

CONTRACT I-18-4694

BID OPENING

JULY 12, 2018

10:30:00 AM

**ELGIN O'HARE WESTERN ACCESS TOLLWAY
BRIDGE CONSTRUCTION
AND
BUILDING DEMOLITION
AT
JANE ADDAMS MEMORIAL TOLLWAY (I-90)
I-90 FROM ELMHURST ROAD
TO
MOUNT PROSPECT ROAD
I-90 MILE POST 73.5 TO MILE POST 74.4
I-490 MILE POST 6.25**



Illinois Tollway
2700 Ogden Avenue Downers Grove, IL 60515

VOLUME II

SPECIAL PROVISIONS

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**ILLINOIS STATE TOLL HIGHWAY AUTHORITY (Illinois Tollway)
SPECIAL PROVISIONS
CONTRACT NUMBER I-18-4694
ELGIN O'HARE WESTERN ACCESS TOLLWAY (I-490)
BRIDGE CONSTRUCTION AND BUILDING DEMOLITION
AT JANE ADDAMS MEMORIAL TOLLWAY (I-90)
I-90 FROM ELMHURST ROAD TO MOUNT PROSPECT ROAD
I-90 MILE POST 73.5 TO MILE POST 74.4
I-490 MILE POST 6.25**

S.P. 101 LOCATION AND SCOPE OF WORK

The improvements to be constructed under this contract shall be performed along the Jane Addams Memorial Tollway (I-90) between Mile Post 73.5 and Mile Post 74.4 and at the Elgin O'Hare Western Access Tollway (I-490) at Mile Pole 6.25 in Cook County, Illinois.

The work under this contract includes, but is not limited to:

- 1.) Site Clearing
- 2.) Building Demolition and Gas Station Removal
- 3.) Earthwork and Grading
- 4.) Construction of Bridge Numbers **1681** (Ramp X4) and **1682** (Ramp X3)
- 5.) Construction of Retaining Walls **NW74.41R,EB, NW74.42R,WB, NW74.43R,EB** and **NW74.44R,WB**
- 6.) Drainage
- 7.) Signing and Pavement Marking
- 8.) Roadway Lighting
- 9.) Intelligent Transportation Systems (ITS) Infrastructure Relocation
- 10.) Erosion and Sediment Control
- 11.) Landscaping
- 12.) Traffic Control and Protection
- 13.) All other appurtenant and miscellaneous construction shown on the plans and within these Special Provisions.

All applicable provisions of the IDOT Standard Specifications adopted April 1, 2016, herein after referred to as the Standard Specifications, IDOT Supplemental Specifications and Recurring Special provisions adopted April 1, 2018, Illinois Tollway Supplemental Specifications to said Standard Specifications issued May 1, 2017, and all Illinois Tollway Construction Bulletins in effect at the time of bidding, shall govern this work except as herein amended.

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S.P. 103 CONTRACT COMPLETION DATE, SUBSTANTIAL AND INTERIM COMPLETION DATES

S.P. 103.1 CONTRACT COMPLETION DATE

The Contractor shall complete all work under this Agreement for the performance of Contract I-18-4694 on or before 11:59 p.m. on **October 31, 2019** and as specified in Article 108.05 of the Illinois Tollway Supplemental Specifications.

S.P. 103.2 SUBSTANTIAL COMPLETION DATE

The Contractor shall have completed all roadway and bridge work, shoulder work, installation of permanent pavement markings, installation of permanent signing, installation of permanent lighting and establishment of the traffic lanes to the final proposed traffic lane configuration such that temporary lane or shoulder closures are no longer required under this Agreement for the performance of Contract I-18-4694 on or before 11:59 p.m. on **September 30, 2019**.

S.P. 103.3 INTERIM COMPLETION DATE

The Contractor shall complete all work at the median sign structure foundation near Mile Post 73.5 including, but not limited to, sign structure foundations, barrier wall transitions, shoulder reconstruction, and removal of traffic control and protection by 11:59 p.m. on **October 31, 2018**.

S.P. 103.4 INTERIM COMPLETION DATE

The Contractor shall complete all remaining Stage 1 work along the I-90 median as specified in the contract plans, including, but not limited to, removals, temporary soil retention system, pier construction, sign structure foundations, barrier wall construction, shoulder reconstruction, temporary and proposed roadway lighting, and removal of traffic control and protection by 11:59 p.m. on **December 14, 2018**.

S.P. 103.5 INTERIM COMPLETION DATE

The Contractor shall complete all building demolition work, including, but not limited to, all work required as part of the Special Provision for BUILDING REMOVAL by 11:59 p.m. on **April 30, 2019**. Seeding of the area disturbed by the building removal work may be completed after this date.

S.P. 103.6 INTERIM COMPLETION DATE

The Contractor shall complete construction of the south MSE wall and abutments for the Ramps X3 & X4 Bridges (BN 1681 & 1682) by 11:59 p.m. on **May 31, 2019**. Following this date, the Contractor shall cede the work area in front of the south MSE wall and abutments to Contract N08-B2 (EB and WB I-90 CD Road Construction) until the Interim Commencement Date specified in S.P. 104.2.

S.P. 104 NOTICE TO PROCEED/COMMENCEMENT OF ON-SITE WORK

In accordance with Article 103.08 of the Illinois Tollway Supplemental Specifications, it is anticipated the Notice to Proceed will be issued after the Contract is approved by all parties; including a work commencement date no earlier than **August 27, 2018**. The Illinois Tollway will not issue the Notice to Proceed until all documents required by the Contract, including bonding and insurance requirements, are submitted by the Contractor and approved by the Illinois Tollway. A Time Extension Request shall not be considered should the Notice to Proceed be delayed due to the failure of the Contractor to submit contract documents in compliance with the specified requirements. There shall be no damages or additional compensation due the Contractor for delays, if any, in issuing the Notice to Proceed.

S.P. 104.1 INTERIM COMMENCEMENT DATE

The Contractor shall not be permitted to begin Stage 2 work prior to **March 1, 2019**.

S.P. 104.2 INTERIM COMMENCEMENT DATE

The Contractor shall not be permitted to begin the final work in front of the south MSE walls and abutments for the Ramps X3 & X4 Bridges (BN 1681 & 1682) prior to **September 2, 2019**. The final work shall include construction of slopewall and completing bridge drainage.

S.P. 105 LIQUIDATED DAMAGES FOR DELAY(S) AND INCENTIVE PLAN(S)

S.P. 105.1 Liquidated Damages

S.P. 105.1.1 Liquidated Damages for Non-Completion Per S.P. 103.1

In accordance with the provisions of Article 108.09 of the Illinois Tollway Supplemental Specifications, the Contractor shall pay to the Illinois Tollway the sum of **\$1,500.00** per day, as liquidated damages for each and every calendar day beyond the Completion Date stipulated in S.P. 103.1 that the work, or any part thereof, remains incomplete.

S.P. 105.1.2 Liquidated Damages for Non-Completion Per S.P. 103.2

In accordance with the provisions of Article 108.09 of the Illinois Tollway Supplemental Specifications, the Contractor shall pay to the Illinois Tollway the sum of **\$3,500.00** per day, as liquidated damages for each and every calendar day beyond the Substantial Completion Date stipulated in S.P. 103.2 that the work, or any part thereof, remains incomplete.

S.P. 105.1.3 Liquidated Damages for Non-Completion Per S.P. 103.3

In accordance with the provisions of Article 108.09 of the Illinois Tollway Supplemental Specifications, the Contractor shall pay to the Illinois Tollway the sum of **\$1,400.00** per per day, as liquidated damages for each and every calendar day beyond the Interim Completion Date stipulated in S.P. 103.3 that the work, or any part thereof, remains incomplete.

S.P. 105.1.4 Liquidated Damages for Non-Completion Per S.P. 103.4

In accordance with the provisions of Article 108.09 of the Illinois Tollway Supplemental Specifications, the Contractor shall pay to the Illinois Tollway the sum of **\$2,500.00** per per day, as liquidated damages for each and every calendar day beyond the Interim Completion Date stipulated in S.P. 103.4 that the work, or any part thereof, remains incomplete.

S.P. 105.1.5 Liquidated Damages for Non-Completion Per S.P. 103.5

In accordance with the provisions of Article 108.09 of the Illinois Tollway Supplemental Specifications, the Contractor shall pay to the Illinois Tollway the sum of **\$2,500.00** per per day, as liquidated damages for each and every calendar day beyond the Interim Completion Date stipulated in S.P. 103.5 that the work, or any part thereof, remains incomplete.

S.P. 105.1.6 Liquidated Damages for Non-Completion Per S.P. 103.6

In accordance with the provisions of Article 108.09 of the Illinois Tollway Supplemental Specifications, the Contractor shall pay to the Illinois Tollway the sum of **\$2,500.00** per per day, as liquidated damages for each and every calendar day beyond the Interim Completion Date stipulated in S.P. 103.6 that the work, or any part thereof, remains incomplete.

S.P. 105.2 Completion Incentive Payment Plan(s)

NOT USED

S.P. 106 COOPERATION WITH UTILITIES AND OTHERS

The Contractor is responsible for verifying the nature and status of all utility relocation work prior to preparation of the Baseline Schedule. The Contractor shall take appropriate measures to ensure that construction operations do not interfere with utility facilities and relocation work. The Baseline Schedule shall reflect construction sequencing which coordinates with all utility relocation work. The Contractor shall be required to adjust the order of its work from time to time, to coordinate same with utility relocation work, and shall prepare revised Baseline Schedule(s) in compliance therewith as directed by the Engineer.

The provisions of Articles 105.07 and 105.08 of the Illinois Tollway Supplemental Specifications shall apply.

The Tollway and the Engineer shall be notified in writing by the Contractor at least 96 hours prior to the start of any operation requiring cooperation with others. Notifications shall be made to the agencies and utilities at least ten (10) days prior to any construction. Any notification to any agency must be made through the Construction Manager.

Where the Contractor is constructing new facilities for a utility, the utility shall be notified 5 days prior to start of this work.

The following persons have been contacted in reference to utilities they own and operate within the right of way limits for this project. All known data from these agencies has been incorporated into the plans. It is, however, the Contractor's responsibility to confirm or establish the existence of all utility facilities and their exact locations, whether contained in the data submitted by these agencies or not, and to safely schedule all utility relocations.

Illinois State Toll Highway Authority
2700 Ogden Avenue
Downers Grove, IL 60515
Contact: John Lussow
Contact's Title: Utility Program Manager
Telephone Number: (630) 241-6800, Ext. 3916

AT&T Distribution (Legacy)
Legal Mandate Group
1000 Commerce Drive, Floor 2
Oak Brook, IL 60523
Contact: Alex Bryant
Telephone Number: (630) 272-9010

City of Des Plaines
1420 Miner Street
Des Plaines, IL 60016
Contact : Jon Duddles
Telephone Number: (847) 391-6127

Comcast
688 Industrial Drive
Elmhurst, IL 60126
Contact: Thomas Munar
Telephone Number: (224) 229-5851

Commonwealth Edison
1910 South Briggs Street
Joliet, IL 60433
Contact: Jose Magalon
Telephone Number: (815) 724-5065

NICOR
 1844 Ferry Road
 Naperville, IL 60563
 Contact: Bruce Koppang
 Telephone Number: (708) 243-5136

NSMJAWA
 900 Wellington Avenue
 Elk Grove Village, IL 60007
 Contact: Paul May
 Title : Assistant Executive Director
 Telephone Number: (847) 981-4083
 Contact: Ron Baker
 Title: Water Operations Manager
 Telephone Number: (773) 686-0077

Utility relocation work is required to be performed by others in conjunction with the proposed work. The Status of Utility Relocation work required is listed in the table below. The Contractor shall include the anticipated date for completion of utility relocation work for each utility listed above on the Detailed Progress Schedule.

The Contractor's bid proposal shall have been submitted with the understanding that utility relocation work will be completed no earlier than listed below. In the case of conflict between work scheduled by utility companies and that scheduled by the Contractor, the Contractor will be required to re-schedule his work to allow the utility company to complete relocation work in accordance with the schedule listed in the Status of Utility Relocation table listed below. No damages or additional compensation will be allowed to the Contractor for any delays, costs or inconveniences sustained by the Contractor due to interference from utility facilities or utility adjustment or relocation work.

| STATUS OF UTILITIES TO BE ADJUSTED | | | |
|---|-------------|---------------------------------|---|
| Name of Utility or Municipality | Type | Location and Disposition | Estimated Dates for Start and Completion of Relocation or Adjustment |
| NONE | | | |

S.P. 106.1 COORDINATION WITH ILLINOIS DEPARTMENT OF TRANSPORTATION

Coordination with the Illinois Department of Transportation (IDOT) shall be as follows:

The Contractor shall notify the Engineer 14 calendar days prior to commencement of any work on or affecting a State highway (Higgins Road (IL 72)), so as to provide the opportunity to alert the motoring public of possible delays. The Engineer or Corridor Construction Manager will notify IDOT of the start of work.

The Contractor shall indemnify and hold harmless IDOT in accordance with the indemnification provided to IDOT in Article 107.26 of IDOT's Standard Specifications for Road and Bridge Construction in effect at the time of construction. Such indemnity shall not be limited to amounts recoverable in the Court of Claims or by any insurance or bonds to be provided by said Contractor.

A highway permit is required to be secured from IDOT for access to IDOT right of way for the purposes of completing the work. The contractor will not be allowed access to IDOT right of way prior to receiving the Highway Permit from IDOT. The contractor shall include the date of anticipated IDOT Permit approval on the Baseline Schedule and on the Revised Baseline Schedule submitted as required by Article 108.02 of the Illinois Tollway Supplemental Specifications. The IDOT Highway Permit is anticipated to be secured no earlier than **March 1, 2019**. The Contractor will not be allowed access to IDOT right of way prior to **March 1, 2019**.

For purposes of obtaining the IDOT Highway Permit, the Contractor shall submit the following to the Engineer upon request:

1. IDOT Highway Permit Form OPER 1045 executed by the Contractor in triplicate.
2. IDOT Individual Highway Permit Bond Form OPER 1046 executed by the Contractor in triplicate. The bond amount required for the contract is \$10,000.
3. Certificate of Liability Insurance listing IDOT as an additional insured; See S.P. 107.J for other agencies required to be included as additional insureds.
4. Traffic Control Authorization BSE 725 form providing contact information.

Where State highways will be affected by the construction of the Toll Highway, the Contractor shall have responsibility for the installation, maintenance, relocation and removal of temporary and permanent traffic control devices along the State highways in accordance with IDOT Standards and Specifications.

The Contractor shall be required to meet regularly with IDOT and Illinois Tollway representatives to keep them abreast of traffic phase changes and shall provide a minimum 24-hour notice of said changes. The Contractor shall be required to comply with all IDOT traffic control requirements, including the specifications for lane closures contained in the contract documents. Such lane closures must be reviewed and approved by IDOT prior to implementation. The Contractor will be

required to request written authorization through the Engineer to the Traffic Control Supervisor, Corey Jucius, a minimum of two (2) weeks prior to any traffic pattern changes or lane closures, and provide detailed description of the traffic pattern revisions and respective durations in his/her authorization request. Upon receipt of the permit and authorization, the Contractor shall submit a copy to the Engineer for recording. The IDOT Traffic Control Supervisor may be contacted at:

Mr. Cory Jucius
Illinois Dept. of Transportation
Region 1
201 West Center Court
Schaumburg, IL 60196-1096
Phone: 847-705-4411
Fax: 847-705-4198

Should the Contractor fail to install or maintain traffic control devices as provided for in the Contract, IDOT, after giving prior notice to the Contractor, shall have the right to perform the work in any reasonable manner or cause the work to be performed on a force account basis at the expense of the Contractor.

The Contractor shall be required to keep at least one lane open in each direction on the State highways continuously at all times during construction unless otherwise authorized.

IDOT and its authorized agents shall have all reasonable rights of inspection (including pre-final and final inspection) during the progress of the Work as it affects the State Highway System. All IDOT communications and correspondence with the Illinois Tollway's Contractor relating to the contract shall be through the Illinois Tollway, unless otherwise specifically approved by the Chief Engineer of the Illinois Tollway. The Contractor shall immediately perform such work or replace or repair such non-complying work.

IDOT will also make inspections upon completion of 70% and 100% of all work on each contract affecting a facility. Deficiencies thus identified shall be subject to reinspection upon completion of corrective work. Payments for all work shall also be subject to IDOT inspections.

This contract (**I-18-4694**) abuts and/or overlaps with other concurrent and future IDOT contracts as listed below. Each contract includes work items requiring close coordination between the various Contractors regarding the sequence and timing for execution of work items. This contract also includes critical work items that affect the future staging of traffic and the completion dates of other contracts. These critical items along with their completion dates are listed after each contract.

1. None

Critical Items affecting the above contract:
None

S.P. 106.2 COORDINATION WITH THE COOK COUNTY DEPARTMENT OF TRANSPORTATION AND HIGHWAYS

For construction on or adjacent to any Cook County roadway (Mount Prospect Road), the Contractor will be required to secure a highway permit from Cook County for access to Cook County right of way for purposes of completing the work. The Contractor will be required to submit the "Contractor Letter" and comply with the Cook County Highway Permit Division "Bond and Insurance Requirements" which has been included herein. Note that Cook County has issued a Project ID Number for the work included in the Contract which is: **18-04-7960-C** for work requiring access to County Highways.

The Contractor shall include the date of anticipated Cook County Permit approval on the Preliminary Detailed Progress Schedule and on the Detailed Progress Schedule submitted as required by Article 108.02 of the Illinois Tollway Supplemental Specifications. The Cook County Highway Permit is anticipated to be secured no earlier than **March 1, 2019**. The Contractor will not be allowed access to Cook County right of way prior to **March 1, 2019**.

The Contractor shall notify the Engineer, who will give the Cook County Permitting Department 14 calendar day notice in writing prior to commencement of onsite work on Cook County right of way by contacting the following individual:

Mr. John Yonan P.E.
Superintendent of Highways
Cook County Highway Department
69 West Washington Street, Room 2300
Chicago, Illinois 60602
Phone: (312) 603-1670
Fax: (312) 603-9945
Attn: Mr. Michael Sterr, Permits Division Head

The Contractor is required to execute permit forms and provide a bond to Cook County to secure a Highway Permit for access to the Cook County right-of-way for the purpose of performing the contract work. The bond shall be furnished in the amount of \$20,000.00. The Contractor is required to meet all insurance requirements necessary for Cook County permits. For additional information:

<https://www.cookcountyl.gov/service/construction-permits-online-payment>

S.P. 106.3 COORDINATION WITH THE CITY OF DES PLAINES

For construction on or adjacent to any City roadway (Jarvis Avenue and Service Drive), the Contractor will be required to contact the Engineer who will contact the City of Des Plaines Public Work Department, as listed below, to secure necessary permits. The Contractor is responsible for meeting all requirements of the City of Des Plaines Public Work Department in connection therewith.

