful manufacturing of such systems. The lowering device provider shall be able to identify a minimum of three previous projects where the purposed system has been installed successfully. The camera lowering system shall be [MG]2 Inc. model: CLDMG2-EXT-HYPIP-XX or Department approved equivalent.

The lowering device manufacturer shall furnish a factory representative to assist with the assembly and testing of the first lowering system onto the tower assembly. The Contractor shall ensure the Hybrid Camera Lowering System Vendor coordinates with the Camera Tower Vendor to ensure proper integration of the Camera Lowering System and Camera Tower. At the time of future installation of the lowering device, the manufacturer shall furnish the Department documentation certifying that the Contractor has been instructed on the installation, operation and safety features of the lowering device.

Materials

The Hybrid Camera Lowering System shall include the following basic components:

1) Contact unit
2) Self-aligning divided support arm
3) Adapter for attachment to tower
4) CCTV Hybrid Composite Cable junction box at the top of the tower
5) Permanent mount lowering tool

All pulleys for the camera lowering device and portable lowering tool shall have sealed, self-lubricated bearings, oil tight bronze bearing, or sintered bronze bushings. The lowering cable shall be a minimum 1/8 in. diameter stainless steel aircraft cable with a minimum breaking strength of 1740 pounds with seven strands of 19 gauge wire each.

The camera lowering system shall be capable of lowering the camera to the ground without contacting the tower structure or anything attached to

the tower structure. A guide cable shall be provided to prevent interference with the tower structure. The guide cable shall be 5/32 in. diameter stainless steel and shall be a manufacturer provided component. The cable guide shall be installed in accordance with manufacturer's recommendations. The guide cable shall be mounted to minimize the impact on the camera's view of the roadway, and shall have the ability to be disconnected from the ground mounting point to maximize the camera's view.

All electrical and video connections between the fixed and lowerable portion of the contact block shall be protected from exposure to the weather by a waterproof seal to prevent degradation of the electrical contacts. The electrical connections between the fixed and movable lowering device components shall be designed to conduct 56,000bps RS422/485 or RS-232 data, and 1 volt peak-to-peak video signals as well as the power requirements for operation of dome environmental controls.

The interface and locking components shall be made of stainless steel and or aluminum. All external components of the lowering device shall be made of corrosion resistant materials, powder coated, galvanized, or otherwise protected from the environment by industry- accepted coatings to withstand exposure to a corrosive environment. A weephole with screen shall be included on the underside of the weight box. A CCTV hybrid composite cable, specified elsewhere in these special provisions, shall be included for each camera lowering system.

Contact Unit

The suspension contact unit shall have a load capacity of 600 lbs with a 4:1 safety factor. There shall be a locking mechanism between the fixed and moveable components of the lowering device. The movable assembly shall have a minimum of two latches. This latching mechanism shall securely hold the device and its mounted equipment. The latching mechanism shall operate by alternately raising and lowering the assembly using the winch and lowering cable. When latched, all weight shall be removed from the lowering cable. The fixed unit shall have a heavy duty cast tracking guide and means to allow latching in the same position each time. The contact unit housing shall be weather proof with a gasket provided to seal the interior from dust and moisture.

The prefabricated components of the lift unit support system shall be designed to prevent the lifting cable from contacting the power or video cabling. The Contractor shall supply a means of separating the power and video cabling from the lowering cable if required by the drawings or Engineer. The only cable allowed to move during lowering or raising shall be the stainless steel lowering cable. All other cables shall remain stable and secure during lowering and raising operations.

The contact assembly block consists of DIN Housing containing thermoplastic insulation bodies that hold the individual contacts. Guide pins and guide bushings shall prevent mis-connections and provide accurate mating without relying on the contact pins to provide alignment. There shall be a minimum of 12, 0.06 in. contacts and one, 75 Ohm contact. The max current rating for each pin shall be at least 13 amps. The signal and power wires shall be crimped using an industry standard eight point crimp tool. The video cable shall be 75 ohm coax not to exceed a length of 1000 ft. The cable loss with the connectors shall not exceed 0.8 db per 100 ft at 5 MHz. The camera cable shall be made up with the contact assembly block in the factory and sealed with electrical insulating. The entire contact assembly block

shall be sealed from external dust and moisture when in the mated condition by means of a gasket.

Lowering Tool

The camera-lowering device shall be operated by use of a permanent mount lowering tool. The lowering tool shall be provided with an adapter for operating the lowering device by a portable drill using a clutch mechanism. The clutch mechanism, but not the portable drill, shall be provided for each site. The lowering tool shall be equipped with a positive locking mechanism to secure the cable reel during raising and lowering operations. The lowering tool shall include the cable reel and steel cable with sufficient length to lower the device to the ground level, plus 10 %. The lowering tool shall be made of durable and corrosion resistant materials, powder coated, galvanized, or otherwise protected from the environment by industry accepted coating to withstand exposure to a corrosive environment. The lowering tool shall be installed in a stainless steel or aluminum enclosure, rated NEMA 3R, mounted to the tower.

Manufacturer Testing

Prior to delivery of the camera lowering system, the manufacturer shall test for the following:

1) Electrical continuity
2) Direct connectivity to ground for an open circuit of 120V.

The results of these tests shall be supplied to the Department with each camera lowering system upon delivery.

Certification

The Contractor shall provide a 916.02(b) Type C certification from the Vendor verifying the CCTV Hybrid Composite Cable was properly installed and tested before delivery to the Contractor.

Warranty

The Contractor shall provide a manufacturer's warranty against defects in material and workmanship for a period of five years after final acceptance of each complete installation. The Contractor shall include labor for removal and reinstallation of a failed unit. Warranty shall include complete connector assembly replacement for contacts failing due to water ingress and corrosion damage.

Construction Requirements

The Hybrid Camera Lowering System shall be installed in accordance with the manufacturer's instructions and as shown on the plans. All materials shall be installed in a neat and professional manner. All installation services shall comply with all warranty provisions and warranty contract maintenance services in accordance with these specifications. All installation services shall comply with all local and state electrical codes, and Motorola R-56 requirements. Installation of the Hybrid Camera Lowering System shall be coordinated with the Engineer to determine actual mounting height and azimuth. Typically, the Hybrid Camera Lower System azimuth shall be perpendicular to the mainline lanes.

Method of Measurement

The Hybrid Camera Lowering System shall be considered incidental to the pay item for the CCTV Assembly and will not be measured for payment.

Basis of Payment

The Hybrid Camera Lowering System shall be considered incidental to the cost of the CCTV Assembly.