The Contractor shall notify the Engineer in writing 14 calendar day notice prior to commencement of work. The Engineer or Corridor Construction Manager will notify the City of Des Plaines of the start of work by contacting the following individual:

City of Des Plaines
1420 Minor Street
Contact: Mr. Jon Duddles, P.E.
Des Plaines, IL 60016
Contact's Title: Assistant Director Public Works and Engineering
Telephone Number: (847) 391-6127

S.P. 106.4 COORDINATION WITH FEDERAL AVIATION ADMINISTRATION (FAA)

A FAA Form 7460, Notice of Proposed Construction, is required to be submitted for items included in the **I-18-4694** contract due to proximity to O'Hare International Airport. An initial permit submittal has been made by the Tollway to account for construction activity as well as the permanent items that will be constructed. The initial permit submittal included a maximum temporary equipment elevation of 829' Above Mean Sea Level (AMSL) within the Contract Limits.

(See <http://www.faa.gov/airports/central/engineering/part77/> if additional detail on 'Who Must File' is desired)

Any proposed work height that results in a hazard determination for flight procedures at O'Hare International Airport will be required to be constructed at night or other times when the impacted runway is temporary closed. Any request by the Contractor to work during temporary runway closure time periods will have to be made at the City of Chicago Department of Aviation's weekly Short Term Operational Phasing (STOP) meeting. Temporary Runway closures are not guaranteed and will not be the basis of claims for time extension.

The Contractor is required to submit details on maximum construction equipment working elevations to the Illinois Tollway that will be used so permit compliance can be verified or any necessary permit modifications can be made. The maximum construction working elevations submitted shall include, but not be limited to, those required for installation of temporary and permanent utilities, webcam and ITS installation, pile driving, girder erection, building demolition and any other work activities. A standard determination timeframe from the FAA is generally 45-60 days.

The Contractor must comply with any requirements that are made by the FAA as part of the 7460 Determination. This may include compliance with FAA Advisory Circular AC 70/7460-1K Obstruction Marking and Lighting and/or notifications to the FAA when proposed work activities will occur at certain locations.

The Contractor is responsible for meeting all requirements of the agency in connection therewith and in coordination with:

Manar Nashif
Illinois Tollway
2700 Ogden Ave
Downers Grove, IL 60515
Main: 630-241-6800

The Contractor shall not be entitled to costs for any damages associated with work required by the FAA in conjunction with requests to exceed the maximum temporary working elevation listed above.

S.P. 106.5 COORDINATION WITH PERMITTING AGENCIES

UNITED STATES ARMY CORP OF ENGINEERS AND THE ILLINOIS ENVIRONMENTAL PROTECTION AGENCY: This project requires an individual permit from the United States Army Corp of Engineers (USACOE 404 Permit) and the Illinois Environmental Protection Agency (IEPA 401 Water Quality Certification). The USACOE Section 404/IEPA Section 401 permit was secured on March 17, 2014 for the entire Elgin O'Hare Western Access project corridor. As a condition of the entire Elgin O'Hare Western Access project corridor permit, a formal permit modification letter approval is required for Contract **I-18-4694** prior to the Contractor disturbing or otherwise impacting the jurisdictional wetlands or waterways. The permit modification approval is anticipated no earlier than **August 27, 2018**. No removals, temporary or permanent construction activities, or other work that would impact will that habitat be allowed until the permit modification is approved by USACOE. This includes, but is not limited to, excavation. Existing resources are shown on the construction contract plans.

The Contractor is responsible for meeting all requirements of these agencies in connection therewith and in coordination with:

Bryan Wagner
Environmental Policy & Program Manager
Illinois Tollway
2700 Ogden Ave
Downers Grove, IL 60515
630-241-6800 Ext. 3872

S.P. 106.6 COORDINATION WITH OTHER CONTRACTORS

The Contractor is advised that certain operations will involve cooperation with Illinois Tollway personnel and Contractors performing work on or adjacent to this contract for the Illinois Tollway. The Contractor shall cooperate to the fullest extent with the Illinois Tollway and the Contractors working on adjacent projects in compliance with the provisions of Article 105.08 of the Illinois Tollway Supplemental Specifications.

The following Illinois Tollway projects in the vicinity of Contract I-18-4694 may be under construction during the term of this Contract:

- Contract I-18-4695: Jane Addams Memorial Tollway (I-90) Collector-Distributors over Higgins Creek – Bridge Construction, Mile Post 74.0 to Mile Post 74.3
- Contract N08-B2: Jane Addams Memorial Tollway (I-90) Collector-Distributors– Roadway Construction, Mile Post 73.3 to Mile Post 74.6
- Contract I-17-4335: Bioswale Improvements – East – Jane Addams Memorial Tollway (I-90), Mile Post 68.3 (IL Route 53) to Mile Post 78.9 (Kennedy Expressway)
- Contract I-17-4294: Right of Way Fence and Gate Installation, Jane Addams Memorial Tollway (I-90) Elgin Plaza 9 to Kennedy Expressway, from M.P. 53.8 to M.P. 78.9
- Contract I-17-4319: Right of Way Fence and Gate Installation, on the Jane Addams Memorial Tollway (I-90) from Milepost 53.8 (Elgin Plaza 9) to Milepost 78.9 (Kennedy Expressway)
- Contract I-17-4323: Tree Planting and Landscaping, Jane Addams Memorial Tollway (I-90), Elgin Plaza 9 to Kennedy Expressway M.P. 53.8 to M.P. 78.9
- Contract I-17-4327: Fiber Optic Removal - East Jane Addams Memorial Tollway, (I-90) IL-53 to Kennedy Expressway, M.P. 68.2 to M.P. 78.9
- Contract I-17-4290: Grading and Landscaping Improvements, Jane Addams Memorial Tollway (I-90) IL 31 to Kennedy Expressway, from M.P. to 54.4 to M.P. 78.1
- Contract I-17-4333: Bridge Signing Improvements, Jane Addams Memorial Tollway (I-90) from Milepost 55.6 (IL 25) to Milepost 76.6 (Lee Street)

The Contractor is advised that access to work areas along the I-90 outside shoulders and the existing Oasis areas shall be via Jarvis Avenue and Service Road. The work areas for Contract N08-B2 (EB and WB I-90 CD Road Construction) will include existing Ramps D and E tie-ins to I-90.

S.P. 106.7 COORDINATION WITH PACE

Pace operates bus routes on the inside shoulders of the Jane Addams Memorial Tollway (I-90) within the Contract Limits. The Contractor shall notify the Engineer in writing 14 calendar days prior to any shoulder closures that will impact Pace operations. The Engineer or Corridor Construction Manager will notify Pace by contacting the following individual:

Pace Suburban Bus
550 West Algonquin Road
Arlington Heights, IL 60005
Contact: Richard Willman, P.E.
Contact's Title: Transportation Engineer
Contact's Email: Richard.Willman@pacebus.com
Telephone Number: (847) 364-8130

S.P. 106. 8 COORDINATION WITH THE METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

For construction on or adjacent to Metropolitan Water Reclamation District of Greater Chicago (MWRDGC) property, the Contractor will be required to contact the MWRDGC, as listed below, to coordinate construction operations with MWRDGC maintenance access to their facility. Unrestricted 24-hour access shall be provided to MWRDGC, and the existing sludge line air relief and blow-off structures shall remain accessible at all times. The Contractor shall notify the Engineer 14 days prior to performing work. The Engineer or Corridor Construction Manager will notify the MWRDGC of the start work by contacting the following individual:

Kirie Water Reclamation Plant
Mr. Adam Gronski
Principal Civil Engineer
847-375-2502

The Contractor is responsible for meeting all requirements of the Illinois Tollway's Intergovernmental Agreement with the MWRDGC in connection therewith:

Metropolitan Water Reclamation District of Greater Chicago
111 E. Erie, Suite # 4
Chicago, IL 60611
Mr. Joseph Schuessler
Principal Civil Engineer
312-751-3236

S.P. 107 INSURANCE

This provision supplements Article 107.27 of the Illinois Tollway Supplemental Specifications.

J. ADDITIONAL INSURED PROTECTION

The work under this contract includes work upon, above, adjacent to and/or along the right-of-way and facilities of the Illinois Department of Transportation (IDOT), Cook County, City of Des Plaines, and the Metropolitan Water Reclamation District of Greater Chicago (MWRDGC). The Contractor's Insurance coverage, required by and in conformance with Article 107.27(j) of the Illinois Tollway Supplemental Specifications, shall include the agencies specified herein, its agents and employees as additional insureds, or provide a separate owner's protective policy of equal limits of coverage for each agency.

S.P. 107.1 ENGINEERING PROFESSIONAL LIABILITY

Engineering Professional Liability insurance shall be maintained during the design-build period of the contract and then provide a discovery period of no less than 5 years after project completion. The discovery period requirement may be met by either an endorsement to the Engineering Professional Liability policy indicating the 5 year discovery period or, alternatively, a letter from the Engineering Professional warranting that Engineering Professional Liability

insurance shall be maintained continuously for a period of not less than five years after project completion. The policy may be written on a claims-made basis. Insurance documentation is required of the engineering firm providing the actual design-build plans. Primary professional liability for the engineering firm should be for a minimum of \$2 million per claim and in aggregate.

This would apply to the following:

| PAY ITEM NO. | DESCRIPTION |
|--------------|--|
| 50157300 | PROTECTIVE SHIELD |
| 50401340 | FURNISHING AND ERECTING PRECAST PRESTRESSED CONCRETE BEAMS, IL63 |
| 52200020 | TEMPORARY SOIL RETENTION SYSTEM |
| J1522500 | MECHANICALLY STABILIZED EARTH RETAINING WALL |

S.P. 107.2 ENVIRONMENTAL PROTECTION

(1) Environmental Impact/Pollution Liability Insurance

Insurance documentation must show limits of liability of not less than \$5 million each claim and \$5 million annual aggregate for personal injury, death and injury to or destruction of real or personal property arising from any escape or broad discharge or any hazardous waste or pollutants discharges. The project contractor is responsible to provide the insurance documentation from their specialized subcontractor, if applicable, who will complete the Work. The insurance documentation shall include the Illinois Tollway and other designated parties as additional insureds on a primary and non-contributory basis on the insurance. Coverage will be maintained for a minimum of five years following acceptance of the Work.

This would apply to the following:

| PAY ITEM NO. | DESCRIPTION |
|--------------|--|
| 66900105 | UNDERGROUND STORAGE TANK REMOVAL |
| 66900200 | NON-SPECIAL WASTE DISPOSAL |
| 66900400 | SPECIAL WASTE GROUNDWATER DISPOSAL |
| 66900450 | SPECIAL WASTE PLANS AND REPORTS |
| 66900530 | SOIL DISPOSAL ANALYSIS |
| 66900530 | PRIORITY POLLUTANTS GROUNDWATER ANALYSIS |
| J1669200 | REMOVE ABANDONED OIL PIPELINE |
| J1669210 | FILL ABANDONED OIL PIPELINE |
| J1669220 | REMOVE OIL SEPARATOR SYSTEM |

(2) Asbestos and Lead Paint Liability Insurance

Insurance documentation must show limits of liability of not less than \$5 million each claim and \$5 million annual aggregate for personal injury, death and injury to or destruction of real or personal property arising out of the removal, enclosure, encapsulation, disposal, storage or transportation of asbestos, lead paint, or asbestos containing materials. The project contractor is responsible to provide the insurance documentation from their specialized subcontractor, if applicable, who will complete the Work. The insurance documentation shall include the Illinois Tollway and other designated parties as additional insureds on a primary and non-contributory basis on the insurance.

This would apply to the following:

| PAY ITEM NO. | DESCRIPTION |
|---------------------|-------------------------------|
| JI669210 | REMOVE ABANDONED OIL PIPELINE |
| Z0007601 | BUILDING REMOVAL NO. 1 |
| Z0007602 | BUILDING REMOVAL NO. 2 |

S.P. 107.3 RAILROAD PROTECTIVE LIABILITY INSURANCE

NOT USED

S.P. 108 INDEMNIFICATION

In addition to indemnifying the Illinois Tollway under Article 107.26 of the Illinois Tollway Supplemental Specifications, the Contractor shall also indemnify and save harmless the Illinois Department of Transportation (IDOT), Cook County, the City of Des Plaines, the Metropolitan Water Reclamation District of Greater Chicago (MWRDGC), Design Corridor Manager (CH2M Hill) and all subconsultants, Exp U.S. Services, Inc. and all subconsultants, Corridor Construction Manager and all subconsultants, Construction Manager and all subconsultants, the Program Management Office (PMO), WSP USA Inc. and all subconsultants and all their officers, agents and employees, in accordance with the indemnification requirements of Article 107.26 of said Illinois Tollway Supplemental Specifications.

S.P. 109 WORKING HOURS AND PROSECUTION OF THE WORK

The Contractor is to refer to Section 108 - PROSECUTION AND PROGRESS in the Illinois Tollway Supplemental Specifications.

Regardless of progress, the Contractor shall be required to prosecute the work without undue delays or extended time intervals between activities. The Contractor is expected to utilize a six-day work week and double shifts as required to complete The Work by the Contract Completion Date specified in S.P. 103.1, substantial completion specific in S.P. 103.2, any Interim Completion Dates specified in S.P. 103.3, S.P. 103.4 and 103.5 and in accordance with the hour restrictions provided in the Contract Documents.

S.P. 110 LIST OF INCIDENTALS TO THE PAY ITEMS

The Contractor's attention is called to several specific incidental work items as noted on the Contract Plans and Special Provisions and in addition to the lists in the Standard Specifications. Listed below is a listing of these items for general information only. The list is not intended to be all-inclusive and, therefore, the Contractor is responsible to perform all work according to the Plans, Special Provisions and the Standard Specifications.

| PAY ITEM NUMBER | DESIGNATION | INDICENTAL WORK |
|------------------------|---|---|
| 50300255 | CONCRETE STRUCTURES | Furnishing and installing water seal, nails, adhesives and preformed joint fillers (JPF). |
| 50300255 | CONCRETE SUPERSTRUCTURE | Furnishing and installing parapet joints. Furnishing, installing and protecting light pole anchor bolts, nuts and washers. |
| 50401340 | FURNISHING AND ERECTING PRECAST PRESTRESSED CONCRTE BEAMS, IL63 | Furnishing and erecting structural steel for side retainers and permanent bracing, including connection details. Surveying and reporting erected position beams. Completing and submitting lateral stability calculations in accordance with the plans. |
| 51100100 | SLOPE WALL 4 INCH | Furnishing and installing preformed joint fillers (PJF). |
| Z0046304 | PIPE UNDERDRAIN FOR STRUCTURES 4" | Furnishing and installing geotechnical filter fabric and drainage fill. |
| JI440010 | CONCRETE MEDIAN BARRIER AND BASE REMOVAL | Removal of existing junction boxes and conduits embedded in barrier wall and base to be removed. |
| JI5030101 | HIGH PERFORMANCE CONCRETE SUPERSTRUCTURE | Furnishing and installing cellular polystyrene, polymer sealant and roofing felt. Furnishing and installing preformed joint fillers (PJF), nails, neoprene sheets, steel plates, anchor bolts, nuts, and washers at wingwall/abutment joints. |
| JS280020 | MANAGEMENT OF EROSION AND SEDIMENT CONTROL | Locating, detailing, constructing, and maintaining excavated concrete truck washout areas and their removal and site restoration. |

| PAY ITEM NUMBER | DESIGNATION | INDICENTAL WORK |
|-----------------------|--|--|
| JS812023, JS812027 | CONDUIT EMBEDDED IN STRUCTURE | Connecting proposed conduits to existing conduits. Extending, threading and capping exposed ends of conduits. |
| JS821110 | UNDERPASS LUMINAIRE, LED | Furnishing and installing anchors and all applicable underpass luminaire hardware. Furnishing and installing liquid tight metallic conduits and #10 AWG wiring. |
| JS813001, JS813014 | JUNCTION BOX, STAINLESS STEEL, EMBEDDED IN STRUCTURE | Furnishing and installing 1" PVC conduit drains w/ screens. |
| JS813094 | JUNCTION BOX, STAINLESS STEEL, ATTACHED TO STRUCTURE, 24" X 24" X 8" | Furnishing and installing fuses with fuse holders. |
| JS846001 | MAINTAIN LIGHTING SYSTEM | Temporary connections to maintain operation of the existing lighting system. Removal of temporary wood poles and aerial cables for temporary lighting system. |
| JT134005 | RELOCATE INTELLIGENT TRANSPORTATION SYSTEM ASSEMBLY | Removal of existing ITS pole foundation. |
| JT132830 | FIBER OPTIC COMMUNICATIONS, ITS ASSEMBLY | Furnishing and installing 12 strand SMFO cable, pigtail. |

S.P. 111 EROSION AND SEDIMENT CONTROL

The Illinois Tollway, in order to comply with various environmental regulations, has included Bid Items from Section 280 of the Illinois Tollway Supplemental Specifications, which implement such compliance. The Contractor shall make his/her employees and subcontractors aware that the Illinois Tollway will strictly enforce these requirements.

The National Pollutant Discharge Elimination System (NPDES) program of the Federal Clean Water Act imposes erosion and sediment control requirements on

construction projects that involve a land disturbance of one (1) acre or more. The procedures in this section are applicable to all Illinois Tollway projects that fall into these parameters.

Erosion and sediment control must be provided on all projects which will expose areas of soil or other material to potential displacement by precipitation and/or wind events such that sediment and other pollutants could adversely affect operations on the highway or associated rights-of-way, could be introduced into receiving waters, or could affect adjacent properties, sensitive environmental resources, or other resources which the Illinois Tollway has committed to protect from pollutant impacts. The nature and extent of the control measures should be appropriate to address the specific conditions involved and the measures must be properly maintained to ensure continued effective operation.

Projects which involve no roadway reconstruction, clearing and grubbing, excavation, stockpiling of soil and aggregates, borrow, or construction of embankment normally will not require erosion and sediment control measures. Projects that involve only isolated excavation normally will not require erosion and sediment control measures. The following are examples of actions which normally will not require erosion and sediment control measures:

- installation of lighting fixtures, signing, traffic signals or guardrail,
- weed spraying,
- pavement marking,
- seal coating,
- pavement patching,
- planting of woody landscaping materials, and
- ditch and pond cleanings if the soil is not redeposited on the site.

If a single project involves a cumulative land disturbance of one (1) acre or more, such as building demolition or building/facility construction at multiple locations, an erosion control plan and an NPDES permit is required.

All projects have evaluated the need for erosion and sediment control (and any additional right-of-way necessary to accommodate their implementation) as part of the preparation of the Contract Documents and have incorporated the appropriate information to address the identified needs in the Plans. Included in the Plans are information identifying the types of erosion and sediment control practices to be used, the locations in which they will be applied, and when they should be applied in relation to the sequence of construction operations. The sequence of construction operations may not have been specified in the Contract Documents. Rather, the application of erosion and sediment control measures in relation to the specific stages of construction that may expose soil wherever those stages occur can be described. Locations for use of practices such as perimeter silt fence and ditch checks may be specified or shown as appropriate. The location and design for non-routine practices are indicated in the Plans.

S.P. 111.1 NPDES PERMIT NO. ILR10

The general construction site activities of this project will be conducted under the Illinois Environmental Protection Agency (IEPA) General Permit to Discharge Stormwater associated with construction site activities (ILR10).

The requirements of this permit include the development of detailed Erosion and Sediment Control Plan (ESCP) and the preparation of a Storm Water Pollution Prevention Plan (SWPPP) that addresses erosion and sediment control issues, storm water management, and control of other pollutants that could impact the local environment. Also included are the installation of the required measures by the Contractor, along with the implementation of an active inspection and maintenance program, and the filing of the necessary required documents.

The Contract Drawings and Specifications describe the ESCP proposed for the project. The Contractor may submit new drawings defining the measures to be installed but these drawings will need to be approved by the Illinois Tollway prior to the Illinois Tollway signing the SWPPP.

The SWPPP, S.P. 111.2, is to be completed by the Contractor and submitted to the Illinois Tollway for review and signature. This SWPPP must be approved and signed by the Illinois Tollway and the Contractor and submitted to the IEPA 30 days prior to the start of construction, with the Notice of Intent. A copy of the signed SWPPP and referenced documents are to be kept on the construction site at all times by the Engineer and the Contractor. The SWPPP is to be updated by the Engineer and Contractor as changes are made during construction.

The Notice of Intent (NOI) must be submitted to the IEPA 30 days prior to the start of construction. The NOI will be started by the Design Section Engineer (DSE), who is responsible for completing the owner, construction site (except for construction start/end dates), type of construction, historic preservation and endangered species compliance, and receiving water information sections. The Contractor will finalize the NOI by completing the contractor information, dates of construction start/end, SWPPP, and any missing information from the type of construction information sections. The Contractor will submit the completed NOI to the Engineer, who will then submit it to the Illinois Tollway Environmental Unit for signature and filing with the IEPA. The Contractor shall submit the completed NOI and SWPPP within five (5) business days of date Notice to Proceed, to the Engineer in order to provide sufficient time for this process and for the forms to be filed with the IEPA 30 days before any ground disturbing activity begins. A copy of a blank NOI can be found at:

<http://www.epa.state.il.us/water/permits/storm-water/construction.html>

A copy of the letter of notification of coverage from the IEPA, along with the General NPDES Permit for Storm Water Discharges from Construction Site Activities shall be posted at the site in a prominent place for public viewing.

The Illinois Tollway's General Permit ILR40 from the IEPA requires established and controlled concrete washout location(s) in order to reduce contaminated runoff into nearby ditches and streams. The Contractor shall be responsible for

locating the concrete truck washout locations. At the time of the Preconstruction Conference, the Contractor shall submit for approval the proposed concrete truck washout location(s). The locations will be reviewed and discussed at the Preconstruction Conference to reinforce to the Contractor the importance of the sites so that pollutants do not reach the storm sewer or ditch systems. The approved location(s) shall be annotated on the Engineer's copy(ies) of the Erosion and Sediment Control Plan.

The Illinois Tollway's General Permit ILR40 also requires that sediment laden storm water runoff containing suspended and dissolved solids from roadway base comprised of either recycled concrete or rubblized concrete have said solids removed prior to discharging outside of Illinois Tollway right-of-way to the extent required by the NPDES General Permit. For construction areas adjacent to creeks and streams, the storm water's pH must also be moderated prior to discharge. The Contract Documents have incorporated appropriate Best Management Practices (BMPs) into the project plans to prevent these types of sediments from leaving Illinois Tollway right-of-way. The Contractor shall be responsible for installing identified BMPs, identifying any areas where sediments are leaving Illinois Tollway right-of-way, and removing said BMPs following completion of the project when sediments are no longer being released.

For any violation of the SWPPP observed during any inspection conducted, including those not required by the plan, and any illicit discharge (defined as any discharge that is not composed entirely of storm water) exiting the right-of-way or to receiving waters, the Engineer will immediately report the incident to the Illinois Tollway Environmental Unit and IEPA of notification being provided. Corrective actions must be taken immediately to address any non-compliance issues(s).

Reports of ION violations of the SWPPP and illicit discharges should be reported to the Illinois Tollway Environmental Unit at environment@getipass.com. For additional inquiry, contact (630) 241-6800 ext. 4222. The Illinois Tollway Environmental Unit will coordinate any potential violations directly with the IEPA. In addition, the Engineer will provide a written submission to the Illinois Tollway Environmental Unit and the project files within five days summarizing the incident/s and actions taken.

A Notice of Termination (NOT) will be filed by the Engineer with the Illinois Tollway and the Contractor when construction is completed and construction related discharge authorized by the permit is eliminated, or the contract is terminated. If the discharge of concrete fines continues at the time of contract termination, the Engineer will advise the Illinois Tollway Environmental Unit. The NOT will be filed when the site is permanently stabilized either with a uniform perennial vegetated cover that has a density of 70% coverage or has an equivalent permanent stabilization such as riprap, gabions, or geotextiles. In addition, the NOT will not be filed until all temporary erosion and sediment control measures have been removed. The NOT will not be filed until at least 30 days after all permanent stabilization is installed, all temporary erosion and sediment control measures have been removed, all BMPs associated with concrete or limestone dust particles from roadway base have been removed, and associated disturbed areas stabilized. The NOT will contain information on the dates the construction was completed and when the site was stabilized.

A copy of the General NPDES Permit ILR10 and samples of the NOI, ION and NOT are available at the following web site:

<http://www.epa.state.il.us/water/permits/storm-water/construction.html>

All inspection reports, Contract Drawings relating to the NPDES permitted activities, the SWPPP as amended and other erosion and sediment control documents will be maintained by the Illinois Tollway for at least three (3) years after filing the NOT.

S.P. 111.2 STORM WATER POLLUTION PREVENTION PLAN

1. Site Description.

The following is a description of the construction activity which is the subject of this plan:

- a. Project location, including latitude and longitude, and mile post numbers, of beginning and end of project limits.

The improvements to be constructed under this contract shall be performed along the Jane Addams Memorial Tollway (I-90) between Mile Post 73.5 and Mile Post 74.4 and at the Elgin O'Hare Western Access Tollway (I-490) at Mile Post 6.25 in Cook County, Illinois. The project latitude and longitude are 42°00'53"N and 87°55'32"W.

- b. **Description of the construction activity**

The work under this contract includes, but is not limited to:

- 1.) Site Clearing
- 2.) Building Demolition and Gas Station Removal
- 3.) Earthwork and Grading
- 4.) Construction of Bridge Numbers **1681** (Ramp X4) and **1682** (Ramp X3)
- 5.) Construction of Retaining Walls **NW74.41R,EB, NW74.42R,WB, NW74.43R,EB** and **NW74.44R,WB**
- 6.) Drainage
- 7.) Signing and Pavement Marking
- 8.) Roadway Lighting
- 9.) Intelligent Transportation Systems (ITS) Infrastructure Relocation
- 10.) Erosion and Sediment Control
- 11.) Landscaping
- 12.) Traffic Control and Protection

- c. The following is a description of the intended sequence of major activities which will disturb soils for major portions of the construction site, such as clearing, excavation, grading and on-site or off-site stockpiling of soils or storage of materials (use

additional pages, as necessary):

Stage 1: I-90 Median Work

1. Install Initial Erosion and Sediment Control Measures
2. Remove Median Barrier Wall and Shoulders
3. Excavate for Sign Structure Foundations and Bridge Piers
4. Drive Abutment Piles
5. Construct Sign Structure Foundations and Bridge Piers
6. Construct Median Barrier Wall and Transitions
7. Reconstruct Shoulders
8. Remove Temporary Erosion and Sediment Control Measures and restore affected areas

Stage 2: Remaining Work

1. Install Initial Erosion and Sediment Control Measures
2. Clearing, Removals and Tree and Shrub Removals
3. Drive Abutment Piles
4. Earthwork
5. Stockpile Unsuitable Material and Topsoil on site
6. Construct MSE Walls and Embankment
7. Grading and Shaping of Ditches
8. Install Proposed Culverts, Storm Sewers, and End Sections including placing Stone Riprap for velocity control at outlets
9. Topsoil Excavation and Placing
10. Install Final Seeding/Stabilization on all disturbed areas including Erosion Control Blanket on bare earth slopes
11. Install and maintain Concrete Truck Washout Facilities per Article 280.03
12. Remove Temporary Erosion and Sediment Control Measures and restore affected areas

The aforementioned general description of construction staging will be modified by the Contractor's Progress Schedule that will be part of the SWPPP. The Contractor shall revise the Suggested Progress Schedule which will be maintained and update as necessary and made part of the SWPPP.

Additional details regarding the progress schedule and erosion and sediment control sequencing are shown on Sheets GEN-03 and GEN-04 "Suggested Progress Schedule", Sheets ERC-01 through ERC-04 "Erosion and Sediment Control Plans", and Sheets BSM-01 through BSM-06 "Borrow Site Plans" and shall be made part of the SWPPP. Where deviations from those drawings are required because of field conditions, the Engineer shall document and maintain a record of the changes as part of this SWPPP.

- d. The total area of the construction sites is estimated to be 25 acres (including on-site or off-site stockpiling of soils or storage of materials).

The total project area of the site that it is estimated to be disturbed by excavation, grading, or other earth disturbing activities is 17 acres.

- e. The estimated runoff coefficients of the various areas of the site after construction activities are completed are contained in the project drainage study which is hereby incorporated by reference.

Information describing the soils at the site is contained in the Geotechnical Soils Report for the project, incorporated by reference, and information available through the U.S. Department of Agriculture Natural Resources Conservation Service (NRCS) web-based soil survey at:

<https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx>.

- f. The design/project report, hydraulic report, or plan documents identified below, hereby incorporated by reference, contain site map(s) indicating drainage patterns and approximate slopes anticipated after major grading activities, areas of major soil disturbance, location(s) of proposed soil stockpiles or material storage locations, the location of major structural and nonstructural erosion and sediment controls identified in the plan, the location of areas where stabilization practices are expected to occur, surface waters (including wetlands), and locations where storm water is discharged from the project to a surface water.

Relevant plan documents are as follows:

Removal Plans, Sheets REM-01 to REM-07
Drainage Plans, Sheets DRN-01 to DRN-03
Proposed Grading Plans, Sheets GRD-01 to GRD-02
Borrow Site Plans, Sheets BSM-01 to BSM-06
Erosion and Sediment Control Plans, Sheets ERC-01 to ERC-04

- g. The use of polymer flocculants or other chemicals to treat stormwater runoff on the project are not planned or anticipated.
- h. Drainage systems this project will drain into are owned by the Metropolitan Water Reclamation District.
- i. The names of receiving water(s) and area extent of wetland acreage at the site are in the design/project report or plan documents which are incorporated by reference as a part of this plan. The primary stream which receives runoff from the site is Higgins Creek.
- j. Identify any areas that are to be protected or remain undisturbed. These areas may include steep slopes, highly erodible soils, streams, stream buffers, wetlands, wetland buffers, specimen

trees, natural vegetation, nature preserves, sensitive environmental resources (floodplains, threatened or endangered species, historic/archaeological resources, etc.).

Higgins Creek south of the project site should remain protected and undisturbed

- k. Identify any 303(d) listed receiving waters within the project limits, including name of listed water body, identification of pollutants causing impairment, a description of how SWPPP will prevent discharges to stream from a 25-year, 24-hour event storm event (if the receiving water is impaired for sediment or a parameter that addresses sediment), a description of how the SWPPP will prevent discharge of other pollutants identified as causing impairment, the location of direct discharge from the project site to the receiving water, and a description of any dewatering discharges to the MS4 and/or receiving water.

Higgins Creek is a medium priority 303(d) listed water for Phosphorous (Total) and an unknown cause. Phosphorous impairment is usually associated with farmland/fertilizer runoff. No farmland will be disturbed as part of this project. All site runoff draining to Higgins Creek will be protected by super silt fence and seeding.

2. Controls.

This section of the plan addresses the various controls that will be implemented for each of the major construction activities described in 1.b. above. For each measure discussed, the contractor that will be responsible for its implementation as indicated. Each such contractor has signed the required certification on forms which are attached to, and are part of, this plan.

The Erosion Control Plan Drawings ERC-01 to ERC-04 included in the Contract Documents define the size and location of the measures to be installed during the construction of this project.

a. Erosion and Sediment Controls.

- (i) **Stabilization Practices.** Provided below is a description of interim and permanent stabilization practices, including site specific scheduling of the implementation of the practices. Site plans should ensure that existing vegetation is preserved where practicable and disturbed portions of the site are stabilized. Stabilization practices may include: temporary seeding, temporary stabilization with straw mulch, permanent seeding, mulching, geotextiles, sod stabilization, vegetative buffer strips, protection of trees, preservation of mature vegetation, and other appropriate measures. Stabilization of disturbed areas must, at a minimum, be initiated immediately whenever any clearing, grading, excavation or other earth disturbing activities have permanently ceased on

any portion of the site, or temporarily ceased on any portion of the site and will not resume for a period exceeding 14 calendar days. Stabilization of disturbed areas must be initiated within 1 working day of permanent or temporary cessation of earth disturbing activities, and shall be completed as soon as possible but not later than 14 days from the initiation of stabilization work in an area. Where construction activity will resume on a portion of the site within 14 days from when activities ceased, then stabilization measures do not have to be initiated on that portion of the site by the 1st day after construction activity temporarily ceased.

Where the initiation of stabilization measures by the 7th day after construction activity temporarily or permanently ceases is precluded by snow cover, stabilization measures shall be initiated as soon as practicable.

Description of Stabilization Practices

Seeding and erosion control blanket will be placed on all graded areas within the gas station demolition area and any other disturbed slopes.

- (ii). **Structural Practices.** Provided below is a description of structural practices that will be implemented, to the degree attainable, to divert flows from exposed soils, store flows, or otherwise limit runoff and the discharge of pollutants from exposed areas of the site. Such practices may include silt fences, earth dikes, drainage swales, sediment traps, check dams, subsurface drains, pipe slope drains, ditch checks, level spreaders, storm drain inlet protection, rock outlet protection, reinforced soil retaining systems, gabions, and temporary or permanent sediment basins. The installation of these devices may be subject to Section 404 of the Clean Water Act.

Description of Structural Practices:

Initial Construction

All sheet flows which exits or enters the site will encounter silt fence or super silt fence for sedimentation control.

Stabilized construction entrances will be set up.

Temporary ditch checks will be placed in the ditch line.

Filter fabric inlet protection will be placed in all existing inlet structures within the project area.

During Construction

Silt fence and super silt fence around the project perimeter will be

maintained.

All temporary ditch checks will be maintained.

Rectangular inlet protection will be added to newly placed inlet structures within the I-90 median.

Once the culvert has been constructed, culvert inlet protection will be placed.

All inlet protection devices will be cleaned and maintained.

Once the slopes have been graded around the ends of the Ramp X3 and X4 bridge cones, temporary slopes drains will be placed.

Post Construction

Once grading is completed, erosion control blankets and seeding will be applied to all slopes.

b. Permanent Storm Water Management Controls.

Provided below is a description of measures that will be installed during the construction process to control pollutants in storm water discharges that will occur after construction operations have been completed. The installation of these devices may be subject to Section 404 of the Clean Water Act.

- (i) Such practices may include: storm water detention structures (including wet ponds); storm water retention structures; flow attenuation by use of open vegetated swales and natural depressions; infiltration of runoff on site; and sequential systems (which combine several practices). The Contractor should incorporate green infrastructure storm water management techniques where appropriate and practicable. The practices selected for implementation should be determined on the basis of the technical guidance in the Illinois Tollway Drainage Design Manual. If practices are applied to situations different from those covered in the Illinois Tollway Drainage Design Manual, the technical basis for such decisions will be explained.
- (ii) Per the Illinois Tollway's General Permit ILR40, one or more of the following general strategies for permanent storm water management should be adopted, in order of preference:
 - Preservation of natural features of the site, including natural storage and infiltration
 - Preservation of existing natural streams, channels, and drainage ways

- Minimization of impervious surfaces
 - Conveyance of storm water in open vegetated channels
 - Construction of structures that provide both quantity and quality control
 - Storm water management should maintain natural buffers around surface waters, minimize soil compaction, and unless infeasible, preserve topsoil.
- (iii) Velocity dissipation devices will be placed at discharge locations and along the length of any outfall channel as necessary to provide a non-erosive velocity flow from the structure to a water course so that the natural physical and biological characteristics and functions are maintained and protected (e.g., maintenance of hydrologic conditions, such as the hydroperiod and hydrodynamics present prior to the initiation of construction activities).

Permanent storm water management controls to be installed as part of the project are as follows:

- (iii) Site runoff will flow to stormwater management and water quality basins that were constructed as part of previous contracts.

c. Other Controls.

- (i) Non-Hazardous Waste Disposal shall conform to Article 202.03 of the Standard Specifications. No solid materials, including building materials, shall be discharged into Waters of the State, except as authorized by a Section 404 permit.
- (ii) Non-storm water discharges are prohibited, including concrete, wastewater from concrete washout areas; release of oils, curing compounds, or other construction materials; fuels; other pollutants used in vehicle and equipment operation and maintenance; soaps, solvents; detergents; or any other pollutant that could cause water pollution.
- (iii) Hazardous Waste Disposal shall conform to Article 107.19(a) of the Illinois Tollway Supplemental Specifications.
- (iv) Sanitary Waste Materials. The Contractor shall not create or allow unsanitary conditions. All personnel involved with construction activities must comply with state and local sanitary or septic system regulations. Temporary sanitary facilities will be provided at the site throughout the construction phase. They must be utilized by all construction personnel and serviced by a

commercial operator. The location of sanitary facilities shall be shown on the plan sheets. Portable toilets must be securely anchored and are not allowed within 30 feet of stormwater inlets or within 50' of a Water of the U.S.