DRAFT – Not For Construction

ITS CABINET AND FOUNDATION

SECTION 809, LINE 38, INSERT AS FOLLOWS:

Wiring within ITS cabinets shall be neatly arranged and ty-wrapped *with reusable hook-and-loop style wraps,* or enclosed in expandable braded polyester sleeving. *Wraps shall be two-sided, cut-to-length style with a minimum 3/4 in. width.*

SECTION 809, LINE 99, INSERT AS FOLLOWS:

ITS CONTROLLER CABINET MODIFIED, TYPE 2……EACH
ITS CONTROLLER CABINET FOUNDATION, CCTV……. EACH

SECTION 809, LINE 100, DELETE AND INSERT AS FOLLOWS:

~~The cost of all cabinet accessories,~~ *The cost of providing all cabinet accessories identified in the plans, specifications, and Standard Drawing Series 809-ITSC and not specifically identified for exclusion or for separate payment or any labor, materials, and equipment necessary to provide a complete and fully-functional cabinet assembly shall include but is not limited to, rack frame assembly, equipment shelves, sunshield, side panels, data pocket, equipment labels, power terminals, ground lugs, ground bus, surge suppression, breakers, panelboards, receptacles, surge protector, door switches, light switches, lamp holders, lamps, fans, heaters, relays, thermostats, detector card racks, detector card terminal blocks, slide out drawers, Ethernet cabling that originates and terminates within a single cabinet,* mounting hardware, anchor bolts, handles, setup and wiring shall be included in the cost of the ITS controller cabinet.

The cost of all work and materials required to provide an ITS controller cabinet foundation as shown on the plans, including but not limited to concrete, conduits, grounding bushings, ground wire, drainage pipe and screen, anchor bolts, and reinforcing steel shall be included in the cost of the ITS controller cabinet foundation. At locations where the cabinet foundation is built integral with the paved concrete site the pay item limits of the cabinet foundation shall be the vertical surfaces of the concrete foundation, with the exception of the reinforcing steel used to tie the foundation to the surrounding concrete pavement which shall be included in the cost of the ITS controller cabinet foundation. Surrounding concrete pavement which is beyond the cabinet foundation will be paid for separately.

SECTION 809, LINE 108, INSERT AS FOLLOWS:

The Controller Cabinet shall be positioned on site as shown on the plan details such that the side of the cabinet with the door hinges is facing away from the highway.

SECTION 925, LINE 118, DELETE AND INSERT AS FOLLOWS:

925.04 Cabinet Accessories

The following accessories shall be furnished and installed with each ITS ~~cabinet.~~ *Controller Cabinet, Modified, Type 1 and ITS Controller Cabinet, Modified, Type 2, unless explicitly identified as not being provided with the ITS controller cabinet.*

SECTION 925, LINE 306, DELETE AND INSERT AS FOLLOWS:

(z) Detector Card Rack

The detector card rack shall be ~~as shown on the plans.~~ *provided with the ITS Controller Cabinet, Modified, Type 1. The ITS Controller Cabinet, Modified, Type 2 shall be provided*

without a detector card rack.

SECTION 925, LINE 325, INSERT AS FOLLOWS:

(cc) Slide-Out Drawer

A 1.5 in. deep by 19 in. wide slide-out drawer with a lift-up writing surface for document storage shall be provided with each ITS Controller Cabinet. The writing surface shall be capable of accommodating an 11 in. by 17 in. plan set. The writing surface shall be capable of supporting 50 lbs. of weight when the drawer is fully extended.

DRAFT – Not For Construction

ITS FIELD SWITCH

Description

This work shall consist of providing the ITS field switch in accordance with 105.03.

Materials

The Contractor shall provide the ITS field switch and rack mount kit conforming to the following specifications: Avaya 3510GT-PWR+

The ITS field switch is used to connect communications equipment and the Aries Field Processor at ATMS sites and other sites as shown on the plans. These switches shall be compatible with the existing ATMS system architecture. Each switch shall be rack mountable. If the unit requires a rack mount kit or adapter which is not paid for elsewhere in these specifications, the kit shall be included with the ITS field switch at no additional cost to the department.

Construction Requirements

The ITS Field Switches shall be delivered to the ITS Technology Deployment Division for configuration at the Indianapolis Traffic Management Center for custom configuration and programming. Upon programming, the Contractor will be notified and shall pick up the devices.

Upon configuration and programming, the Contractor shall install the ITS Field Switches in accordance with the plans and the manufacturer's instructions. Installation shall include all cables, mounting hardware, rack mount kit, power supplies with North American power cords and associated equipment required to mount and interface the communications subsystem. Installation activities shall be documented, including the output from show sys-info quantity, brand, model/part numbers, test results of all materials and devices used. The Contractor shall provide installer signed list of the materials installed with the required documentation. All cabling shall be labeled and dressed using hook and loop style straps to secure cables in cable management.

Method of Measurement

The ITS Field switch and rack mount kits will be measured by the number of units furnished and installed, complete and in place and after passing component and subsystem testing. This includes the mounting hardware, rack mount kit, all cabling, power supplies, and incidentals necessary to complete the work.

Basis of Payment

The ITS Field switch will be paid for at the contract unit price per each installed, complete and in place.

Payment will be made under:

Pay Item	**Pay Unit Symbol**
ITS FIELD SWITCH, 3510GT-PWR+	EACH

The cost of materials, labor, equipment, transportation, placement, and all incidentals shall be included in the cost of the pay item.

DRAFT – Not For Construction

ITS SECONDARY SERVICE DISCONNECT

Description

This work shall consist of installing a secondary service disconnect on a pedestal and foundation at each of the CCTV camera site locations. The primary disconnect and the service point for each of the CCTV camera sites will be located across the mainline roadway.

Materials

Materials for the ITS, Secondary Service Disconnect shall be in accordance with 920.

Construction Requirements

Construction for the ITS, Secondary Service Disconnect shall be in accordance with 807.

Method of Measurement

The ITS, Secondary Service Disconnect will be measured by the number of units installed, complete and in place.

Basis of Payment

The ITS, Secondary Service Disconnect will be paid for at the contract unit price per each installed, complete and in place.

Payment will be made under:

Pay Item	**Pay Unit Symbol**
ITS, SECONDARY SERVICE DISCONNECT	EACH

The cost of materials, labor, equipment, transportation, placement, and all incidentals shall be included in the cost of the pay item to create a complete and working secondary service disconnect.

DRAFT – Not For Construction

CABLE DUCT MARKER

Description

This work shall consist of providing ATMS cable duct markers as shown on the Plans and as directed by the Engineer.

Materials

Concrete Markers: Concrete cable duct markers shall be manufactured and installed according to the Standard Specifications 807.08 except as revised herein. Concrete cable duct markers shall be marked "ATMS Power" with field-cut arrows identifying the direction of the underground conduits.

Decals shall be provided on both sides of the markers. Decal shall consist of a standard warning message, visible from a distance, such as "Warning ATMS Power". In addition, the decal shall include the message "Call INDOT Technology Deployment Technicians Supervisor before Digging 317-899-8606" along with the Department symbol (digital image is available on the Department's website):

Figure A: Department's Logo

All markers and decals shall be from a single manufacturer. Decals shall be considered incidental to the cost of the flexible markers.

Construction Requirements

Markers shall be installed according to the manufacturer's recommendations, or to a depth suitable to resist the impact of wind or an errant vehicle without pulling free. Location of marker installations shall be as shown on plans or as determined by the Department.

Method of Measurement

The completed work as described for cable duct marker will be measured by the unit of each and includes furnishing and installing of a cable duct marker with all accessories necessary for a complete installation.