- (v) Off-Site Vehicle Tracking. Each site shall have one or more stabilized construction entrance(s) in conformance with Standard Specifications and Standard Design Details. Where the contractor's equipment is operated on any portion of the traveled surface or structures used by traffic on or adjacent to the section under construction, the contractor shall clean (not flushing) the traveled surface of all dirt and debris at the end of each day's operations, or more frequently if directed by the Engineer.
- (vi) Dewatering. Discharges from dewatering operations must be directed through an appropriate pollution prevention/treatment measure, such as a pump discharge filter bag, sediment trap or sediment basin prior to being discharged from the site or into a water body of the State. Under no circumstances are discharges from dewatering operations to be discharged directly into streams, rivers, lakes or other areas beyond the permitted project area. Likewise, discharges into storm sewer systems that do not drain to a suitable on-site treatment facility, such as a basin, are also prohibited. Discharges from dewatering operations must also be conducted in a manner sufficient to prevent erosion from the discharge runoff.
- (vii) Soil Storage Pile Protection. Soil storage piles containing more than 10 cubic yards of material shall not be located within downslope drainage lengths less than 25 feet away from a roadway or drainage channel. Filter barriers, consisting of silt fence or equivalent, shall be installed immediately on the downslope side of the piles.
- (viii) Concrete Dust Particles: Dust particles and other fine materials generated due to the use of rubblized or recycled concrete as roadway base, must be removed from storm water prior to the water discharging to outside of Illinois Tollway right-of-way. This material can be removed via vegetated ditches as long as there is sufficient time and space for removal prior to the discharge of the storm water to outside the right-of-way. For those areas where there is not sufficient space and time for vegetative remediation, other methods for removing said materials will be identified. For construction areas adjacent to creeks and streams, the storm water's pH must also be moderated prior to discharge.
- (ix) Stabilization of Trapped Sediment. Sediment trapped from the use of temporary erosion and sediment control measures shall be permanently stabilized to prevent further erosion and sedimentation.

- (x) Concrete Dust BMPs: Special BMPs designed to remove concrete or limestone dust particles from storm water runoff in contact with recycled or rubblized concrete underpavement must be removed once the storm water discharging from the site is determined to be clean. This is often several months following completion of the project. The Contractor may have to return to the project area following project completion to remove these BMPs and restore the work site.
- (xi) Fugitive Dust Control: The Contractor shall control fugitive dust emissions due to construction activities as necessary and directed by the Engineer. Repetitive treatment shall be applied as directed to accomplish control based on site and weather conditions. A water truck will be present on site (or available) for sprinkling/irrigation to limit the amount of dust leaving the site. Watering will be applied daily (or more frequently) to be effective. Caution will be used not to overwater, as that may cause erosion. If field observations indicate that additional protection is necessary, alternative dust suppressant controls will be implemented at the discretion and approval of the Engineer.
- (xii) Vehicle/Equipment Storage, Cleaning and Maintenance. Construction vehicles will be inspected frequently to identify any leaks; leaks will be repaired immediately or the vehicle will be removed from site. If minor vehicle/equipment maintenance must occur on site, repairs and maintenance will be made within an approved staging or storage area or other approved location to prevent the migration of mechanical fluids to watercourses, wetlands or storm drains. Spill response equipment shall be readily available when performing any vehicle or equipment maintenance. When not in use, vehicles and equipment utilized for construction operations will be staged outside of the regulatory floodplain and away from any natural or created watercourses, ponds, drainage-ways or storm drains.

Cleaning of vehicles and equipment is discouraged and will be performed only when necessary to perform repairs or maintenance. Cleaning of vehicles and equipment with soap, solvents or steam shall not occur on the project. Vehicle and equipment wash water shall be contained for percolation or evaporative drying away from storm drain inlets or watercourses.}

d. Approved State or Local Plans.

The management practices, controls, and other provisions contained in this plan will be in accordance with the Illinois Tollway Supplemental Specifications and Standard Drawings, which are at least as protective as the requirements contained in the Illinois Urban Manual standards and specifications. Procedures and requirements specified in applicable sediment and erosion control site plans or storm water management plans approved by local officials shall be described or incorporated by

reference in the space provided below. Requirements specified in sediment and erosion control site plans, site permits, storm water management site plans, or site permits approved by local officials that are applicable to protecting surface water resources are, upon submittal of a NOI, to be authorized to discharge under this permit, incorporated by reference, and are enforceable under this permit even if they are not specifically included in the plan.

All applicable sediment and erosion control and storm water management plans should align with the rules and regulations stated in the Cook County Watershed Management ordinance (as administered by MWRDGC).

3. Maintenance.

The following is a description of procedures that will be used to maintain, in good and effective operating conditions, vegetation, erosion and sediment control measures and other protective measures identified in this plan:

- Erosion and Sediment Control Manager (ESCM): The Contractor shall assign an ESCM to the project. This person is required to have taken an approved sediment and erosion control training course. The ESCM will be responsible for supervising the maintenance of Erosion & Sediment Control measures and implementation of this plan.
- Inlet Protection: Remove sediment from inlet filter baskets when basket is 25% full or 50% of the fabric pores are covered with silt. Clean filter if standing water is present longer than one hour after a rain event. Clean sediment or replace silt fence when sediment accumulates to one-third the height of the fabric. Remove trash accumulated around or on top of inlet protection device. When filter is removed for cleaning, replace fabric if any tear is present.
- Outlet Protection/Temporary Riprap: Restore dislodged protection and correct erosion that may occur. Remedy deficient areas prone to increased erosion immediately to prevent greater deficiencies.
- Temporary Ditch Checks: Remove sediment from upstream side of ditch checks when sediment has reached 50% of height of structure. Repair or replace ditch checks whenever tears, splits, unraveling or compressed excelsior is apparent. Replace torn fabric mat that may allow water to undermine ditch check. Remove debris (garbage, crop residue, etc.) when observed. Reestablish the flow over the center of the ditch check. Water or sediment going around the ditch check indicates incorrect installation. Device needs lengthening or the selected device is inappropriate for site conditions. Remove ditch checks once all upslope areas are stabilized and seed or otherwise stabilize temporary ditch check areas.

- Temporary Erosion Control Seeding: Reapply seed if stabilization hasn't been achieved. Apply temporary mulch to hold seed in place if seed has been washed away or found to be concentrated in ditch bottoms. Restore rills as quickly as possible on slopes steeper than 1V:4H to prevent sheet-flow from becoming concentrated flow patterns. Mow, if necessary, to promote seed soil contact when excessive weed development occurs (a common indication of ineffective temporary seeding). Supplement seed if weather conditions (extreme heat or cold) are not conducive to germination.
- Silt Fence: Repair tears, gaps or undermining. Restore leaning silt fence and ensure taut. Repair or replace any missing or broken stakes immediately. Clean fence line if sediment reaches one-third height of barrier. Remove fence once final stabilization is established. Repair fence if undermining occurs anywhere along its entire length.
- Temporary Stabilized Construction Entrances: Replenish stone or replace exit if vehicles continue to track sediment onto the roadway from the construction site. Sweep sediment on roadway from construction activities immediately. Ensure culverts are free from damage.
- Stockpile Management: Repair and/or replace perimeter controls and stabilization measures when stockpile material has potential to be discharged or leave the limits of the protection. Remove all off-tracked material by sweeping or other methods. Update the SWPPP any time a stockpile location has been removed, relocated, added or required maintenance. During summer months, stockpiles should be watered to maintain the cover crop.
- Erosion Control Blanket: Repair damage due to water running beneath the blanket and restore blanket when displacement occurs. Reseeding may be necessary. Replace all displaced blanket and restaple.
- Temporary Slope Drains: Fill eroded area at inlet with well-compacted soil. Stabilize outfall to eliminate scour. Repair leaks along length of pipe and re-compact soil to stabilize pipe. Reconnect pipe at joints when separation occurs. Restore or increase anchors along length of pipe to ensure pipe stability. If slope drain washes out it may be necessary to use aggregate-lined channels or additional drains.
- Temporary Concrete Washout: Do not discharge wastewater into the environment (Note: acidity, not particulates, is environmentally detrimental). Facilitate evaporation of low volume washout water. Clean and remove any discharges within 24 hours of discovery. If effluent cannot be removed prior to anticipated rainfall event, place and secure a non-collapsing, non-water collecting cover over the washout facility to prevent accumulation and precipitation overflow. Replace damaged liner immediately. Remove washout when no longer needed and restore disturbed areas to original condition. Properly dispose of solidified concrete waste.

- **Material Delivery & Storage:** Document the various types of materials delivered and their storage locations in the SWPPP. Update the SWPPP any time significant changes occur to material storage or handling locations and when they have been removed. Cleanup spills immediately. Remove empty containers.
- **Solid Waste Management:** Designate a waste collection area(s) and identify them in the SWPPP. Inspect inlets, outfalls and drainageways for litter, debris, containers, etc. Observe the construction site for improper waste disposal. Update the SWPPP any time the trash management plan significantly changes. Correct items discarded outside of designated areas
- **Vehicle and Equipment Fueling, Cleaning and Maintenance:** Cleanup spills immediately. Contractor must provide documentation that spills were cleaned, materials disposed of, and impacts mitigated. Update the SWPPP when designated location has been removed, relocated, added or requires maintenance. In the event of a spill into a storm drain, waterway or onto a paved surface, the owner of the fuel must immediately take action to contain the spill. Once contained, clean up the spill. As an initial step this may involve collecting any bulk material and placing it in a secure container for later disposal. Follow-up cleaning will also be required to remove residues from paved or other hard surfaces.

4. Inspections.

The Engineer will be responsible for conducting inspections. The Contractor shall be notified when inspections are to take place and shall have a representative present during the inspection. A maintenance inspection report will be completed after each inspection. A copy of the report form is to be completed by the inspector and to be maintained on site.

Qualified personnel shall inspect disturbed areas of the construction site which have not been finally stabilized, structural control measures, and locations where vehicles enter or exit the site. Such inspection shall be conducted at least once every seven (7) calendar days and within 24 hours of the end of a storm that is 0.5 inches or greater or the equivalent snowfall. Inspections may be reduced to once per month when construction activities have ceased due to frozen conditions. Weekly inspections shall recommence when construction activities are resumed.

- a. Disturbed areas and areas used for storage of materials that are exposed to precipitation shall be inspected for evidence of, or the potential for, pollutants entering the drainage system. Erosion and sediment control measures identified in the plan shall be observed to ensure that they are operating correctly. If repair is necessary, it will be initiated within 24 hours of the completion of the inspection report. Where discharge locations or points are accessible, they shall be inspected to ascertain whether erosion control measures are effective

in preventing significant impacts to receiving waters. Locations where vehicles enter or exit the site shall be inspected for evidence of off-site sediment tracking.

- b. If the inspections determine concrete fines are discharging as a result of roadway reconstruction, the Contractor must ensure that the discharge does not exit the right-of-way. The Engineer will immediately test the pH levels of the affected discharge runoff to determine the average pH levels. Where pH levels exceed 9.0, the Engineer will recommend remediation strategy to reduce the alkalinity to acceptable levels before allowing to exit the right-of-way or discharge to environmentally sensitive locations.
- c. Based on the results of the inspection, the description of potential pollutant sources identified in section 1 above, and pollution prevention measures identified in section 2 above, the Storm Water Pollution Prevention Plan shall be revised as appropriate as soon as practicable after such inspection. Any changes to this plan resulting from the required inspections shall be implemented within seven (7) calendar days following the inspection.
- d. A report summarizing the scope of the inspection, name(s), qualifications of personnel making the inspection, the date(s) of the inspection, major observations relating to the implementation of this Storm Water Pollution Prevention Plan, and actions taken in accordance with section 4.b. shall be made and retained as part of the plan for at least three (3) years after the date of the inspection. The report shall be signed in accordance with Part VI.G of the general permit.
- e. For any violation of the SWPPP observed during any inspection conducted, including those not required by the plan, and any illicit discharge (defined as any discharge that is not composed entirely of storm water) exiting the right-of-way or to receiving waters, the Engineer will immediately report the incident to the Illinois Tollway Environmental Unit and shall be submitted electronically on the Incidence of Non-Compliance (ION) forms provided by IEPA within 12 hours.

Reports of ION violations of the SWPPP and illicit discharges should be reported to the Illinois Tollway Environmental Unit at environment@getipass.com For additional inquiry, contact (630) 241-6800 ext. 4222. The Illinois Tollway Environmental Unit will coordinate any potential violations directly with the IEPA. In addition, the Engineer will provide a written submission to the Illinois Tollway Environmental Unit and the project files within five days summarizing the incident/s and actions taken.

5. Non-Storm Water Discharges.

The following non-stormwater discharges may combine with stormwater discharges that are treated by the measures included in this plan and are anticipated on the project:

- Waters used to wash vehicles or control dust where detergents are not used.
- Pavement wash waters where spills or leaks of toxic or hazardous materials have not occurred (unless spilled materials have been removed) and where detergents are not used.
- Irrigation drainages.
- Uncontaminated groundwater.
- Foundation or footing drains where flows are not contaminated with process materials, such as solvents.
- Potable water sources including uncontaminated waterline or fire hydrant flushings.
- Water used to control dust.
- Discharges from dewatering of trenches and excavations if managed by appropriate controls.

Foundation or footing drains where flows are not contaminated with process materials, such as solvents.

6. Contractor Operations.

The Contractor shall provide the following information should they elect to modify the work plan as described in above sections 1.b. and 1.c. or will utilize polymer flocculants or other chemical treatments at the site.

- a. A revised description of the intended sequence of major activities which will disturb soils for major portions of the construction site, such as clearing, excavation, grading and on-site or off-site stockpiling of soils or storage of materials.

Note: The Contractor must submit a complete A-50 form if a preferred stockpile location is within Illinois Tollway ROW and falls outside of disturbed areas within the contract for Illinois Tollway review and approval. Approval of Contractor chosen stockpile locations within Illinois Tollway ROW should not be assumed.

- b. A revised total area of the construction including on-site or off-site stockpiling of soils or storage of materials.

- c. A work plan shall be submitted for approval to the Engineer covering the use of all polymer flocculants or treatment chemicals at the site, if applicable. Dosage of treatment chemicals shall be identified, MSDS sheets shall be provided, procedures for storage and use of the treatment chemical must be described, and staff responsible for use/application must be identified. The system must be designed by a Certified Professional in Erosion and Sediment Control (CPESC).

7. Inventory for Pollution Prevention Plan.

The materials or substances listed below are expected to be present on site during construction (use additional pages, as necessary). **To be filled in by Contractor.**

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8. Spill Prevention - Material Management Practices.

The following are the material management practices that will be used to reduce the risk of spills or other accidental exposure of materials and substances to storm water runoff.

Good Housekeeping:

The following good housekeeping practices will be followed on site during the construction project:

- An effort will be made to store on-site only enough product required to do the job.
- All materials stored on site will be stored in a neat, orderly manner in their appropriate containers and, if possible, under a roof or other enclosure.
- Products will be kept in their original containers with original manufacturer's label.
- Substances will not be mixed with another unless recommended by the manufacturer.

- The site superintendent will inspect daily to ensure proper use and disposal of materials on-site.
- Whenever possible, all of a product will be used up before disposing of the container.
- Manufacturer's recommendations for proper use and disposal will be followed.

Hazardous Products:

These practices will be used to reduce the risks of spills and releases associated with hazardous materials.

- Products will be kept in original containers unless they are not re-sealable.
- Original labels and material safety data sheets will be retained.
- If surplus product must be disposed of, manufacturer's or local and state recommended methods for proper disposal will be followed.
- Manufacturer's recommendations for proper use and disposal will be followed.

Spill Control Practices:

In addition to the good housekeeping and material management practices discussed above, the following practices will be followed for spill prevention and cleanup:

- Manufacturer's recommended methods for spill cleanup will be clearly posted and site personnel will be made aware of the procedures and location of the information and cleanup supplies.
- Materials and equipment necessary for spill cleanup will be kept in the material storage area on-site. Equipment and materials will include, but not be limited to, brooms, dust pans, mops, rags, gloves, goggles, kitty litter, sand, sawdust and plastic and metal trash containers specifically for this purpose.
- All spills will be cleaned up immediately after discovery.
- The spill area will be kept well ventilated and personnel will wear appropriate protective clothing to prevent injury from contact with hazardous substance.
- Spills of toxic or hazardous material will be reported to the appropriate state or local government agency, regardless of size.

- The spill prevention plan will be adjusted to include measures to prevent this type of spill from recurring and how to clean up the spill if there is one. A description of the spill, what caused it and the cleanup measures will also be included.
- The Contractor shall be responsible for day-to-day operations and will designate a Spill Prevention and Cleanup Coordinator (Coordinator). The Coordinator will designate at least two (2) other site personnel who will receive spill prevention and cleanup training. These individuals will each become responsible for a particular phase of prevention and cleanup. The names of responsible spill personnel, listed below, will be posted in the material storage area and in the office trailer on-site.

Spill Prevention and Cleanup Coordinator:

Printed Name

Contractor

Additional Trained Spill Prevention and Response Personnel:

Printed Name

Contractor

Printed Name

Contractor

9. Contractor Required Submittals.

The Contractor and each subcontractor shall provide, as an attachment to their signed Contractor Certification Statement, a narrative description of how they will complete with the requirements of the ILR10 permit in regard to the following items:

- Vehicle Entrance and Exits – Identify the location of stabilized construction entrances and exists to be used and provide a description of how they will be maintained.
- Material Delivery, Storage and Use – Discuss where and how materials including chemicals, concrete curing compounds, petroleum products, etc. will be stored to prevent spills.

- Waste Management and Disposal – Discuss the procedures to be used to contain and the method of disposal for construction waste and litter.
- Sanitary Waste: Discuss how sanitary wastes will be contained and disposed along with the locations of portable restroom facilities. A schedule of maintenance shall be provided.
- Spill Response and Control – Describe the steps that will be taken to respond to, control, and report chemical or petroleum spills which may occur. Procedures to address spills in excess of RCRA reportable quantities must be provided.
- Concrete Residuals and Washout Wastes – Discuss the location and type of concrete washout facilities to be used on this project and how they will be identified and maintained.
- Vehicle and Equipment Cleaning and Maintenance – Identify where vehicle and equipment cleaning and maintenance will be performed and what BMPs will be used for spill containment and spill prevention, and containment and treatment of wash waters.
- Dewatering – Identify the controls which will be used for any dewatering operations to ensure sediments will not leave the construction site.
- Polymer Flocculants and Treatment Chemicals – Identify the use and dosage of treatment chemicals, Safety Data Sheets, procedures on how the polymers/chemicals will be used and identify the individual(s) who will be responsible for their use and application. Provide documentation of training for the individuals who will be applying the polymers/treatment chemicals.