Basis of Payment

Payment for the work included in this special provision will be paid for at the Contract unit price per each.

Payment will be made under:

Pay Item	Pay Unit Symbol

CABLE-DUCT MARKER.....EACH

The cost of materials, labor, equipment, transportation, placement, and all incidentals shall be included in the cost of the pay item.

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FOUNDATION FOR CCTV MONOTUBE TOWER

SECTION 807, LINE 367, INSERT AS FOLLOWS:

The Contractor shall provide structural designs, calculations, and engineering drawings signed and sealed by a professional engineer registered in the state of Indiana for each new tower and tower foundation used for closed circuit television (CCTV) cameras. The foundation design shall be based on the site-specific soil boring results and shall consider the existing and proposed site conditions as shown on the plans and contained in the geotechnical report for each individual tower site. A tower foundation shall not interfere with natural or constructed drainage or runoff. The bolt pattern for the foundation shall match those for the tower.

~~SECTION 807, LINE 820, INSERT AS FOLLOWS:~~

~~*FOUNDATION, MONOTUBE TOWER……EACH*~~

SECTION 807, LINE 761, INSERT AS FOLLOWS:

The cost of the foundation and design for each CCTV monotube tower foundation, shall be included in the cost of the Tower, 60FT Monotube Tower pay item.

DRAFT – Not For Construction

GROUNDING

Description

This work includes solid grounding of tower grounding systems, electrical systems and equipment. It includes basic requirements for grounding for protection of life, equipment, circuits, and systems. Grounding requirements specified herein may be supplemented in other sections of these specifications. All ground wires shall be tinned copper.

The Contractor shall design a ground system for each type of remote site and submit Plans in the form of a design drawing for approval by the Engineer. Tower shop drawing submittals shall include the tower grounding design compatible with the site's ground system and shall be sealed by a professional engineer experienced in the design of towers and grounding systems and registered in the State of Indiana.

The work shall be completed in accordance with 807 and 922.07. This work shall also comply with Motorola R-56, Motorola Standards and Guidelines for Communications Sites 2000, Chapter 6, External Grounding. Where conflicts exist between Motorola R-56 and specifications, the more stringent requirement shall prevail.

Materials

Subject to compliance with requirements, manufacturers offering products that may be incorporated in the work include but are not limited to, the following:

1. O-Z/Gedney Co.
2. Alltec Corporation
3. American Electric/Blackburn
4. Thomas & Betts Corp.

Grounding and Bonding Products:

Products of types indicated and of sizes and ratings to comply with the NEC. Where types, sizes, ratings, and quantities indicated in these Specifications, Plans, Motorola R-56, or 807 are in excess of the NEC requirements, the more stringent requirements and the greater size, rating, and quantity indications govern. Conductor materials shall be copper.

Wire and Cable Conductors:

1. Aluminum wire and cable shall not be used.
2. In general, conform to NEC Table 8, except as otherwise indicated, for conductor properties, including stranding.
3. Equipment Grounding Conductor shall be green insulated.
4. Grounding Electrode Conductor shall be bare, tinned, solid copper wire. Grounding conductor shall meet the size requirements of NFPA 70, Article 250-66, with a minimum of #2/AWG or as shown on the Plans. For areas highly prone to lightning or areas with highly acidic soil, larger conductors shall be used per Motorola R-56.
5. Bare Copper Conductors shall be solid copper wire: ASTM B-3.
6. Assembly of Stranded Conductors in accordance with ASTM B-8.
7. Tinned Conductors in accordance with ASTM B-33.

Miscellaneous Conductors:

1. Ground Bus shall be bare annealed copper bars of rectangular cross section.

Connector Products:

1. In general shall be listed and labeled as grounding connectors for the materials used.
2. Pressure Connectors shall be high-conductivity-plated units.
3. Bolted Clamps shall be heavy-duty units listed for the application.
4. Exothermic Welded Connections shall be provided in kit form and selected for the specific types, sizes, and combinations of conductors and other items to be connected.

Grounding Electrodes:

Ground Rods shall be copper-clad steel with high-strength steel core and electrolytic-grade copper outer sheath, molten welded to core. Ground rods shall be 5/8 in. by 10 ft., or greater as otherwise required by NFPA 70, Article 250-52. The actual size, material, and number of ground rods required may vary with site conditions or as determined by an engineering study based on the soil resistivity profile and soil pH of the site. Refer to "Soil Resistivity Measurements" NFPA 70, Article 250-52, and NFPA 780, Section 3-13 for more information. The method of bonding grounding conductors to ground rods shall be compatible with the types of metals being bonded.

Tower Grounding Assemblies:

The Tower Grounding Assembly includes all items and incidentals necessary to successfully ground the communication tower, the surrounding chain link fence, ITS Equipment Cabinets, and electric disconnects as shown on the Plans.

Construction Requirements

Electrical systems and equipment shall be grounded in accordance with Motorola R-56 and NEC requirements except where exceed by the plans or the specifications.

Listing and Labeling:

Products provided shall be listed and labeled. The terms "listed" and "labeled" shall be in accordance with NEC, Article 100.

Electrical Component Standard:

Components and installation shall comply with NFPA 70 of the NEC.

UL Standard:

Grounding and bonding equipment shall comply with UL 467, Grounding and Bonding Equipment.

Equipment Grounding Conductor Application:

Equipment grounding conductors shall comply with NEC Article 250 for size and quantity, except where larger sizes or more conductors are indicated on the plans or by Motorola R-56.

Connections:

In general make connections in such a manner as to minimize galvanic action or electrolysis. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be compatible and prevent galvanic action. The following requirements shall also apply:

1. Use electroplated or hot-tin-coated materials to ensure high conductivity and make contact points closer in order of galvanic series.

2. Make connections with clean bare metal at points of contact.
3. Aluminum to steel connections shall be with stainless steel separators and mechanical clamps.
4. Aluminum to galvanized steel connections shall be with tin- plated copper jumpers and mechanical clamps.
5. Coat and seal connections involving dissimilar metals with inert material such as red lead paint to prevent future penetration of moisture to the contact surfaces.

Grounding Conductors:

Grounding conductors shall be run as short, straight, and smoothly as possible, with the fewest possible number of bends and curves. See NFPA 70, Articles 800-40, 810-21, and 820-40.

A minimum bending radius of 8 inches shall be maintained, applicable to grounding conductors of all sizes (per NFPA 780, Section 3-9.5 and ANSI T1.313-1997). A diagonal run is preferable to a bend even though it does not follow the contour or run parallel to the supporting structure. All bends, curves, and connections shall be toward the ground location, rod or ground bar (grounded end) of the conductor.

Grounding conductors attached to the tower and above ground structures, especially copper straps, are exposed to movement by wind and other physical forces that can lead to damage or breakage over time. The following requirements shall apply when installing grounding conductors on these structures:

1. The grounding conductor or its covering shall be securely fastened to the surface on which it is carried.
2. Grounding conductors shall be attached using the method recommended by the equipment manufacturer.
3. The fasteners shall not be subject to breakage and shall be of the same material as the conductor or of a material equally resistant to corrosion as that of the conductor.
4. Approved bonding techniques shall be observed for the connection of dissimilar metals.
5. Grounding conductors shall be securely fastened at intervals not exceeding 3ft. See NFPA 70, Articles 250-64(b), 810-21(c), and NFPA 780, Section 3-10.