In addition to the above, Contractor is required to provide the following submittals which are incorporated by reference into the SWPPP:

- Dust Control Plan pursuant to Article 107.36 of the Supplemental Specifications. The plan shall be submitted and approved prior to commencement of earth disturbing work activities.

ILLINOIS TOLLWAY CERTIFICATION STATEMENT

This certification statement is a part of the Storm Water Pollution Prevention Plan for the project described below, in accordance with NPDES Permit No. ILR10, issued by the Illinois Environmental Protection Agency.

Project Information:

Route Elgin O'Hare Western Access Tollway Marked I-490
Section Mile Post 6.25 Project No. I-18-4694
County DuPage and Cook

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Prepared By: Exp U.S. Services, Inc.
DESIGN SECTION ENGINEER

By: Thomas M. Hough, P.E./Project Manager
Name/Title

Dated: _____

OWNER: ILLINOIS STATE TOLL HIGHWAY AUTHORITY

Signed: _____
Name/Title

CONTRACTOR CERTIFICATION STATEMENT

This certification statement is a part of the Storm Water Pollution Prevention Plan for the project described below, in accordance with NPDES Permit No. ILR10, issued by the Illinois Environmental Protection Agency.

Project Information:

Route _____ Elgin O'Hare Western Access Tollway _____ Marked _____ I-490 _____
Section _____ Mile Post 6.25 _____ Project No _____ I-18-4694 _____
County _____ Cook _____

I certify under penalty of law that I understand the terms of the general National Pollutant Discharge Elimination System (NPDES) permit No. ILR10 that authorizes the storm water discharges associated with industrial activity from the construction site identified as part of this certification: That I agree to comply therewith; and that I will ensure that all Subcontractors working on the subject project understand and comply with said permit.

Signature _____ Date _____

Title _____

Name of Firm _____

Street Address _____

City _____ State _____ Zip Code _____

Telephone Number _____

ATTACHMENT _____

Note: CONTRACTOR TO COMPLETE

Prepare additional signature pages as needed if the responsibilities of the storm water pollution prevention plan are split between contractors. - specify which item(s) these sub-contractors assume responsibility for.

S.P. 112 QUALIFIED PRODUCTS

S.P. 112.1 Multi-Polymer Pavement markings

1. Epoplex's LS-65 Multi-Polymer marking Product.
2. PolyCarb's mark 55.4 multi-Polymer marking Product.

S.P. 113 RESERVED

NOT USED

S.P. 114 DELIVERY OF SALVAGEABLE MATERIAL TO THE ILLINOIS TOLLWAY

The Plans and Special Provisions require the Contractor to deliver various items, which have been removed and deemed salvageable, "to the Illinois Tollway's Maintenance facility stipulated in the Special Provisions." The following is a list of those references and the assigned location the material is to be delivered for this Contract, as applicable.

| <u>Item</u> | <u>Location</u> |
|---|--|
| Single mode fiber optic cable | Illinois Tollway Fiber Maintenance Manager (Coordinate delivery location with Engineer) |
| Sign sheets | Illinois Tollway Central Sign Shop (I-88 at Naperville Road) |
| Removed structural steel breakaway posts | M-11 Maintenance Yard (I-88 at Il. Rte. 47 (M.P. 109.3)) |
| Luminaires, ballasts, aluminum pole fitters, aluminum mast arms, and aluminum poles | M-6 Maintenance Yard (I-90 at U.S. Route 20 (M.P. 36.8)) |

**S.P. 115 ILLINOIS TOLLWAY OPERATIONAL FACILITIES
(PROCEDURES, PROTECTION, AND LIQUIDATED DAMAGES)**

Illinois Tollway operational facilities include but are not limited to roadways, bridges, overhead sign structures, cantilever sign structures, overhead pedestrian walkways, plaza canopies, buildings, Electronic Toll Collection (ETC) monotubes and frame structures, fiber optic cable, multi-mode cable, Digital Message Signs (DMS), cameras, Vehicle Detection Sensors, telecommunication cable, electrical (overhead and underground), water and sewer. Illinois Tollway Operational Facilities are installed along and across the rights-of-way of the Illinois Tollway system.

S.P. 115.1 Facilities Locate Process

The Contractor or Sub-Contractor performing the work shall have all known Illinois Tollway facilities located at all times in the general area of the facility. The location of the Illinois Tollway's fiber optic cable, as well as other Illinois Tollway facilities, is not available through the J.U.L.I.E. system. The contractor shall coordinate with the Illinois Tollway to determine the location of these facilities.

The Contractor shall initiate the locate process for the Illinois Tollway facilities by completing an online Locate Request Form A-36. To submit a Illinois Tollway Locate, log onto www.illinoisvirtualtollway.com/utilitylocates. The completed A-36 form, valid for 28 days, shall be transmitted, at least two (2) business days prior to starting any underground operations, excavations or digging of any type in the general area of the Illinois Tollway facility. If outside factors (weather, construction activity or vandalism) at the dig site have caused the markings to become disturbed and/or indistinguishable, a request for remarks/refresh is required. The request shall be electronically transmitted, at least two (2) business days prior to starting any underground operation. After remarking, the locate request is valid for another 28 days. A copy of all completed A-36 forms sent to the Illinois Tollway shall be provided to the contract Engineer.

For assistance in completing a locate request, please refer to:

- Click for Contractor Manual or Click for Video Tutorial for instructions
 - o First time users **MUST** click this button: Click to Create Account
 - follow instructions and complete
- Click Submit Request:
 - o Fill-in all required fields*
 - o All sketches **MUST** be in .pdf and all lower case
 - o **MUST** have the full eight digit project number or the complete permit number

Any questions or problems please direct to:

Illinois Tollway Utility / Permit Section
Michael Scaramella - Utility Intergovernmental Agreement
Phone: 630.241.6800 Extension: 4129 Fax: 630.271.7568
Email: mscaramella@getipass.com

S.P. 115.2 Contractors Responsibilities

The Contractor shall take reasonable action to determine the location of any underground utility facilities in and near the area for which such excavation operation is to be conducted; and shall plan the excavation or demolition to avoid or minimize interference with underground utility facilities within the tolerance zone by utilizing such precautions that include, but are not limited to, hand excavation, vacuum excavation methods, and visually inspecting the excavation while in progress until clear of the existing marked facility; This work is covered under the Special Provision, EXPLORATION TRENCH – UTILITIES.

During and following excavation and/or demolition, the Contractor shall protect existing underground utility facilities in and near the excavation or demolition area as required to avoid damage to the facility.

The Contractor shall backfill all excavations in such manner and with such materials as may be reasonably necessary for the protection of existing underground utility facilities in and near the excavation or demolition area.

In addition to establishing the approximate location of the facility, the Contractor shall be required to fully expose the facility to verify its horizontal and vertical location, if underground operations are contemplated within the Tolerance Zone, which is defined to mean the approximate location of underground utility facilities defined as a strip of land at least 3 feet wide, but not wider than the width of the underground facility plus 2.0 feet on either side of the outside edge of such facility based upon the markings made by the Illinois Tollway or operator of the facility. Excavation within the tolerance zone requires extra care and precaution.

S.P. 115.3 Illinois Tollway's Fiber Optic System

The Illinois Tollway's fiber optic system is a Utility Facility providing service to the Illinois Tollway and other telecommunication companies. The Contractor is responsible for coordinating and scheduling its work with all necessary work on the fiber optic system, so as not to interfere with any fiber optic system adjustment or relocation work to be done by or on behalf of the Illinois Tollway. The Contractor is responsible for coordinating and scheduling its work in a manner that such work to be done by or on behalf of the Illinois Tollway will not cause interference with the Contractor's completion of The Work by the Completion Date. All aspects of the Contractor's responsibilities as they relate to the Illinois Tollway facilities are specified in Article 105.07 of the Illinois Tollway Supplemental Specifications.

The Contractor shall immediately notify the Illinois Tollway Project Manager, Illinois Tollway Fiber Optic Manager and Utility Administrator in the event the fiber optic cable is damaged or in danger of being damaged. The Contractor shall be responsible for all costs incurred in connection with the repair, restoration, and testing of the system to insure it is operational and in the same condition as prior to the Contractor-caused damage.

In addition, for the interruption in service and the administrative burden, The Contractor shall pay to the Illinois Tollway the amount of \$10,000.00 for each occurrence of Contractor-caused damage to the fiber optic cable. The Illinois Tollway reserves the right to identify each strand of fiber individually as Contractor-caused damage.

S.P. 115.4 Illinois Tollway's Miscellaneous Utility Facilities

Should damage occur to any other Illinois Tollway utility within the contract limits, the Contractor shall immediately notify the Illinois Tollway Project Manager. The Contractor shall repair and be responsible for all costs incurred in connection with the repair, restoration, and testing to insure it is operational and in the same condition as prior to the Contractor-caused damage in accordance with Article

107.30 of the Illinois Tollway Supplemental Specifications.

In addition, for the interruption in service and the administrative burden, The Contractor shall pay to the Illinois Tollway the amount of \$1,000.00 for each occurrence of Contractor-caused damage to any other Illinois Tollway facility not including the fiber optic cable.

S.P. 115.5 Illinois Tollway’s Operational Facilities

The Contractor is responsible for coordinating and scheduling its work so as not to interfere with the operation or function of Illinois Tollway Facilities.

The Contractor shall immediately notify the Illinois Tollway Project Manager, Illinois Tollway Fiber Optic Manager and Utility Administrator in the event of any damages to these Operational Facilities within the Illinois Tollway Right-of-Way.

The Contractor shall be responsible for all costs incurred in connection with the repair, restoration, replacement and testing of the system to insure it is operational and in the same condition as prior to the Contractor-caused damage. The Contractor shall also be charged liquidated damages.

Actual damages are difficult or impossible to define with certainty prior to an actual event, therefore, liquidated damages shall be assessed for each direction of traffic impacted based on the below schedule:

(6 AM to 10 PM)

| | | |
|-----------------------------|------------------|-------------|
| Jane Addams Memorial (I-90) | West of MP 53.75 | \$4,000/hr |
| Jane Addams Memorial (I-90) | East of MP 53.75 | \$9,000/hr |
| Reagan Memorial (I-88) | West of MP 117.8 | \$4,000/hr |
| Reagan Memorial (I-88) | East of MP 117.8 | \$9,000/hr |
| Tri-State (I-94/I-294) | | \$10,000/hr |
| Veterans Memorial (I-355) | | \$5,000/hr |
| Elgin O’Hare (IL-390) | | \$2,000/hr |

(10 PM to 6 AM)

| | |
|--------------|------------|
| All roadways | \$2,000/hr |
|--------------|------------|

For extraordinary events, in addition to the liquidated damages the Contractor may be responsible for itemized costs associated with Emergency Responders and the Illinois Tollway’s loss of collected revenue for the duration of the affected period as calculated by recent revenues, which are indicative of the period in which the event occurred.

S.P. 116 APPROVING A PART or PORTION OF THE WORK FOR BENEFICIAL USE

When a part or portion of the Work is completed, the Illinois Tollway may approve that part or portion of The Work for beneficial use. This provision will be applicable only to that part or portion of the Work for which the Chief Engineer

has furnished to the Contractor written approval for such use. Responsibility shall remain with the Contractor for any damages within or to that approved part or portion of the Work which may be caused by defective work, or by Contractor's failure to comply with the Contract.

This approval may include a part or portions of buildings or structures and equipment. This approval shall not apply to facilities the Contractor is required to maintain throughout the duration of the Contract, and for which the Contractor is compensated under a separate pay item, such as roadway lighting (including poles), and sediment or erosion control measures. This approval shall not apply to opening a part or portion of the Work to traffic.

Prior to the time the Illinois Tollway approves a part or portion of the Work for beneficial use: a Partial Final inspection will be conducted and a Partial Final Inspection Correction List will be created identifying remaining items of uncompleted work and the identified items of work shall be addressed to the satisfaction of the Illinois Tollway; all Systems and Equipment will have been tested and, in the case of HVAC or similar work balanced; and all Operations and Maintenance Manuals for systems within or affecting the portion of the Work to be approved for beneficial use will have been submitted by the Contractor to and approved by the Illinois Tollway; all required training will have been conducted and signed off by the Illinois Tollway; and all applicable Warranty information will have been submitted to and approved by the Illinois Tollway.

The Contractor shall remain responsible throughout the duration of the Project for maintaining all egress paths, life safety equipment and systems necessary to ensure the safety of the buildings occupants.

The Contractor's warranty period for HVAC or similar equipment will begin at the time of approval for partial use. All other warranty periods will begin upon final acceptance of the Work. The Contractor will be responsible for testing and balancing all systems prior to final acceptance of the Work, inclusive of all equipment approved for partial use.

Upon issuance of a Statement of Partial Final Completion, the Contractor shall only be responsible for damages to the part or portion of the Work approved for beneficial use that is caused by the negligence or intentional misconduct of the Contractor, its subcontractors or their agents or employees. However, the Contractor shall be responsible to repair and/or replace damage items where the Contractor is required to furnish Builder's Risk Insurance to cover damages caused by negligence of the contractor, its subcontractors or their agents, as specified elsewhere in the Contract Documents.

When damage occurs to such approved parts or portions of the Work by parties other than the Contractor, its subcontractors or their agents and employees:

1. The Illinois Tollway may correct and/or replace the damaged items with its own personnel; or
2. The Illinois Tollway may direct the Contractor to correct and/or replace the damaged items. This work will be paid for as provided in Article 109.04 of the Illinois Tollway Supplemental Specifications.

Any approval granted under this subsection shall neither constitute final acceptance of any of the Work nor be construed to be substantial completion thereof, and the work covered by any approval shall continue to be subject to final inspection and acceptance in accordance with the terms of the Contract. Repairs to work subject to the approval required due to defective materials or workmanship or caused in whole or in part by the Contractor's operations or negligence, shall be performed at no additional cost to the Illinois Tollway.

S.P. 117 RESERVED

S.P. 118 RIGHT-OF-WAY

Proposed right-of-way and easements for the performance of the Work may not be available when Notice to Proceed is issued. The Contractor shall verify the status of right-of-way parcels to be acquired prior to the preparation of the Baseline Schedule. The Baseline Schedule should reflect construction sequencing necessary to work only within acquired right-of-way parcels, and the Contractor shall take all appropriate measures to ensure that construction operations do not encroach on parcels not acquired. The Contractor shall be required to adjust the work schedule as needed to coincide with parcel acquisition from time to time to work only within available right-of-way, and shall prepare revised Baseline Schedule(s) in compliance therewith as directed by the Engineer.

The final configuration of the Project Right-of-Way requires the acquisitions of several land parcels. This listing identifies these individual parcels and provides the acquisition status. The Contractor's bid proposal shall have been submitted with the understanding that access to the proposed right-of-way and easements will be provided no earlier than the date indicated in the "Projected Acquisition Date" column in the table below.

| Parcel ID # | Projected Acquisition Date | Actual Acquisition Date |
|--------------------|-----------------------------------|--------------------------------|
| None Required | | |

However, the Illinois Tollway reserves the right not to issue the Notice to Proceed until sufficient right-of-way, as deemed by the Engineer, is available for commencement of the Work. In any event, there shall be no damages or additional compensation due to the Contractor for delays due to delay in furnishing the right-of-way, and the Contractor's sole remedy, where applicable, shall be an extension of time.

S.P. 119 AVAILABLE GEOTECHNICAL INFORMATION

The following is a listing of the geotechnical reports prepared by Geo Services, Inc. that are available for review at the office of the Illinois Tollway.

- Structure Geotechnical Report
Ramp X3 & X4 Bridge Structures
I-490/I-90 System Interchange

S.P. 120 AVAILABLE REPORTS AND DOCUMENTS

The following is a listing of reports and other documents that are available for review at the office of the Illinois Tollway:

- Phase II Environmental Assessment
I-490/I-90 System Interchange (N08)
Elgin O'Hare Western Access
Prepared by WITGSG
- Utility Permit 59-29
Standard Oil Company
- Record Plans – Selected drawings from the following:
 - Contract MIP-93-588, Oasis Redevelopment Program, Circa 2005
 - Contract I-13-4620, Oasis Bridge Demolition, Circa 2015
 - 7-11 Renovation - Eastbound, Circa 2015
 - 7-11 Renovation - Westbound, 2015
 - I-14-4210, Outside Roadway and Bridge Reconstruction - Oakton Street to Wolf Road, Circa 2017
 - I-14-4211, Outside Mainline Roadway, Bridge Reconstruction, and Wall Construction - Wolf Road to Mannheim Road, Circa 2017
- Existing Des Plaines Oasis Site Photos

S.P. 121 ELECTRONIC DATA FILES AVAILABLE

NOT USED

WARRANTY (Illinois Tollway)

Effective: January 11, 2010

Revised: May 29, 2018

GENERAL

This special provision amends and supersedes any previous warranty provisions, and is in addition to the warranty requirements of Article 105.18 of the Illinois Tollway Supplemental Specifications.

The Contractor warrants that all work completed under the contract pay items, including all materials and workmanship furnished by the Contractor and subcontractors shall comply with the contract, and that the work shall be free from defects or failures for the period specified after commencement of the warranty period. The Contractor does not warrant the work against failures due to design defects, due to the Illinois Tollway's routine maintenance operations or due to the occurrence of acts of nature that the finished work was not designed to withstand.

The Contractor guarantees that after receipt of notice from the Illinois Tollway as provided herein, he/she shall perform the warranty work as specified in the notice in accordance with the warranty work actions specified herein including all necessary incidental work to complete the action and restore the complete facility, and damage to adjoining structures caused by failure of the warranted work, including but not limited to removal, engineering, material procurement, reinstallation, or replacement at the Contractor's cost and expense. The Illinois Tollway's remedies under this warranty are not exclusive but are in addition to any other remedies provided by this contract or law. The additional obligations undertaken by the Contractor to provide this warranty for the work and to perform in accordance herewith shall be secured by a performance and payment bond provided by the Contractor in a form furnished by the Illinois Tollway, and said bond to remain in full force and effect for the duration of the warranty period.

For the purpose of this special provision, the following definitions shall apply:

Warranty: An assurance by the seller and/or manufacturer of a product that the goods or property will continue to perform as promised or represented and which provides for a specific remedy, such as repair or replacement, in the event the goods or property fails within a specific timeframe.