Exothermic Welded Connections:

Use for connections to structural steel, for all underground connections, and for all connections to ground rods and plate electrodes. Comply with manufacturer’s written recommendations. Welds that are puffed up or that show convex surfaces indicating improper cleaning are not acceptable.

Terminate insulated equipment grounding conductors for feeders and branch circuits with pressure-type grounding lugs. Where metallic conduits terminate at metallic housings without mechanical and electrical connection to the housing, terminate each conduit with a grounding bushing. Connect grounding bushings with a bare grounding conductor to the ground bus in the housing. Non-continuous, metallic conduits shall be bonded, in an electrical manner, at one end with grounding bushings and bare grounding conductors.

Tighten grounding and bonding connectors and terminals, including screws and bolts, in accordance with manufacturer's published torque-tightening values for connectors and bolts. Where manufacturer's torquing requirements are not

indicated, tighten connections to comply with torque tightening values specified in UL 486A.

Ground Rod Installations:

Ground rounds shall be driven into the earth. The top of the ground rod shall be a minimum of 18 inches below finished grade. Where practical, ground rods shall be buried below permanent moisture level in accordance with NFPA 70, Article 250. Ground rods that cannot be driven straight down, due to contact with rock formations, may be driven at an oblique angle of not greater than 45 degrees from the vertical, or may be buried horizontally and perpendicular to the building, in a trench at least 30 inches deep in accordance with NFPA 70, Article 250 and NFPA 780. Conductor terminations to the ground rod shall be made by exothermic welds, rated for underground installation and compatible with the types of metals being bonded. Ground rods shall be free of paint or other nonconductive coatings in accordance with NFPA 70, Article 250 and NFPA 780.

Ground rods shall not be installed more than twice the length of the rods apart, and not less than 6 feet apart per NFPA 70, Article 250.

Compression-Type Connections:

Use hydraulic compression tools to provide the correct circumferential pressure for compression connectors. Use tools and dies recommended by the manufacturer of the connectors. Provide embossing die code or other standard method to make a visible indication that a connector has been adequately compressed on the ground conductor.

Tower Transmission Lines:

All transmission lines shall be grounded using ground kits as follows (See ANSI T1.313-1997 for more information):

1. Transmission line ground kits shall be installed per manufacturer specifications. The Contractor shall be responsible for completely replacing any waveguide or transmission lines where the copper jacket is cut through. Braid is not acceptable for attachment of ground kits to the ground bus.
2. Transmission line ground kits shall be sealed from the weather by properly applying, as a minimum, Butyl rubber and two layers of Scotch #88 plastic tape to prevent water and corrosion damage to the transmission line.
3. Transmission line ground kits shall be attached to a tower ground bus bar attached to the tower structure as shown on the Plans. Cable ladders shall not be used as a grounding point for transmission lines.
4. Transmission line ground kits shall be attached to the tower using the ground kit manufacturer approved methods.
5. Transmission line ground kit grounding conductors shall be installed without drip loops, parallel to the transmission line, and routed downward towards the ground to provide a direct discharge path for lightning.
6. Transmission lines shall be grounded at the top of the vertical run, near the antenna.
7. Transmission lines shall be grounded at the bottom of the vertical run, no more than 6 feet above the horizontal transition to the communication shelter.
8. Additional transmission line ground kits shall be installed as needed to limit the distance between ground kits to no more than 75ft.
9. Transmission lines at the bottom of the vertical run shall be bonded to the tower ground bus bar.

10. Transmission lines shall be grounded to the external ground bus bar within 24 inches of the building entry (See NFPA 70, Article 820-33).

Tower Grounding:

A ground ring containing at least three equally spaced ground rods shall encircle the tower. The ground rod spacing shall not exceed 20 feet for 10 foot ground rods. The tower ground ring shall have a minimum diameter of 18 feet.

Self-supporting towers exceeding 5 feet in base width shall have at least four ground rods (ANSI T1.313-1997 and ANSI/EIA/TIA-222f). The ground rod spacing shall not exceed 20 feet for 10 foot ground rods. The tower ground ring shall have a minimum diameter of 23 feet.

Each leg of the towers shall be bonded to the tower ground ring using grounding conductors of #2 AWG minimum, bare, tinned, solid copper conductor. The vertical wire from the tower leg to the ring shall be insulated from earth contact for the first 12 inches or more by passing it through a PVC pipe. This is to reduce the step voltage in the immediate vicinity of the tower.

In addition, a top-mounted aerial lightning rod, extending above the topmost antenna, connected to a full tower length "down conductor" grounding cable shall be installed to provide a nondestructive path to ground for lightning contact with the tower structure. The down conductor shall consist of a #2 stranded copper cable attached and exothermically bonded to the uppermost tip of one tower leg. The down conductor shall then extend downward in a continuous run, exothermically bonded at the lower end of the same leg. The down conductor shall then be exothermically bonded to the grounding ring at the tower base. The down conductor shall run straight without bends or curves and be securely fastened to the tower leg on which it is installed using two wraps of stainless steel wraplock to prevent movement. The aerial down conductor and all transmission line grounding kits shall be bonded to this down conductor. The tower ground bus bars shall be bonded to the down conductor.

All tower grounding work shall be coordinated with the tower erection, fence construction, and other electrical work associated with energizing the panel board within the communication shelter. All metallic non-current carrying electrical components installed on the tower and at the site shall be electrically connected to the grounding system. This includes but is not limited to the antennas, radios, pan-tilt-zoom mechanisms, cameras, and cable shielding. All construction and testing work shall conform to NEC requirements and these Special Provisions. The Contractor shall provide the Engineer with all test data and results for review. The pH (Hydrogen ion concentration) of the soil where a grounding electrode system is to be installed shall be tested before the system is installed. Acidic soils (pH below 7) can have a destructive effect on copper and other metals. In strongly acidic soils (pH of 5 or below), an electrolytic ground rod system shall be installed to maintain the life expectancy of the system, if requested by the Engineer. Electrolytic ground rods will not be required for grounding electrodes covered by concrete, unless ground resistance cannot otherwise be achieved and as requested by the Engineer. The electrolytic ground rod system shall be by Harger or equivalent.

Moisture Protection:

Where insulated ground conductors terminated underground insulate the entire area of the connection and seal against moisture penetration of the insulation and cable.

Field Quality Control:

The procedures for performing resistance testing of the site grounding electrode system shall comply with the following:

The resistance of a grounding electrode system shall be measured after its installation and before it is bonded to the power company neutral wire or any other utility, such as the telephone ground or metallic pipes.

Resistance testing shall be done using the Three-Point/Fall-of- Potential method. The Three-Point/Fall-of-Potential test is the most widely accepted and recommended test method. This procedure is documented in ANSI/IEEE STD 81 and shall be referred to for more details. The testing shall be done in accordance with Motorola R-56. An instrument designed specifically to measure the resistance of a point to each ground shall be used and the instructions provided with the instrument shall be followed for proper measurement method. All measurements shall be recorded along with the location of each ground rod and submitted to the Engineer.

Upon completion of all grounding requirements outlined in these Special Provisions and other applicable documents, the ground resistance for each tower site and shelter site shall be 5 Ohms or less, unless approved by the Engineer. In no case shall the ground resistance of each tower site and shelter site be greater than 10 Ohms.

Deficiencies:

Where ground resistances exceed specified values, the Contractor shall modify the grounding system to reduce resistance values. Additional costs for materials and labor used in these modifications will be considered incidental to the cost of the grounding system.

Reporting:

Prepare test reports of the ground resistance at each test location. Include observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results.

Site Preparation and Clean-up:

All earthwork preparation and grading necessary for installation of the Tower Grounding System will be considered incidental to this work. When the installation is completed, all disturbed portions of the construction area will be cleaned and the original grades reestablished unless otherwise indicated and any excess excavation or other materials shall be disposed of in a timely manner. All final clean-up will also be considered incidental to this work.

Where sod has been removed, replace it as soon as possible after backfilling is completed. Restore areas disturbed by trenching, storing of dirt, cable laying, and other work to their original condition. Include necessary topsoil, fertilizing, liming, seeding, sodding, sprigging, or mulching. Maintain disturbed surfaces, restore vegetation, and restore disturbed paving.

Inspection:

The grounding system will be inspected by the Engineer using the checklist from Motorola R-56 Appendix F pages 601 through 643, as applicable.

Method of Measurement

Grounding will not be measured for payment.

Basis of Payment

Grounding will not be paid for separately, and shall be considered incidental to the cost of electrical equipment, cabinets, and ATMS equipment.

Grounding shall include but not be limited to all welding, bonding, trenching, conduits, connections, labor, materials, testing and other incidentals necessary to successfully ground the tower, chain link fences, shelter, generator, transformers, subpanels, disconnects, and other equipment.

No separate payment will be made for equipment grounding unless otherwise specifically stated herein.

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HANDHOLES

SECTION 805, BEGIN LINE 30, INSERT AS FOLLOWS:

ATMS handholes shall be as shown on the plans. The handhole covers shall be bolted into place with stainless steel bolts and washers. The cover frame shall be installed in the handhole with a butyl rubber sealant in tape/coil form for a proper seal between the handhole and frame and to prevent it from moving out of place. The sealant shall comply with ASTM C990 for butyl rubber sealants.

The cover for the ATMS handhole shall be marked with logo imprints of "Traffic Management System" or "Traffic Management Power" horizontally across the cover. Covers labeled "Traffic Management Power" shall be provided whenever the handhole is used for power distribution cables. Covers labeled "Traffic Management System" shall be provided in all other handholes.

SECTION 805, BEGIN LINE 661, INSERT AS FOLLOWS:

HANDHOLE, ATMS .....EACH

SECTION 805, BEGIN LINE 727, DELETE AND INSERT AS FOLLOWS:

The cost of concrete reinforcing pipe and ring or polymer concrete box, cover and attachment hardware, handhole bottom if required, *bolt-down cover hardware, butyl rubber seal, custom cover logo,* and aggregate as shown on the plans shall be included in the cost of handhole, ~~signal~~ *ATMS*.

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LIGHTNING PROTECTION

Description

Lightning protection shall include all devices necessary to provide safety for the equipment, cabinets, and service personnel by preventing damage caused by lightning. All towers that are connected to an external power source, non-solar, shall be equipped with appropriate lightning protection.

1. The following documents contain requirements that relate to this section:
2. Underwriters Laboratories, Inc., Lightning Protection Components, UL96 and UL96A
3. National Fire Protection Association (NFPA), Standard for the installation of Lightning Protection Systems, NFPA780
4. Motorola R-56, Motorola Standards and Guidelines for Communications Sites 2000, Chapter 6, External Grounding.

Where conflicts exist between the above referenced documents and this document, the more stringent requirement shall prevail.

Materials

Subject to compliance with requirements, manufacturers offering products that may be incorporated in the work include but are not limited to Alltec Corporation, Canton, NC or Lightning Masters Corporation, Clearwater, FL or East Coast Lightning Equipment, Inc., Winsted, CT.

The lightning protection system shall be the standard product of a manufacturer regularly engaged in the production of lightning protection equipment and shall be the manufacturer's latest approved design. The manufacturer shall have a proven track record of successful lightning protection system performance.

The manufacturer or its authorized representative shall provide product and technical support.

All equipment shall be new and of a design and construction to suit the application where it is used in accordance with accepted industry standards and UL and NFPA requirements.

All lightning protection materials and components shall comply in weight, size, and composition with UL96 and NFPA780 lightning protection material requirements for the structure being protected. Components shall be constructed of material as specified by UL96 and UL96A for a system employing copper components, unless otherwise directed by the Department or necessary to prevent dissimilar metals from coming into contact. Class II materials shall be used on throughout the system.

Construction Requirements

Lightning Protection shall be installed in accordance with the manufacturer's instructions and per the plans. All materials shall be installed in a neat and professional manner. All installation services shall comply with all warranty provisions and warranty contract maintenance services in accordance with these specifications. Installation shall be accomplished by a company experienced with lightning protection installation.

If installed on a metallic or otherwise electrically conductive structure, the system shall be electrically bonded to the structure upon

which it is installed through its mounting clamps and brackets, with additional bonding jumpers to grounded objects and to the structure, as required.

The contractor shall coordinate his work in such a manner as to not interfere with the normal operation of the structure upon which the installation is performed.

Contractor shall assure a sound bond to the grounding system.

Method of Measurement

Lightning Protection will be measured for payment per the number of units furnished and installed, complete and in place. Terminations, connections, fittings, etc. will be considered incidental to the installation of the lightning protection and will not be measured for payment.

Basis of Payment

Lightning Protection will be paid for at the contract unit price per each.

Payment will be made under:

Pay Item	**Pay Unit Symbol**
TOWER, LIGHTNING PROTECTION	EACH

Terminations, connections, fittings, etc. shall be considered incidental to the installation of the lightning protection system with no additional payment.

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MONOTUBE TOWER FOR CCTV

Description

This work consists of designing, furnishing and erecting a monopole camera tower on a tower foundation for the type and height shown on the plans and specified herein, complete with all components, as shown on the plans. The tower shall be used to support a closed circuit television (CCTV) camera for expressway surveillance. Two proposed tower locations are located along U.S. 41 as shown on the plans. The design, furnishing and installing the tower foundation is discussed elsewhere in the special provisions.

The contractor shall provide structural designs, calculations, and engineering drawings signed and sealed by a professional engineer registered in the state of Indiana for each new tower and tower foundation. The foundation design shall be based on the site-specific soil boring results and shall consider the existing and proposed site conditions as shown on the plans for each individual tower site. A tower foundation shall not interfere with natural or constructed drainage or runoff.