Guaranty: An assurance by the contractor that the specific Work will meet expected workmanship standards as stated in the contract or in accordance with industry standards and provides for a specific remedy, such as repair or replacement of the Work, if it fails within a specific timeframe.

| Std. Sp/S.P. | DESCRIPTION | CONTRACTOR | MANUFACTURER |
|---|--|----------------|-----------------|
| | ROADWAY and BRIDGES | | |
| | | | |
| 109.08(b) Illinois Tollway Suppl. | GUARANTY AGAINST DEFECTIVE WORK | 1 year | |
| | | | |
| S.P. | MECHANICALLY STABILIZED EARTH RETAINING WALLS | 3 years | 5 years |
| | | | |
| 1067.09(j) Illinois Tollway Suppl. | LIGHT EMITTING DIODE (LED) LUMINAIRE | | |
| | complete luminaire (consisting of the housing, optical assembly, LED arrays or assemblies, LED drivers, integral control devices, surge protection devices, and internal wiring/terminal blocks) | 1 year | 10 years |
| | | | |
| | INTELLIGENT TRANSPORTATION SYSTEMS | | |
| | | | |
| S.P. | SOLAR POWERED GENERATOR ASSEMBLY | 1 year | 1 year |
| S.P. | FIBER OPTIC COMMUNICATIONS, ITS ASSEMBLY | 1 year | 1 year |

COMMENCEMENT OF WARRANTY PERIOD

The Warranty Period Start Date shall be the Contract Completion date stated in the Chief Engineer's letter to the Contractor confirming that the Contractor has completed all work.

Commencement of warranty does not relieve the Contractor of any remaining or contractual obligations. Approval of the Warranty Period Start Date shall not be construed as final acceptance of the work of the contract not subject to approval.

The Contractor shall submit Tollway form A-27 documenting the warranty items and terms.

WARRANTY REQUIREMENTS

The Illinois Tollway will notify the Contractor of the need for corrective action. The Contractor shall perform corrective action promptly as defined in the notification. The notification will provide for a requested start date for performance of corrective action covered by the notice, and for a number of working days estimated to complete the corrective action. The Illinois Tollway and Contractor may agree upon a start date and reasonable period of performance to define prompt completion.

CONTROL OF THE WORK

DESCRIPTION

Article 105.16 Job – Site Safety

Revise the third paragraph of the Illinois Tollway Supplemental Specifications to read:

“All personnel protective equipment, excluding flaggers, shall be in accordance to Article 701.12 of the Standard Specifications. Personal protective equipment for flaggers shall be in accordance to Article 701.13 of the Standard Specifications.”

CONTROL OF MATERIALS

DESCRIPTION

Replace Article 106.06 of the Illinois Tollway Supplemental Specifications with the following:

106.06 Stored Materials and Equipment. If it is necessary to store materials, they shall be protected in such manner as to insure the preservation of their quality and fitness for The Work. Materials shall be stored and located so as to facilitate prompt inspection. All stored materials shall be made available for inspection by the Engineer at the time of their use in The Work, even though they may have been inspected and approved before being placed in storage. All existing materials which are required to be removed and stored during the progress of The Work shall be carefully removed and stored at locations noted on the Plans, or as may be directed by the Engineer. When the Contractor is allowed to use the existing right-of-way for storage of materials, stockpiles shall be confined to such cleared areas as may be approved by the Engineer. If stockpiling is done or required to be done outside of the right-of-way, the additional space required shall be provided by the Contractor at its expense. The use of such storage sites shall be discontinued immediately upon completion of that portion of The Work for which the storage was required and the sites shall be cleaned of all surplus materials and debris and restored as nearly as possible to their original condition by the Contractor at its expense.

The Contractor may be permitted a storage yard for equipment or materials or a field office on existing property, with written permission from the Engineer, subject to the express conditions of such permission and provided the City of Des Plaines and the Illinois Tollway are indemnified and held harmless by the Contractor against all costs or liabilities in connection therewith. Under no circumstances will the Contractor's employees be permitted to park personal vehicles on shoulders or in the median.

Storage of materials and equipment on pavement or shoulders, or adjacent thereto, shall be not be permitted without the approval of the Engineer.

STEEL AND IRON PRODUCTS (Illinois Tollway)
Effective: April 5, 2013

Replace Article 107.01(d) of the Illinois Tollway Supplemental Specifications with the following:

All materials to be permanently incorporated in the work shall be new unless otherwise specifically prescribed in the contract documents.

All iron and steel products, which are to be incorporated into the work shall be domestically manufactured or produced and fabricated. The Contractor shall obtain from the iron or steel producer and/or fabricator, in addition to the mill analysis, a certification that all iron or steel materials meet these domestic source requirements.

The application of all coatings, epoxy, galvanizing, painting, etc., to metal products shall be domestically applied.

Metal materials other than iron and steel, which are not domestically produced, may be accepted provided:

- a) The Contractor notifies the Illinois Tollway in advance of his/her intention to use other than domestically manufactured or produced material.
- b) Written evidence is provided in English of compliance with all requirements of the Specifications.
- c) Physical tests conducted by the Illinois Tollway verifying the acceptability of the material.

The Contractor is responsible for complying with these conditions so the material can be sampled and tested prior to the time it is required, and no material shall be incorporated in the work until approval is obtained from the Engineer.

WIRE AND CABLE

Revise Section 1066 of the Illinois Tollway Supplemental Specification.

Revise the first paragraph of Article 1066.05 of the Standard Specifications to read:

The tape shall be 6 in. (150 mm) wide; consisting of 7 mil (0.18 mm) minimum polyethylene according to ASTM D 882, ASTM D 5034, ASTM D 5035 and ASTM D 2103. When placed with electrical power cables, the tape shall be red with black lettering or red with silver lettering reading "CAUTION – ELECTRICAL LINE BURIED BELOW". When placed with communications cable, the tape shall be orange with black lettering reading "CAUTION – FIBER OPTIC LINE BURIED BELOW".

WINTER PERIOD WORK

Description. Work between December 15 and February 28 (winter period) of any calendar year is not required in order to meet the completion dates specified in the contract. The Contractor's bid proposal should be submitted with the understanding, that work between December 15 and February 28 in any calendar year will not be performed.

Should the Contractor request to perform work between December 15 and February 28, that is not otherwise prohibited by any other restrictions in the contract, no damages or additional compensation will be allowed to the Contractor for any delays, costs or inconveniences associated with such work.

COORDINATION OF DES PLAINES OASIS CLOSURE

The closure of the Eastbound and Westbound Des Plaines Oasis shall not be permitted prior to the Interim Commencement Date stipulated in S.P. 104.1. The Contractor shall coordinate the closure date with the Engineer. The Contractor shall not contact the Des Plaines Oasis operator or the Des Plaines Oasis Gas Station and Convenience Store employees directly.

The Contractor shall install "This Ramp Will Be Closed" signs, in advance of the exit ramp closures, as shown on the plans.

The Contractor shall install Trailer Mounted Full Matrix Portable Changeable Message Signs at the following Des Plaines Oasis overhead sign locations or as directed by the Engineer:

- Eastbound Sta. 3691+00 (M.P. 70.6) "Des Plaines Oasis 3 Miles"
- Eastbound Sta. 3794+88 (M.P. 72.6) "Des Plaines Oasis 1 Mile"
- Westbound Sta. 3917+50 (M.P. 74.9) "Des Plaines Oasis Exit Only"
- Westbound Sta. 3942+00 (M.P. 75.4) "Des Plaines Oasis Exit Only"
- Westbound Sta. 3975+00 (M.P. 76.0) "Des Plaines Oasis 1 Mile Exit Only"

The Trailer Mounted Full Matrix Portable Changeable Message Signs listed above shall be in place four weeks in advance of the exit ramp closures. The Engineer will provide the Contractor with the message to be displayed before and after the ramp closures are implemented. The Contractor shall remove the Des Plaines Oasis overhead sign panels listed above as soon as practical after ramp closures are implemented.

The Trailer Mounted Full Matrix Portable Changeable Message Signs located at the Des Plaines Oasis overhead sign locations shall remain in place until all building demolition work specified in the Special Provision for BUILDING REMOVAL is completed or as directed by the Engineer.

The Contractor shall cover the "Des Plaines Oasis" associated ground mounted signs at the following locations:

- Eastbound Sta. 3846+00 (M.P. 73.5) "Mobile Electric Gas Sign"
- Eastbound Sta. 3853+00 (M.P. 73.7) "Des Plaines Oasis Next Right"
- Eastbound Sta. 3877+65 (M.P. 74.1) "Des Plaines Oasis Exit"
- Eastbound Sta. 3880+60 (M.P. 74.2) "Exit 20 MPH"
- Eastbound Sta. 3882+85 (M.P. 74.2) "Oasis"
- Westbound Sta. 3901+10 (M.P. 74.6) "Exit 20 MPH"
- Westbound Sta. 3902+50 (M.P. 74.6) "Oasis"
- Westbound Sta. 3986+00 (M.P. 76.2) "Mobile Electric Gas Sign"
- Westbound Sta. 3988+00 (M.P. 76.2) "Des Plaines Oasis 1 ½ Miles"

The Des Plaines Oasis associated ground mounted signs listed above shall be covered the same day the ramp closures are implemented. The type of covering used shall be adequate to obscure the sign message as approved by the Engineer. The Contractor shall remove the Des Plaines Oasis ground mounted signs listed above as soon as practical after ramp closures are implemented.

The Contractor shall install barricades or drums to close the eastbound and westbound exit ramps as shown on the Maintenance of Traffic plans. The Contractor shall remove existing exit ramp pavement marking and install proposed pavement marking, as shown on the plans, and install signing at the following locations:

- Westbound Sta. 3925+20 (M.P. 75.0) "Lane Ends"
- Westbound Sta. 3936+25 (M.P. 75.2) "Right Lane Ends"

The Contractor shall complete the work listed above as soon as practical after ramp closures are implemented.

Method of Measurement and Basis of Payment. No separate measurement or payment will be made for Coordination of Oasis Closure work. The cost for this work shall be considered as included in the contract unit prices for the various pay items under which coordination is required.

EARTH AND ROCK EXCAVATION (Illinois Tollway)

Effective: October 29, 2012

Revised: May 15, 2018

Description. This work shall consist of the excavation and transportation of suitable excavated material to embankment locations throughout the limits of the contract, or the excavation, transportation, and disposal of excavated material according to Section 202 of the Standard Specifications except as modified herein. This work also includes the placement of material at embankment locations in accordance with the Illinois Tollway special provision for Embankment. This work does not include excavation for structures or channel excavation.

Revise Article 202.03 of the Standard Specifications to read:

“202.03 Removal and Disposal of Surplus, Unsuitable Materials, and Organic Waste. Suitable excavated materials of any moisture content shall not be wasted without permission of the Engineer. The Contractor shall dispose of all surplus, unsuitable materials, and organic waste, in such a manner that public or private property will not be damaged or endangered. Suitable but excessively moist excavated materials if used for embankment may be treated in accordance with the Illinois Tollway special provision for Embankment to obtain the specified compaction levels.

Suitable earth, stones and boulders naturally occurring within the right-of-way may be placed in fills or embankments in lifts and compacted according to Section 205. Broken concrete pavement and structural concrete excavated from the job-site without protruding metal bars, bricks, rock stone, sand or soils generated from the construction activities shall be transported to processing stations or mobile crushers for the material to be crushed and screened as either a porous granular embankment aggregate, a porous granular subbase aggregate, a recycled coarse aggregate for concrete pavements, or as a recycled coarse aggregate for cement treated bases. Broken concrete from other sources may be used in embankment or in fill. Reclaimed asphalt pavement with no expansive aggregate (such as steel slag or blast furnace slag), or uncontaminated dirt and sand generated from construction or demolition activities may be used in embankment or in fill. In areas supporting roadway pavement and structures, the placement of reclaimed asphalt pavement shall only be allowed when ambient air temperature is 40°F and rising. If used in fills or embankments, these materials shall be processed, placed and compacted to the satisfaction of the Engineer; shall be buried under a minimum of 2 feet of earth cover (except when the materials include only uncontaminated dirt); and shall not create an unsightly appearance or detract from the natural topographic features of an area. Broken concrete without protruding metal bars, bricks, rock, or stone from other sources may be used as riprap as approved by the Engineer. If the materials are used for fill in locations within the right-of-way but outside project construction limits, as approved by the Engineer, the Contractor must specify to the Engineer, in writing, how the landscape restoration of the fill areas will be accomplished. Placement of fill in such areas shall not commence until the Contractor’s landscape restoration plan is approved by the Engineer.

Aside from the materials listed above, all other construction and demolition debris or waste shall be disposed of in a licensed landfill, recycled, reused, or otherwise disposed of as allowed by State or Federal laws and regulations. If the Uncontaminated Soil Disposal Special Provision is not included in the Contract Requirements, the Contractor shall dispose

of all excess soil generated by construction activities as non-special waste, paid for at the contract unit price for NON-SPECIAL WASTE DISPOSAL according to Section 669.

Organic waste originating within the right-of-way limits may be chipped or shredded and placed as mulch around landscape plantings within the right-of-way when approved by the Engineer. Chipped or shredded material to be placed as mulch shall not exceed a depth of 6 inches.

When the Contractor proposes to dispose of uncontaminated surplus excavated material off the right-of-way, the Contractor shall obtain and file with the Engineer permission in writing, from the property owner, for the use of the property for this purpose. The approval of the proposed disposal site shall be according to Article 107.22 of the Illinois Tollway Supplemental Specifications. Any such disposal shall not create an unsightly or objectionable appearance or detract from the natural topographic features, nor be placed at an elevation higher than that of the adjacent roadway without permission from the Engineer.

Unsuitable material, including excavated material from sewer trenches or other underground construction, shall be excavated or removed and replaced with material as shown on the plans. Unsuitable material shall not be used in embankments. If unsuitable material is present at or below the finished grade, it shall be removed and replaced with subbase granular material, Type A or Type B, according to Section 311. Unsuitable material shall be placed as approved by the Engineer within the right-of-way according to the Illinois Tollway special provision for "Embankment", or disposed of by the Contractor outside of the right-of-way.

Revise the first paragraph of Article 202.07(b) to read as follows:

"(b) Measured Quantities. Earth and rock excavation will be measured in their original positions, and the volumes in cubic yards computed by the method of average end areas. The volume of any unsuitable material removed will be measured for payment in cubic yards."

Revise the second paragraph of Article 202.08 to read as follows:

"Removal and disposal of unsuitable material will be paid for at the contract unit price per cubic yard for REMOVAL AND DISPOSAL OF UNSUITABLE MATERIAL."

Revise the fourth paragraph of Article 202.08 to read as follows:

When the contract does not contain a pay item for removal and disposal of unsuitable material and this item is required, it will be paid for according to Article 109.04 of the Illinois Tollway Supplemental Specifications

| Pay Item Number | Designation | Unit of Measure |
|--------------------|---|--------------------|
| 20200100 | EARTH EXCAVATION | CU YD |
| 66900200 | NON-SPECIAL WASTE DISPOSAL | CU YD |
| J1202210 | REMOVAL AND DISPOSAL OF UNSUITABLE MATERIAL | CU YD |

EMBANKMENT

Description. The work shall consist of the construction of embankments by depositing, placing, and compacting earth, stone, gravel, or other materials of acceptable quality above the natural ground surface or other surface. This work also includes modifying the moisture content of the suitable embankment material to achieve the specified compaction by drying, adding water, or by chemical treatments.

The work shall be in accordance with Sections 202, 204, and 205 of the Standard Specifications except as modified herein, and in accordance with the Illinois Tollway special provisions for Embankment Modification and Subgrade Soil Stabilization when chemical treatments are applied.

Embankments shall be constructed in zones in accordance with the Plans.

Zone "A" Embankment is defined as the structural embankment required for support of the roadbed. Proposed embankments for this Contract shall be constructed with material that meets the requirements of Zone "A" Only. Material that meets the requirements of Zone "B" will not be permitted for the construction of proposed embankments. Zone "B" material shall be stockpiled at the locations shown on the plans.

Material.

1. Embankment Source Submittal Requirements

Unless otherwise specified in the contract plans, proposed earth excavation, borrow excavation and furnished excavation locations are to be designated by the Contractor and approved by the Engineer prior to their use.

The Contractor shall submit the following information to the Engineer for approval no later than 30 days prior to the planned start of work at each area:

- a) Location map for the proposed excavation:
 - a. Property boundaries
 - b. Planned excavation extents
 - c. Access locations
 - d. Planned depths and quantity of excavation
 - e. Contractor's proposed sampling locations for geotechnical and environmental testing.
- b) Narrative describing the planned use, schedule and quantities planned for the excavation.
- c) Written permission for the Illinois Tollway and Engineer to enter the non-job site property to collect earth excavation and furnished excavation soil samples for geotechnical and environmental testing.

2. Zone "A" Embankment Material

Zone "A" Embankment material shall be as required in Sections 202, 204, and 205 of the Standard Specifications, except as follows.

All onsite material used for Zone "A" Embankment must be approved by the Engineer prior to placing. Where furnished excavation is used, the excavation source location, excavation plan, and material must be approved by the Engineer in writing prior to any offsite work.

- a) The laboratory Standard Dry Density shall be a minimum of 98 lb/cu ft when determined according to AASHTO T 99 (Method C).
- b) The organic content shall be less than ten percent determined according to AASHTO T 194 (Wet Combustion).
- c) Soils which demonstrate the following properties shall be restricted to the interior of the embankment and shall be covered on both the sides and top of the embankment by a minimum of 3 feet of soil not considered detrimental in terms of erosion potential or excess volume change.
 1. A grain size distribution with less than 35 percent passing the number 75 um (#200) sieve as tested per AASHTO T 27/T 11.
 2. A plasticity index (PI) of less than 12 as tested per AASHTO T 90.
 3. A liquid limit (LL) in excess of 50 as tested per AASHTO T 89.
- d) For each test method listed in Items a through c above, one test will be performed for every 5000 cubic yards of embankment, or as required by the Engineer.
- e) Reclaimed asphalt pavement shall not be used within the ground water table or as a fill if ground water is present.
- f) In areas supporting roadway pavement and structures, the placement of reclaimed asphalt pavement shall only be allowed when ambient air temperature is 40°F and rising.
- g) The reclaimed asphalt pavement used shall be according to the current IDOT Bureau of Materials and Physical Research Policy Memorandum, "Reclaimed Asphalt Pavement (RAP) for Aggregate Applications". Gradation deleterious count shall not exceed 10% of total RAP and 5% of other by total weight.

Zone "A" Embankment material shall be sampled, tested, and approved before use. The contractor shall identify embankment sources, and provide equipment as the Engineer requires, for the collection of samples from those sources. Samples will be furnished to the Engineer a minimum of 14 days prior to use in order that laboratory tests for approval and compaction can be performed. Embankment material placement cannot begin until tests are completed and approval given. The Engineer may collect independent soil samples and perform confirmatory tests prior to approval.

3. Zone "B" Embankment Material

Zone "B" Embankment material shall be free from stumps, large roots, frozen materials and chemical contaminants which inhibit the growth of vegetation. Excess topsoil and material not suitable for placement in Zone "A" Embankment may be used in Zone "B" Embankment.

Construction Requirements

1. Placing Zone "A" Embankment Material

Zone "A" Embankment material shall be placed in accordance with Article 205.04 of the Standard Specifications, with the following additional requirements.

In addition to Article 202.03 of the Standard Specifications, broken concrete, reclaimed asphalt with no expansive aggregate, or uncontaminated dirt and sand generated from construction or demolition activities shall be placed in 6-inch lifts and disked with the underlying lift until a uniform homogenous material is formed. This process also applies to the overlaying lifts. The disk must have a minimum blade diameter of 24 inches.

When embankments are to be constructed on hillsides or existing slopes that are steeper than 3H:1V, steps shall be keyed into the existing slope by stepping and benching as shown in the plans or as directed by the engineer.

The requirement for embankment stability in Article 205.04 of the Standard Specifications will be measured with a Dynamic Cone Penetrometer (DCP) according to the test method in the IDOT Geotechnical Manual. The penetration rate must be equal or less than 1.5 inches per blow.

2. Placing Zone "B" Embankment Material

Zone "B" Embankment material shall be deposited in uniform layers not to exceed 8 inches in loose depth for the full width of the zones, except that wet material shall be placed in layers not exceeding 6 inches in depth and successive layers of wet material shall not be placed. Each lift shall be thoroughly compacted before the next lift is started.

Layers of drier material shall be alternated with layers of wetter material. The level of Zone "B" Embankment shall be kept lower than the elevation level of Zone "A" Embankment. Each layer of Zone "B" Embankment shall be "stepped" or "benched" a minimum distance of 2 feet into adjacent Zone "A" Embankment to prevent the formation of slippage planes between the two zones. When topsoil is used in Zone "B" Embankment, it shall be mixed prior to or during placement with other Zone "B" material to prevent the formation of slippage planes or zones of significantly different density.

Rigid control of the moisture content of material placed in Zone "B" Embankment will not be required. However, if, in the opinion of the Engineer, material placed from Zone "B" Embankment is excessively wet, the material shall be allowed to dry before being compacted or a layer of drier material may be placed over the loose layer of wet material. The two layers shall then be mixed by disking, harrowing, or other means until a moisture content satisfactory to the Engineer is attained before compaction of the layer commences. If, in the opinion of the Engineer, material placed for Zone "B" Embankment is excessively dry, water shall be added and mixed into the layer by disking before compaction of the layer commences.

No embankment material that does not meet the requirements of Zone "A" embankment shall be imported to the project for use as Zone "B" Embankment", unless approved by the Engineer.

3. Compaction of Zone "A" Embankment Material

Zone "A" Embankment material shall be compacted in accordance with Article 205.06 of the Standard Specifications, except as follows.

Soils classification for moisture content control will be determined by the Soils Inspector using visual field examination techniques and the IDH Textural Classification Chart.

When tested for density in place each lift shall have a maximum moisture content as follows.

- a) A maximum of 110 percent of the optimum moisture for all forms of clay soils.
- b) A maximum of 105 percent of the optimum moisture for all forms of clay loam soils.

Below the top 2 feet from the embankment final grade, the Contractor will be permitted the use of disking and drying according to the Standard Specifications or the use of an approved chemical treatment in accordance with the Illinois Tollway special provision for Embankment Modification to effect a quicker drying time to obtain the minimum compaction or stability when excessive moisture content is present within an embankment composed of suitable material. If the Engineer approves the Contractor to place suitable but unstable embankment due to excessively high moisture content at the time of placement, then the Contractor will be compensated in accordance with the Illinois Tollway special provision for Embankment Modification.

Within the top 2 feet from the final grade of all embankment, the Contractor will be permitted to use an approved chemical treatment in accordance with the Illinois Tollway special provision for Subgrade Soil Stabilization to obtain the minimum compaction or stability when excessive moisture content is present. If the Contractor elects to place suitable but unstable embankment due to high moisture contents at the time of placement without the Engineer's approval, then the Contractor shall be responsible for any treatments or removal and replacement requirements at no additional cost to the Illinois Tollway. If the Engineer approves the Contractor to place suitable but unstable embankment due to excessively high moisture content at the time of placement, then the Contractor will be compensated in accordance with the Illinois Tollway special provision for Subgrade Soil Stabilization.

The embankment shall be sprinkled with water when it is necessary to increase the moisture content of the soil, or shall be either disked or chemically modified or stabilized using an approved method to decrease the moisture content of the soil to permit the embankment to be constructed to the specified densities.

Compacting equipment, compacting operations, and soil modification / stabilization procedures shall be coordinated with the rate of placing embankment so the required density is obtained.

4. Compaction of Zone "B" Embankment Material

Zone "B" Embankment material shall be compacted to not less than 80 percent of the standard laboratory density for the full width of the zone.

Method of Measurement. This work will not be measured for payment. Mechanical compaction will not be measured for payment.

Basis of Payment. This work and any disking and drying, additive or water applied will not be paid for separately but shall be considered as included in the various items of excavation, and their construction shall be included in the unit prices for those items.

When suitable embankment material with excessively high moisture contents at the time of placement are approved by the Engineer to be modified and placed, this work will be paid for according to the Illinois Tollway special provisions for EMBANKMENT MODIFICATION or SUBGRADE SOIL STABILIZATION.

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO (MWRDGC) STOCKPILE B BORROW SITE

Description:

This work shall consist of excavating suitable materials obtained from the MWRDGC Stockpile B Borrow site and hauling the materials to embankment locations throughout the limits for proposed roadway embankment construction. The Contractor will not be allowed to remove materials from the MWRDGC Stockpile B borrow site below Elevation 670.00 unless otherwise directed by the Engineer in writing.

Illinois Tollway Contract I-13-4629 previously completed work, including construction of haul roads, erosion control systems, pipeline and water main protection systems, fencing, and appurtenances for use by other contracts.

The Contractor shall be responsible for maintenance and settlement monitoring of the MWRDGC Borrow Site from the date the Contractor initiates access to the site until all borrow material is removed and the site restored and accepted by the Engineer. This work shall include maintenance of the haul roads, pipeline and water main protection systems, erosion control systems, super silt fence, signs and gates. The aforementioned items shall remain in place for use in other contracts.

Any portion of MWRDGC Stockpile B Borrow Site that remains upon completion of the contract shall be left in a stable condition with the top of the remaining material sloped at 2% maximum and side slopes no steeper than 1:3 (V:H).

The Contractor is advised that other contracts may concurrently be hauling suitable excavated materials or topsoil from the MWRDGC Stockpile B Borrow site. In addition to complying with S.P. 106, the Contractor will be required to coordinate their operations with other contractors that may be working at the site. The coordination would include making reasonable accommodations and modifications to the Contractor's operations so as not to impede the progress of other contractors working at the site.

If unsuitable material is encountered, it shall be removed from the MWRDGC property in accordance with Section 202 of the Standard Specifications.

Construction vehicles will not be allowed to cross Higgins Road to or from Nicolas Boulevard to enter or exit the site, but must turn either left or right to or from Higgins Road. Flaggers shall be provided to ensure safe operations for vehicles entering and exiting the site.

This work shall be completed according to the applicable portions of Sections 201, 202, 204, and 211 of the Standard Specifications, the Special Provisions for ALLOWANCE FOR HAUL ROAD MAINTENANCE, WATER TRANSMISSION MAIN PROTECTION – MWRDGC STOCKPILE B BORROW SITE, and MAINTENANCE OF TRAFFIC, and as noted herein.

Measurement and Payment:

Excavation of materials from the MWRDGC Stockpile B Borrow site, hauling the materials to embankment locations throughout the limits of the contract and constructing the proposed roadway embankment, and restoring the MWRDGC site to the final grades will be measured and paid for at the contract unit price per cubic yard for BORROW EXCAVATION.

| Pay Item Number | Designation | Unit of Measure |
|--------------------|-------------------|--------------------|
| 20400100 | BORROW EXCAVATION | CU YD |

ERECTION OF GIRDERS (Illinois Tollway GBSP)

Effective: May 1, 2017

Description. In addition to the requirements of Sections 503, 504 and 505 of the Standard Specifications, the following shall apply.

The Contractor or sub-Contractor performing the erection of the girders is herein referred to as the Erection Contractor.

Handling, Storage, Shipment. The Contractor shall handle, store, and ship the girders in such a manner as to prevent damage. Braces, trusses, chains, cables, or other devices used for handling, storing, and shipping shall be adequately padded at points in contact with the materials to prevent damage of the finished product. Damaged materials shall be repaired or replaced at no additional cost to the Illinois Tollway.

Erection Plan. The Erection Contractor shall retain the services of an Illinois Licensed Structural Engineer, experienced in the analysis and preparation of erection plans, for the completion of a project-specific erection plan. The Structural Engineer shall sign and seal the erection plan, drawings, and calculations for the proposed erection of the girders.

The erection plan shall be complete in detail for all phases, stages, and conditions anticipated during erection. The erection plan shall include structural calculations and supporting documentation necessary to completely describe and document the means, methods, sequence temporary support positions, and loads necessary to safely erect the structure in conformance with the contract documents and as outlined herein.

The Illinois Tollway Base Sheets M-BRG-527 and M-BRG-528 are available for use as a guide in preparation of the erection plan.

The erection plan and procedure shall provide complete details of the erection process including but not limited to:

- (a) Falsework, struts, bracing, tie cables and other devices, material properties and specifications for temporary works, requirements prior to releasing girders from the cranes (if required), connection details and attachments to other structure components or objects. These details shall include catalog cuts and or sealed drawings showing the capacities of items being utilized;
- (b) Procedure and sequence of operations, including a schedule that addresses work items that need to comply with specific working hour limitations;
- (c) Load chart lift capacity, outrigger size and reactions for each crane;
- (d) A scaled drawing showing the locations of cranes, pick radius, trucks delivering girders, and the location of cranes and outriggers relative to other structures, including retaining walls, wingwalls and utilities.
- (e) Calculations that show the structure can withstand the loads without damage shall be provided if a crane is to be placed on a structure during the erection process. If the crane is to be placed on the ground, the ground should be reviewed for stability.
- (f) Calculated loads and girder weights, lift points, lifting devices, spreaders, and angle of lifting cables.
- (g) Girder stresses at critical points along the girder length during progressive stages of erection shall be evaluated to assure that the structural integrity and stability of the

girders is maintained at all times. Stresses at lift points induced as a result of lifting shall be evaluated and if required, adequate bracing provided as indicated by the analysis.

- (h) Drawings, notes, catalog data showing the manufacturer's recommendations or performance tests, and calculations clearly showing the above listed details, assumptions, and dimensions.
- (i) Maximum permissible wind speeds for erection activities to proceed.

The Contractor shall submit the erection plans and procedures utilizing the Tollway Web-based Program Management System (WBPM), to the Engineer for review and acceptance a minimum of 14 days prior to starting the work. All submittals must be created, tracked and reviewed and handled via the WBPM. Review and acceptance by the Engineer shall not be construed to guarantee the safety and acceptability of the work. Construction safety shall be in accordance with Article 105.16 of the Illinois Tollway Supplemental Specifications.

Any changes to the erection plan must be reviewed and accepted by the Engineer before implementation.

Pre-Erection Meeting. A Pre-Erection meeting shall be held at least one week prior to the commencement of the erection. The Engineer, Contractor, Erection Contractor, and the Erection Contractor's Structural Engineer shall attend the meeting. The Contractor's Structural Engineer may attend the meeting by conference call or web-cast. The intent of the meeting is to develop a mutual understanding of the proposed implementation of the Contractor's erection plan. Revisions or adjustments to the plan, and potential revisions or adjustment to the implementation of the erection plan shall be discussed.

The Erection Contractor shall demonstrate his knowledge and familiarity of where the piece marks are located on the components to be erected, their orientation in the erected structure, and the shop drawing piece mark convention used by the girder fabricator at the Pre-Erection meeting.

Additional Pre-Erection meetings may be required for subsequent phases of construction, or for phases that differ from the original erection plan, as directed by the Engineer. Additional meetings may also be requested by the Contractor, and approved by the Engineer.

Pre-Erection Site Meeting. A Pre-Erection Site meeting shall be held 24 hours prior to the commencement of erection. The Engineer, Contractor, and Erection Contractor shall attend the meeting. The Erection Contractor's Structural Engineer shall be available if needed. The intent of the meeting is to develop a mutual understanding of the proposed implementation of the Contractor's erection plan, to confirm environmental conditions are acceptable and to evaluate any potential revisions or adjustment in the implementation of the erection plan.

Basis of Payment. This work will not be paid for separately but shall be included in the contract pay item for FURNISHING AND ERECTING STRUCTURAL STEEL, or FURNISHING AND ERECTING SHALLOW DEPTH PRECAST PRESTRESSED CONCRETE BEAM, of the depth specified, or FURNISHING AND ERECTING PRECAST PRESTRESSED CONCRETE I-BEAMS, of the depth specified, or FURNISHING AND ERECTING PRECAST PRESTRESSED CONCRETE BULB T-BEAMS, of the depth specified or FURNISHING AND ERECTING PRECAST PRESTRESSED CONCRETE BEAMS, of the depth specified.

STORM SEWERS

Description: This work shall consist of furnishing and installing storm sewer in accordance with Section 550 of the IDOT Standard Specifications.

Materials shall be in accordance with Section 550.02 and 550.03 of the IDOT Standard Specifications, except that the material must be reinforced concrete pipe.

Method of Measurement: Storm Sewers will be measured for payment in place in feet.

Basis of Payment: This work will be paid for at the contract unit price per foot for STORM SEWERS of the class, type and diameter specified.

| Pay Item Number | Designation | Unit of Measure |
|-----------------|-----------------------------------|-----------------|
| 550A0380 | STORM SEWERS, CLASS A, TYPE 2 18" | FOOT |

DRAINAGE SYSTEM

Description. This work shall consist of furnishing and installing a bridge drainage system as shown on the plans, including all piping, fittings, support brackets, inserts and bolts. This work shall also include splash blocks when shown on the plans.

Materials. Drain pipe may be Polyvinyl Chloride (PVC) Pipe, Reinforced Fiberglass Pipe or Galvanized Steel Pipe.

Polyvinyl Chloride Pipe

Polyvinyl Chloride (PVC) Pipe and fittings shall be 8" diameter schedule 80 meeting the requirements of ASTM D1785 (F441), D2464 and D2467. The PVC pipe and fittings shall be colored to match the adjacent beam and/or column.

Reinforced Fiberglass Pipe

Reinforced Fiberglass Pipe and fittings shall be 8" diameter, meeting the requirements of ASTM D2996 RTRP with a 30,000 psi minimum short-time rupture strength hoop tensile stress. The reinforced fiberglass shall also have an apparent stiffness factor at 5 percent deflection exceeding 200 cu in.-lbf/sq. in. and a minimum wall thickness of 0.10 in. The adhesive for joining pipe and fittings shall be as recommended by the manufacturer. The exterior surfaces of fiberglass pipe and fittings shall be pigmented in accordance with the pipe manufacturer's recommendations or cleaned, given a prewash in accordance with MIL - P - 15328 and top coated with an epoxy-based coating recommended for outdoor applications by the prewash manufacturer.

The resin in either case shall have an ultraviolet absorber designed to prevent ultraviolet degradation. The ultraviolet protection shall be designed to withstand a minimum of 2,500 hours of accelerated weathering when tested in conformance with the requirements in ASTM Designation: G 154. Lamps shall be UV-8 (313 nm wavelength). The resting cycle shall be 4 hours of ultraviolet exposure at 140°F (60°C), and then 4 hours of condensate exposure at 120°F (49°C). After testing, the surface of the pipe shall exhibit no fiber exposure, crazing, or checking, and only a slight chalking or color change. The supplier shall certify the material supplied meets or exceeds these requirements.

Galvanized Steel Pipe

Seamless and welded pipe and fittings shall be 8" diameter, extra strong, galvanized steel pipe, meeting the requirements of ASTM A53. Galvanized Steel Pipe shall not be painted.

Pipe Supports

Pipe hangers shall be provided for all horizontal (collection) drain pipes at each fitting, cleanout, or change in direction and at intermediate points not more than 5'-0" on centers. Collection pipe hangers shall have an allowable load capacity of not less than 500 lbs. and shall be designed so as not to apply excessive compressive stress to the pipe. Steel straps, bars and plates shall meet the requirements of AASHTO M270, Grade 36 or 50.

Pipe supports shall be provided for all vertical (downspout) drain pipes at points not more than 12'-0" on centers. Structural steel shapes shall meet the requirement of AASHTO M270, Grade 36.

All pipe hangers, supports and hardware shall be hot-dipped galvanized after fabrication in accordance with AASHTO M232 (ASTM A153) unless otherwise noted. All bolts, nuts and

washers shall be stainless steel. Stainless steel bolts, and washers shall be in accordance with Standard Specifications Article 1006.29(d).

All stainless steel hardware shall be coated with an anti-seize compound.

Painting

All exposed surfaces of floor drains, hangers, brackets and piping located on the exterior side of painted fascia beams and/or visible to the motoring public shall be painted or supplied in the appropriate color except stainless steel and galvanized shall not be painted. The color of the final coat shall match that of the adjacent beam and/or column, Munsell number 5B7/1 Gray. Final color shall be submitted to the Engineer for approval.

Design. The drainage system shall be designed as an open system with allowances for the differential expansion and contraction expected between the superstructure and the substructure to which the drainage system is attached.

Installation. All connections of pipes and fittings shown on the plans to facilitate future removal for maintenance cleanout or flushing shall be made with a threaded, gasketed coupler or a bolted gasketed flange system. Adhesive bonded joints will be permitted for runs of pipe between such connections. The end-run connection shall feature a minimum nominal 8 in female threaded outlet. Straight runs may utilize a 45-degree reducing saddle bonded to the pipe. The female outlet shall be filled with a male threaded PVC plug.