Each tower shall be designed in accordance with ANSI requirements. All work for the monotube tower shall be accomplished in accordance with these provisions and section 922.10(a) Steel Strain Pole. The monopole tower shall be supplied complete with all parts, fittings, and conduit risers, completely erected, lighted (as required), painted (as required), and ready for use by the Department. The Contractor shall comply with all applicable Federal and Indiana Occupational Safety and Health Agencies (OSHA) regulations for this type structure.

Materials

The material requirements shall be as stated in section 922.10(a) except as modified herein. The monopole tower shall be designed such that the following requirements are met.

In all cases the pole must be designed to be supported by the foundation. Wind and dead load applications must be considered when the camera poles are designed. The moment at any point along the pole's length is the sum of the moments resulting from dead loads and forces from wind loads. The wind force is equal to the wind pressure multiplied by the effective projected area (EPA) of the objects involved. The following wind load and pole deflection specifications are based on a pole installed with a CCTV assembly; camera lowering device (CLD); and no greater than two wireless point-to-point or point-to-multipoint antenna(s); when wireless communications are utilized, with the wireless antenna mounted at a height that shall optimize communications without obstructing the CLD.

Poles measuring 50 feet or more above grade in height are to be designed to have a minimal deflection not greater than 3.0 inches in 30 MPH continuous wind speed. The CLD shall be supplied under a separate provision but in all cases the pole and the CLD must function as a total system.

Construction Requirements

The contractor shall provide and utilize equipment and tools appropriate for installation of the towers and foundations. The tower shall be constructed in accordance with manufacturer recommended practices and INDOT standard specifications.

Provisions shall be made for all CCTV and CLD to be installed and cabling

routed within the interior of the pole. Pole entrances shall be no further than 10 feet from each device and maintenance access shall be provided such that maintenance personnel are able to access the interior of the pole near device cabling entrances. Strain relief shall be provided near all cable entry points to fasten cables and or conduits to the CLD and device wiring for the system.

The bolt patterns for the tower shall match those of the foundation.

Method of Measurement

The completed work as described shall be measured at the unit of each and includes the complete installation, certification, and testing of the tower.

Basis of Payment

Payment for the work included in this special provision shall be based on each, delivered, installed, and tested.

Payment will be made under:

Pay Item	**Pay Unit Symbol**
TOWER, 60 FT. MONOTUBE.....	EACH

The cost of materials, labor, equipment, transportation, placement and all incidentals shall be included in the cost of the pay item.

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WIRELESS MODEM FOR CCTV

The contractor shall provide a wireless modem with unlimited data plan from AT&T for each CCTV site location. The modem shall be connected into the ITS field switch.

WIRES AND CABLE

Description

This Section shall consist of furnishing and installing wires and cables, and making all connections as shown on the Plans. This Section includes wires and cables and associated splices, connectors, and terminations for wiring systems rated 600 volts and less.

The following sections of the Standard Specifications relate specifically to this section: Section 807, Highway Illumination; Section 805, Traffic Signals; and Section 920.01(c), Wire and Cable. Deliver wire and cable according to NEMA WC-26.

Materials

Subject to compliance with requirements, manufacturers offering products that may be incorporated in the work include, but are not limited to, the following:

Wires and Cables:

1. American Insulated Wire Corp., Leviton Manufacturing Co.
2. Brand-Rex Cable Systems, Brintec Corp.
3. Carol Cable Company, Inc.
4. Senator Wire & Cable Co.
5. Southwire Co.

Connectors for Wires and Cables:

1. Teledyne Penn-Union
2. ILSCO
3. Thomas & Betts Corp.
4. Electrical Products Division, 3M Co.
5. O-Z/Gedney Unit, General Signal.

All conductors shall have insulation rated at 600 VAC, with conductor temperatures not to exceed 194° F (90° C) in dry locations and 167° F (75° C) in wet locations.

Service Entrance: Type XHHW, copper conductor, in raceway.

Branch Circuits: Type XHHW, copper conductor, in conduit at ATMS equipment cabinets/enclosures.

Connectors and Splices: UL-listed factory-fabricated wiring connectors of size, ampacity rating, material, and type and class for application and for service indicated. Select to comply with Project's installation requirements.

Construction Requirements

Coordinate layout and installation of cable with other installations. Revise locations and elevations from those indicated as required to suit field conditions and as approved by the Engineer.

All components and installation shall comply with NFPA 70, National Electrical Code. Provide products specified in this Section that are listed and labeled as defined in the National Electrical Code, Article 100.

Install wires and cables as indicated, according to manufacturer's written instructions and the NECA, Standard of Installation.

Pull conductors into raceway simultaneously where more than one is being installed in same raceway. Use pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Use pulling means; including fish tape, cable, rope, and basket-weave wire/cable grips that will not damage cables or raceway.

Minimize conductor splices where possible. All splices and connections shall comply with the Standard Specifications, Section 807. Install splices and covers that possess equivalent or better mechanical strength and insulation ratings than conductors being spliced.

Use splice and tap connectors that are compatible with conductor material.

Examine conduits to receive wires and cables for compliance with installation tolerances and other conditions. Do not proceed with installation until unsatisfactory conditions have been corrected.

Testing: Upon installation of wires and cables and before electrical circuitry has been energized, demonstrate product capability and compliance with requirements.

Procedures: Perform each visual and mechanical inspection and electrical test stated in NETA Standard ATS, Section 7.3.1. Certify compliance with test parameters.

Correct malfunctioning products at site, where possible, and retest to demonstrate compliance; otherwise, remove and replace with new units, and retest.

Method of Measurement

All wires, cables, and connections will be measured for payment per foot of wire or cable complete and in place.

Basis of Payment

Wires and cables will be paid for at the contract unit price per foot in accordance with Standard Specification Section 807.19 and for the following pay units:

Payment will be made under:

Pay Item	**Pay Unit Symbol**
WIRE NO 2 CU 3 1/C, XHHW	EACH
WIRE, XHHW, 1 1/C, NO. 6 COPPER, GREEN JACKET	EACH

The cost of removing existing cable from existing conduit shall be incidental to the installation of new wire.

Connections, terminations, and splices shall be incidental to this work and no separate payment will be made.

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WEIGH IN MOTION STATION

Description

The reconstruction of the WIM station shall be in accordance with 105.03 and as shown below.

Materials

WIM Station Components.

The WIM Station shall contain the following components:

a. Controller Cabinet and Foundation. Existing ITS controller cabinet and foundation shall be retained and used for the new WIM station.

b. Recorder Control Equipment. The existing recorder that is within the cabinet shall be retained and reused with all LSM cards. 2 Quartz cards(KSM) shall be used to replace the existing 2 Piezo(PSM) cards within the cabinet.

b. Ground Rods, Sensors and Systems. WIM ground rods, sensors, and systems shall be in accordance with Section 925. All rods, sensors, and systems shall be replaced with new and installed in accordance with Section 925.

c. ITS Handholes, Rings and Covers. ITS handholes shall be retained where possible as shown on the plans. All new ITS handholes shall be in accordance with 922.

d. Traffic Signal Detector Housings. Traffic Signal Detector Housings shall be in accordance with 805.08, 922.11 and E-805-SGDH-01, E805-SGDH-02, and E805-SGDH-03. Existing detector housings shall be removed. New detector housings shall be placed as shown on the plans.

e. Galvanized Steel and PVC Conduits. Galvanized Steel and PVC conduits at WIM Station shall be in accordance with 805.11 and 805.12. Portions of existing conduit to remain as shown in the plans.

f. Utility Service Point. Existing service point shall be removed and new service point installed for the new WIM station in accordance with 807.15.

g. ITS Communications Network Connection. WIM Station shall be connected to the existing ITS Communications Network. Existing ITS communication network connection to remain and shall be used for the new WIM station.

WIM Roadway Sensor Array

1) ***Presence Detection***. Traffic Monitoring Loop Detectors shall be 6 ft round loop detectors with four wraps of wire and in accordance with 805.09.

2) ***Axle Detection***. At locations with lane widths of 12 ft or greater, WIM station shall have dual axle sensors, one 5.75 ft and one 6.5 ft Quartz installed staggered from end to center to provide separate weights for right and left wheel paths. Axle sensors shall be installed per manufacturer's recommended procedures.

3) ***Temperature Sensor***. One temperature sensor is required for each controller in use. Temperature sensors shall be installed per the WIM

Controller manufacturer's recommended procedures. WIM sensor arrays shall consist of one 6 ft round loop detector, followed by two axle sensors installed end to end, right and left wheel paths, followed by one 6 ft round loop detector, followed by two axle sensors installed end to end, right and left wheel paths, followed by one 6 ft round loop detector in each travel lane.

Sensor placement shall be such that saw slots are no closer than 2 ft to transverse pavement joints. Moving in the direction of travel, downstream, sensors shall be offset from the left most lane to the right approximately 6.75 ft. in a downstream direction. Roadway loop wire shall be 14 AWG gauge IMSA 51-3 wire with polyvinyl chloride or polyethylene outer jacket of .136 in. diameter. Only non-duct loop wire may be used for Traffic Monitoring loop detectors. IMSA 51-7 loop wire with polyvinyl chloride or polyethylene outer jacket of .250 in. diameter may be used if the wire is separated from the outer duct prior to installation.

All saw slots other than the Loop Detector body and where the lead-in joins with the Loop Detector Body shall be at right angles to the roadway. Lead-in saw slot intersections shall only be allowed on shoulder and median pavement.

Loop Detector Lead in cable shall be in accordance with 922.06(e)7a. 4 in. pieces of foam backer rod shall be inserted at 2 ft +/- intervals on the loop detector and lead-in saw slots after the Roadway loop wire has been installed prior to sealing.

Construction Requirements

The Contractor shall notify the INDOT Division of Traffic prior to any work at the WIM station. The Contractor shall coordinate and verify that the power is turned off at the cabinet prior to any work at the WIM station.

The Contractor shall submit documentation indicating the qualifications and experience of the subcontractors and vendors that will supply, install, and test pavement sensors. The Contractor shall identify the representative and provide a detailed resume of the individual from each subcontractor or vendor who will direct and oversee the supply, installation and testing. The documentation shall also include names, addresses, and telephone numbers of at least two references for each subcontractor and vendor who may be contacted regarding these installations.

Prior to the purchase or fabrication of any equipment or material proposed for use on the WIM Station, the Contractor shall submit for review by the Engineer catalog cut sheets along with specifications for all standard off-the-shelf items and shop drawings with specifications for all non-catalog or custom items. An electronic copy of all submittals and shop drawings shall be provided in pdf format. In lieu of electronic copies the Contractor may choose to submit ten paper copies of submittals and shop drawings. Submittals and shop drawings will be approved or rejected in writing and a memorandum stating the disposition will be returned to the Contractor. For items requiring verification of performance, it shall be provided with the catalog cut sheets, shop drawings, and specifications. See individual equipment specifications for requirements.

The purpose of the submittal and shop drawing data is to show specifically, and in detail, how the Contractor intends to satisfy the

requirements of the Special Provisions and Plans. If preprinted literature is utilized to satisfy some or all of these requirements, there shall be no statements on the literature which conflict with either the Special Provisions or Plans. Any such statements shall be crossed off and initialed by the Contractor and an appropriate statement shall be attached clearly indicating how the requirements of these Special Provisions and Plans will be fulfilled. The Contractor shall clearly label each item of submittal and shop drawing data with the bid item number, where applicable, and other description of the items to which it applies. Each submittal of catalog cut sheets, specifications or shop drawings, shall contain sufficient information and details to permit the Engineer to fully evaluate the particular component.

Copies of the catalog cut sheets, specifications and shop drawings shall be submitted by the Contractor to the Engineer and the ITS Engineering Personnel, who will be introduced at the pre-construction meeting. All catalog cut sheets and specification submittal data shall be submitted within 30 calendar days following issuance of the Notice to Proceed. All shop drawings shall be submitted within 90 calendar days following issuance of the Notice to Proceed. Failure to submit catalog cut sheets, specifications and shop drawings within this time frame shall result in a $1000 per day penalty to be withheld from contractor payment. All submittals will be reviewed and the approval or disapproval returned to the Contractor within 30 days of submission. All submittals returned to the Contractor as rejected shall be resubmitted for approval within 14 calendar days from the notice of rejection. Failure to resubmit documentation within the 14 calendar days from notice of rejection will result in a $1000 per day penalty to be withheld from contractor payment. The Contractor may submit alternatives to the Plans and Special Provisions to The Department for consideration. Any alternative submitted shall be clearly identified with benefits analyzed.

All testing shall be witnessed by the Engineer or a Department designated representative. Testing, including sensor testing performed before and after installation, shall be scheduled in a manner which allows the Engineer or representative to witness the test. The Engineer shall be notified a minimum of 72 hours prior to commencement of each test. All test plans and the test procedures for the component or subsystem being tested shall be approved by the Engineer before any testing is conducted. Additionally, the Contractor shall provide the Engineer 72 hours notification of anticipated disruption of any services. Concealed work, including underground, shall be tested by the Contractor and witnessed by the Engineer prior to covering. Instruments used by the Contractor shall be regularly and accurately calibrated and maintained in good working condition. Test reports shall include copies of documentation, calibration reports or tags, demonstrating calibration within one year of start of testing. The Contractor shall provide all test instruments.

Quartz Sensor Testing

The Contractor shall meter all new quartz sensors prior to and following installation. Equipment needed to perform the testing is an ICR (inductance, capacitance, and resistance) meter which also measures dissipation and an oscilloscope/scope meter.

1) PRE-INSTALLATION TEST READINGS - The following testing shall be performed on Quartz axle sensors prior to installation into the roadway to ensure the sensor is reliable:

a. Capacitance: Measure the capacitance of the sensor with the attached lead in cable. This shall be within 20% ± of the reading recorded on the sensor's data sheet included with the sensor. The meter shall typically be set on a 20nF range. The measurement shall be taken with the red lead on the center electrode of the cable and the black lead connected to the outer braid.

b. Dissipation Factor: With the capacitance set on the scale indicated above, switch the meter over to Dissipation Factor. The reading shall be less than 0.04 and shall be 20% ± of the reading recorded on the sensor's data sheet included with the sensor.

c. Resistance: Measure the resistance across the sensor. The meter shall be set on the 20M ohms setting. The meter shall read in excess of 20M ohms, which is typically displayed with a "1" on most LCR meters. This test may be performed using a standard multimeter which will display actual measured resistance.

2) POST-INSTALLATION TEST READINGS – The following testing shall be performed on Quartz axle sensors after installation into the roadway to ensure the sensor was not damaged during installation and is functional per the manufacturer's specifications:

a. Once the sensor is installed and the grout has cured, repeat the Pre-Installation Testing per the instructions above.

b. The Contractor shall hook up an oscilloscope to the sensor and view wave forms as vehicles pass over the sensors to ensure the signal is clear and without noise. The sensor output voltage shall consistently measure a minimum of 90 mV for smaller vehicles to be accepted.

3) QUARTZ SENSOR TESTING AND MATERIAL RECORD – The Contractor shall record quartz test readings with sensor and material information. The record shall at minimum include the following information for each quartz sensor installed:

a. Quartz Sensor Serial Number
b. Quartz Sensor length
c. Quartz lead-in length from the factory
d. Readings from pre-installation testing
e. Readings from post-installation testing
f. Lane description or number
g. The Quartz sensor number as shown on the plans.
h. The Quartz Sensor grout type and expiration date
i. The lot number of the grout
j. The outside temperature when the Quartz was installed
k. Installation Date
l. Installer's Name and Company

If multiple cans of grout are used to encapsulate one quartz sensor, then the grout type, lot number, and the expiration date for each can of grout used shall be recorded.

4) QUARTZ SENSOR ACCEPTANCE CRITERIA – For a quartz sensor to be accepted, test READINGS as described in section 1 and 2 above shall fall within the following ranges:

a. Capacitance 4 to 15 nF
b. Resistance Greater than 900 KΩ
c. Dissipation Less than 0.05
d. Average Signal Level for 2 axle passenger vehicles shall be a minimum of 90 mV

Sensors testing and producing other readings or failing to be in compliance with the above specifications shall be considered as failing and shall be replaced at no additional cost to The Department.

WIM STATION Calibration & Accuracy Requirements

Calibration

Upon completion of all work at WIM stations, the Contractor shall perform scale calibration for each travel lane. The Contractor shall calibrate each lane using a five-axle tractor-trailer with air ride suspension loaded with a non shifting load at near legal gross weight limit with a minimum weight of 75,000 pounds. Prior to the start of calibration, the Contractor shall have the truck weighed at a certified scale to obtain individual single axle and grouped axle weights for every axle or group of axles on the vehicle, as well as the overall vehicle gross weight. These weights shall be provided to the person performing the calibration so the actual weight of the vehicle is known prior to the start of calibration.

The truck shall make a minimum of 15 passes over each lane to ensure that each lane is properly calibrated. Upon completion of the calibration procedure, the Contractor shall submit a summary of the calibration process to the PE, and to the ITS Field Engineer of the Department through the PE, showing the weight of the truck from the certified scales and the weight of the system indicated each time the truck crossed over the scales. This summary shall at minimum include the pre-calibration weights for each axle with total gross weight and individual axle with total gross weights for the last ten passes of the truck for each lane. The Contractor shall include all variable factors related to calibration of the system which were programmed into the WIM electronics for each lane on this summary. Electronic copy of the site parameters and WIM Electronics configuration files shall be provided though the PE to the ITS Field Engineer.

Accuracy Requirements

Utilizing Quartz sensors in each lane, the system shall meet the following accuracy criteria:

	Mean Error	Standard Deviation
Steering Axles	+/- 2%	8%
Single Axles	+/- 2%	8%
Tandem Axles	+/- 2%	7%
Gross Vehicle Weight	+/- 1.5%	5%
Axle Spacing	+/- 2 in.	3 in.
Vehicle Length	+/- 12 in.	18 in.
Speed	+/- 1 MPH	2 MPH

The above accuracy specifications are to be based on a minimum sample of 10 vehicle passes, loaded to a minimum of 93% of the legal allowable weight limit. Vehicle passes which traverse the scale with more than a 10% speed variation shall not be considered. The accuracy will be based on a one standard deviation confidence level. This assumes that the errors are normally distributed, and subsequently, 68% of all samples fall within the above quoted limits.

In addition to previously described accuracy criteria, each WIM system covered by this specification shall comply with the requirements of ASTM E1318-09 for type III WIM systems. In the event the station does not operate

within tolerances defined by the above accuracy criteria and does not satisfy requirements of ASTM E1318-09 for Type III WIM systems, The Department will not accept any work at the WIM station until the Contractor has taken necessary corrective action to bring the station into compliance.

ITS TECHNOLOGY DEPLOYMENT DIVISION FINAL ACCEPTANCE CHECK

After the Contractor has notified the PE that all work at the VWIM station has been completed, utilities have been connected, and the site has been calibrated, then the Department's ITS Technology Deployment Division shall schedule technicians to perform a thorough site inspection/operation test within ten working days. Noted discrepancies, if any, will be reported to the PE and the Contractor shall correct these discrepancies before the site is accepted. It shall be the Contractor's responsibility to notify both the PE and ITS Field Engineer with the Department when all work is completed to have the final acceptance check performed. Prior to acceptance of the station, a minimum of two weeks data shall be collected, processed, and evaluated by the Department. Acceptance of the station shall not take place until it has been determined that data accuracy is in accordance with above stated accuracy criteria.

WARRANTY

The Contractor shall arrange for vendors to warranty their equipment for not less than five years after the date of final acceptance of all work in the contract. Specified warranty periods shall apply to all in-road sensors and equipment installed in or at each WIM station covered by this specification. Final acceptance by the Department is when the entire contract has been completed and accepted.

Warranties shall include, but not be limited to, defects in material, poor workmanship, and/or malfunction of any in-road sensor and/or equipment provided by this special provision. Any in-road sensor, splice or lead-in cable that fails to meet specifications and/or develops a problem during the construction and/or warranty period shall be repaired or replaced as required within fourteen days of notification by the Department. All warranty costs outside shall be covered under the warranty including parts, travel, labor, maintenance of traffic, and mileage. Any equipment that fails during the warranty period likewise shall be replaced or repaired within fourteen days of notification by the Department. The warranty shall include damage to the electronics in the cabinet caused by lightning. Routine maintenance at each location covered by this specification shall be included in the warranty and performed at each location annually for the length of the warranty.

Method of Measurement

The WIM Station, Rebuild, will not be measured for payment.

Basis of Payment

The components necessary to rebuild the WIM station, removal of existing traffic monitor detector housings, loop detectors, handholes, and existing conduit as shown on the plans, will be paid for at a contract lump sum price. All work and incidentals necessary for this work shall be included in the cost of the WIM Station, Rebuild.

Payment will be made under:

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Pay Item	Pay Unit Symbol
WIM Station, Rebuild	LS

All cost of materials and equipment to perform WIM STATION Calibration shall be included in the LS price bid for WIM STATION, Rebuild.