Runs of pipe shall be supported at spacings not exceeding those recommended by the manufacturer of the pipe. Supports that have point contact or narrow supporting areas shall be avoided. Standard slings, clamps, clevis hangers and shoe supports designed for use with steel pipe may be used. A minimum strap width for hangers shall be 1 1/2 in. (40 mm) for all pipe under 12 in. (300 mm) in diameter and 2 in. (50 mm) for diameters 12 in. (300 mm) or greater. Straps shall have 120 degrees of contact with the pipe. Pipes supported on less than 120 degrees of contact shall have a split fiberglass pipe protective sleeve bonded in place with adhesive.

All pipe, fittings, and expansion joints shall be handled and installed according to guidelines and procedures recommended by the manufacturer or supplier of the material.

Basis of Payment. This work will be paid for at the contract unit price per each for DRAINAGE SYSTEM, at the location specified.

| Pay Item Number | Designation | Unit of Measure |
|-----------------|------------------------|-----------------|
| X0320000 | DRAINAGE SYSTEM, NO. 1 | EACH |
| X0320002 | DRAINAGE SYSTEM, NO. 2 | EACH |

STORM SEWER CONNECTION

DESCRIPTION

This work shall consist of connecting proposed pipes to existing manholes or catch basins at the locations and elevations as shown on the plans or as directed by the Engineer. The work shall be performed in accordance with applicable portions of Sections 550 and 602 of the Standard Specifications.

MATERIALS

Materials for the storm sewer connection shall be in accordance with Section 602 and 1040 of the Standard Specifications.

CONSTRUCTION REQUIREMENTS

Excavation and backfill for connections to existing manholes or catch basins shall be in accordance with Section 550 of the Standard Specifications. A hole adequate to receive the new pipe shall be cored into the manhole or catch basin with proper coring equipment. The invert shall be brought into the existing manhole at the elevation shown on the Drawings. The downstream pipe in manholes shall be screened to prevent entry of mortar or other debris from entering the system. The connection shall be made watertight using concrete or equivalent method with approval of the Engineer.

After connection is made to the structure and the mortar holding the pipe in place has set, the pipe shall be cut off evenly such that no more than two inches (2") of pipe protrudes into the structure and any screening shall be removed. Mortar or other debris that has entered the existing manhole or catch basin shall be removed.

METHOD OF MEASUREMENT

This work will be measured for payment in units of each, in place.

BASIS OF PAYMENT

This work will be paid for at the Contract unit price per each for STORM SEWER CONNECTION.

| Pay Item Number | Designation | Unit of Measure |
|--------------------|------------------------|-----------------|
| X0323389 | STORM SEWER CONNECTION | EACH |

REMOVE SIGN (SPECIAL)

Description. This work shall consist of disconnecting and removing the Mobil electric gas sign structure, foundation, and associated sign transformer rack at the locations shown on the plans.

CONSTRUCTION REQUIREMENTS

The Contractor shall arrange for the discontinuance of all utility services that serve the sign according to the respective requirements and regulations of the utility companies involved. The Contractor shall disconnect and seal, in an approved manner, all service outlets that the serve the sign to be removed.

No removal work will be permitted until written authorization to proceed is provided by the Illinois Tollway.

The existing concrete foundation shall be removed according to Article 737.02(b) of the Standard Specifications.

All components of the existing concrete foundation, including the concrete, reinforcing, and electrical items, shall be removed at least one foot below the ground line.

All materials and debris resulting from the removal operation shall be removed from the right-of-way within five calendar days after the Mobil price sign structure has been removed from the site. All removed materials shall become the property of the Contractor and shall be disposed of according to Article 202.03 of the Standard Specifications.

Basis of Payment. This work will be paid for at the contract unit price each for REMOVE SIGN (SPECIAL).

| Pay Item Number | Designation | Unit of Measure |
|-----------------|-----------------------|-----------------|
| X0327009 | REMOVE SIGN (SPECIAL) | EACH |

CONSTRUCTION VIBRATION MONITORING

Description:

Appropriate measures shall be taken by the Contractor during pile driving operations to avoid damage to the adjacent properties. The Contractor shall choose equipment and methods, such as size of pile driving hammers that will meet the requirements of the contract, but not exceed the acceptable vibration limits.

Pile driving shall be performed in accordance with applicable portions of Section 512 of the Standard Specification except as herein modified.

Pre-construction survey and vibration monitoring activities shall be performed by the Contractor to document pre-existing conditions and to ensure that vibrations due to pile driving operations are within acceptable limits defined herein.

Requirements:

Preconstruction Survey: Before the start of construction the contractor shall complete a pre-construction inspection of the existing buildings located within 300 feet of the proposed pile driving operations. This survey shall include mapping of all current deterioration, distress on elevation and plan views of the buildings or building elements. The survey shall also include videotaping and close-up photographs of 100% of the building contents (floors, wall and ceilings). The above shall be documented in a Pre-Construction Survey Reports and kept on file by the Contractor. A copy of the report shall be submitted to the Engineer and the Tollway prior to commencement of planned pile driving operations.

Vibration Limitation and Recordings: The Contractor shall furnish, install, calibrate, maintain, and operate instrumentation for measuring and recording vibrations. The recording instrument shall be a velocity seismograph. Additional instruments shall be provided as necessary to evaluate propagation of vibrations. All instruments shall be periodically checked for proper calibration and shall be maintained in first-class working order. Instruments shall be replaced, repaired, or re-calibrated when needed or when directed by the Engineer.

The recordings shall be taken under the supervision of a qualified Licensed Structural Engineer in the State of Illinois. In addition, the Contractor's engineer shall interpret the readings and shall establish the vibration limitations, but under no circumstances shall the limit exceed the value as discussed below.

Prior to commencement of pile driving operations, the Contractor shall submit in writing, for approval of the Engineer, his plan for monitoring his operations to assure compliance with the vibration limitation. As a minimum, this plan shall provide for the following:

- a. Recommended vibration limitation at the site based on survey establishing proximity of structure, type of structure, and condition of structure.
- b. Vibrations shall be recorded by the seismograph equipment at the adjacent properties while the operation is taking place.
- c. Trained personnel shall be provided to operate the equipment and interpret the recordings. Names and resumes of personnel to be provided shall be furnished.
- d. All operations shall be done in such a manner as to reduce vibrations which reach the adjacent property to or below acceptable limits as established by the Contractor, but which shall not exceed the limits as specified below.

Acceptable limits are defined as follows:

- a. 0.2 inch per second at a frequency 1 Hertz.
- b. 0.5 inch per second at frequencies between 2.6 Hertz and 40 Hertz.
- c. Velocities less than that defined by a straight line variation between 1 Hertz and 2.6 Hertz, per (a) and (b) above.
- d. 0.75 inch per second at frequencies above 40 Hertz.

A qualified Licensed Structural Engineer in the State of Illinois shall be provided by the Contractor. This person's responsibilities shall include the following:

- a. Supervise establishment of the program and initial operation of the equipment.
- b. Visit the jobsite a minimum of once a week, while pile driving or pavement breaking and removal operations are underway. The SE will make additional visits, if the Engineer determines that additional visits are required due to problems with calibration of equipment or other problems with the contractor's plan. These additional visits will be at no additional cost to the Tollway
- c. Inspect the recording program and interpretation of records, check the operations and recalibrate the equipment if necessary.
- d. Provide the Engineer with a comprehensive written report of the vibration measuring program and an analysis of the impact recordings within 7 days after completion of the pile driving operations.

In the event any recordings indicate the vibration limits are exceeded, all pile driving operations shall be suspended immediately, and a report shall be made immediately to the Engineer and the Tollway. The Contractor shall reduce the efforts, or otherwise cause appropriate measures to be taken to reduce the resulting vibrations to the acceptable limits.

Basis of Payment: All materials, labor, and equipment necessary to perform the work as specified herein shall be included in the contract unit price per Lump Sum for Construction Vibration Monitoring.

| Pay Item Number | Designation | Unit of Measure |
|-----------------|-----------------------------------|-----------------|
| X0327357 | CONSTRUCTION VIBRATION MONITORING | L SUM |

CHAIN LINK FENCE, ATTACHED TO STRUCTURE

DESCRIPTION

This work shall consist of furnishing and installing galvanized chain link fence on wall copings, wingwalls, retaining walls and concrete post foundations in accordance with the details and locations shown on the plans and the applicable portions of Section 664 of the Standard Specifications. This work shall include constructing concrete post foundations and furnishing and installing all related accessories for a complete fence installation including base plates, stiffeners, and expansion anchors for mounting the fence.

CONSTRUCTION REQUIREMENTS

All posts shall be vertical when erected; shim posts in place at the proper angle to account for any slope along the top of the wall until mortar has cured.

The fence fabric shall be Type I, Class D and shall be in accordance with Article 1006.27 of the Standard Specifications.

The fence posts shall be galvanized in accordance with the requirements of AASHTO M111.

METHOD OF MEASUREMENT

This work will be measured along the top of the fence center to center of the end posts, in feet, completed in place.

BASIS OF PAYMENT

This work will be paid at the contract unit price per foot for CHAIN LINK FENCE, (of the height specified) ATTACHED TO STRUCTURE.

| Pay Item Number | Designation | Unit of Measure |
|-----------------|--|-----------------|
| X6640535 | CHAIN LINK FENCE, 6' ATTACHED TO STRUCTURE | FOOT |

BUILDING REMOVAL

Description:

This work shall consist of the removal and disposal of various buildings of various sizes, types of construction and ages, together with all foundations, retaining walls and piers, and all incidental and collateral work necessary to complete the removal of the building(s) in a manner approved by the Engineer. This work shall include the removal and disposal of all items within the site limits of building removal as shown on the plans and as described herein.

This contract lists properties/buildings that the Illinois Tollway has leased to other entities. **NO WORK SPECIFIED HEREIN WILL COMMENCE UNTIL THE CONTRACTOR IS GIVEN WRITTEN AUTHORIZATION TO PROCEED BY THE ILLINOIS TOLLWAY.**

Site inspections prior to contract award shall be confined to publicly accessible areas only. The buildings are leased and there must be NO contact, relative to these Proposal Documents, between the contractor and the lessee.

The building(s) and site limits of building removal are identified as follows:

| BUILDING NO. | DESCRIPTION | TYPE OF BUILDING | YEAR BUILT | APPROX. SQ FT OF BUILDING |
|---------------------|------------------------|-------------------------|-------------------|----------------------------------|
| 1 | Des Plaines Oasis - EB | Commercial Building | 2004 | 3,756 |
| 2 | Des Plaines Oasis - WB | Commercial Building | 2004 | 3,836 |

Underground storage tank removal and associated work shall be in accordance with Section 669 of the Standard Specifications and will be paid for separately. Removal of abandoned oil pipeline and associated work shall be in accordance with the special provision for REMOVE ABANDONED OIL PIPELINE and will be paid for separately. Removal of oil separator systems and associated work shall be in accordance with the special provision for REMOVE OIL SEPARATOR SYSTEM and will be paid for separately. Transportation and proper disposal of contaminated soil and water shall be in accordance with Section 669 of the Standard Specifications and will be paid for separately.

Sequence of Work and Site Schedule Determination

The following is an anticipated sequence of work and timeline for each individual parcel.

1. Notification. The Illinois Tollway will provide the Contractor with written authorization when work may proceed on each site.

2. Environmental Testing. The Contractor shall immediately order the Environmental Inspection of the buildings. Field inspections and sampling must be completed within 7 calendar days of receiving written authorization from the Illinois Tollway that work may proceed. Environmental reports must be received within 21 calendar days following the date of the Environmental Field Inspection.

3. Site Security. The Contractor shall secure the site with 6 feet high temporary chain link fence and board up the buildings within 48 hours of receiving written authorization from the Illinois Tollway that work may proceed.

4. Utility disconnects. The Contractor shall order and coordinate the disconnection of utilities from the building(s).

5. Environmental Remediation (if required). The Illinois Tollway will review the results of the Environmental inspection reports and determine the course of action and a detailed schedule for the building removal work. The remediation of any environmental issues shall be completed within 30 calendar days after written notification by the Illinois Tollway unless a separate detailed schedule is determined by the Illinois Tollway.

6. Erosion Control Measures. The Contractor shall implement erosion control measures as described in S.P. 111.2 and the plans.

7. Building Removal. The Contractor shall remove all buildings and structures from the site within 14 calendar days of receipt of written notification from the Illinois Tollway of the satisfactory completion of any environmental remediation or of notification that the building(s) do not require environmental remediation.

8. Site Clearing and Restoration. The Contractor shall remove all other items from the site, grade the site to drain, and seed bare earth areas.

Items of Work

Environmental Inspection

The Contractor shall employ the services of a consulting firm licensed by the Illinois Department of Public Health (IDPH) to perform an asbestos survey in accordance the National Emission Standard for Hazardous Air Pollutants (NESHAP) and develop a comprehensive report for review by the Engineer. Upon completion of the review, the contractor shall employ an asbestos abatement contractor licensed by the IDPH to completely remove all asbestos containing materials (ACM) prior to building demolition.

Asbestos Inspection & Report

The following criteria specifies how Preliminary Asbestos Inspection and reports shall be formatted and what information should be presented within.

All NESHAP preliminary asbestos assessments shall be performed by a Licensed Asbestos Inspector and laboratory analysis of suspect asbestos containing building materials shall be performed by a laboratory that successfully participates in the AIHA Proficiency Analytical Testing (PAT) Program and the National Voluntary Laboratory Accreditation Program (NVLAP). Representative samples of each homogenous suspect material shall be conducted in all physically accessible/visible areas of the Site. All representative samples of a homogenous type of material do not have to be sampled if the first sample demonstrates that the material contains greater than 1 % asbestos according to OSHA 29 CFR 1910.120. At least the minimum number of samples specified by NESHAP and Asbestos Hazard Emergency Response Act (AHERA) requirements must be taken of each homogenous material based on quantity to insure sampling compliance. If a positive result is achieved duplicate samples do not need to be analyzed.

All preliminary asbestos assessment reports should be submitted as a single pdf and bound copy and include the following:

1. Site photographs containing a representative image of the Site along with a description of where the picture was taken and what is shown in the image.
2. Inspector name(s) and license number(s)
3. Laboratory name and address
4. Laboratory testing methods used (polarized light microscopy, point count analysis)
5. Sample ID's with descriptions of what testing methods were performed on which samples
6. All analytical data including a percentage and type of asbestos present
7. Photographs of sampling locations with a description of the sampled material
8. All Chain of Custodies
9. Measured quantities of the material that has been sampled throughout the Site. If measurements cannot be taken, educated estimates shall be accepted. All estimates and any reasoning for estimate values should be noted
10. A breakdown of the condition of the material, applicable regulations, and the intended scope of work at the time of the inspection report preparation.
11. Data shall be broken down stating which material is "Category I Non-Friable, Category II Non-Friable, Friable, and/or Non Asbestos Containing"

The report shall be submitted to the Engineer for acceptance and concurrence. The cost of the inspection and report preparation shall be included in the cost of BUILDING REMOVAL.

Asbestos Abatement & Air Clearance Monitoring

Should the Environmental Report show positive testing for asbestos or other material, the contractor shall enlist an IDPH Licensed Asbestos Abatement contractor to remove all ACM from the building prior to building demolition. The abatement contractor shall be responsible for all notifications and fees as required by state and local agencies.

Removal of ACM shall be conducted in accordance with NESHAP regulations 40 CFR 61, Subpart M, and OSHA regulations 29 CFR 1926.1101. At the conclusion of the abatement project, all ACM shall be removed from the work area and transported to a regulated landfill location approved for disposal of asbestos-containing waste.

The Contractor shall provide a shipping manifest to the Engineer for the disposal of all ACM wastes.

Permits: The Contractor shall apply for permit(s) in compliance with applicable regulations of the Illinois Environmental Protection Agency. Any and all other permits required by other federal,

state, or local agencies for carrying on the work shall be the responsibility of the Contractor. Copies of these permits shall be sent to the Engineer.

Notifications: The "Demolition/Renovation Notice" form, which can be obtained from the IEPA office, shall be completed and submitted to the address listed below at least ten days prior to commencement of any asbestos removal or demolition activity. Separate notices shall be sent for the asbestos removal work and the building demolition if they are done as separate operations.

Asbestos Demolition/Renovation Coordinator
Illinois Environmental Protection Agency
Division of Air Pollution Control
P. O. Box 19276
Springfield, Illinois 62794-9276
(217) 785-1743

Notices shall be updated if there is a change in the starting date or the amount of asbestos changes by more than 20 percent.

Submittals:

A. All submittals and notices shall be made to the Engineer, except where otherwise specified herein.

B. Submittals that shall be made prior to start of work:

1. Submittals required under Asbestos Abatement Experience.
2. Submit documentation indicating that all employees have had medical examinations and instruction on the hazards of asbestos exposure, on use and fitting of respirators, on protective dress, on use of showers, on entry and exit from work areas, and on all aspects of work procedures and protective measures as specified in Worker Protection Procedures.
3. Submit manufacturer's certification stating that vacuums, ventilation equipment, and other equipment required to contain airborne fibers conform to ANSI 29.2.
4. Submit to the Engineer the brand name, manufacturer, and specification of all sealants or surfactants to be used. Testing under existing conditions will be required at the direction of the Engineer.
5. Submit proof that all required permits, site locations, and arrangements for transport and disposal of asbestos-containing or asbestos-contaminated materials, supplies, and the like have been obtained (i.e., a letter of authorization to utilize designated landfill).
6. Submit a list of penalties, including liquidated damages, incurred through noncompliance with asbestos abatement project specifications.
7. Submit a detailed plan of the procedures proposed for use in complying with the requirements of this specification. Include in the plan the location and layout of decontamination units, the sequencing of work, the respiratory protection plan to be used during this work, a site safety plan, a disposal plan including the location of an

approved disposal site, and a detailed description of the methods to be used to control pollution. The plan shall be submitted to the Engineer prior to the start of work.

8. Submit proof of written notification and compliance with Paragraph "Notifications".

C. Submittals that shall be made upon completion of abatement work:

1. Submit copies of all waste chain-of-custodies, trip tickets, and disposal receipts for all asbestos waste materials removed from the work area;

2. Submit daily copies of work site entry logbooks with information on worker and visitor access;

3. Submit logs documenting filter changes on respirators, HEPA vacuums, negative pressure ventilation units, and other engineering controls; and

4. Submit results of any bulk material analysis and air sampling data collected during the course of the abatement including results of any on-site testing by any federal, state, or local agency.

Certificate of Insurance:

a. The Contractor shall document general liability insurance for personal injury, occupational disease and sickness or death, and property damage.

b. The Contractor shall document current Workmen's Compensation Insurance coverage.

c. The Contractor shall supply insurance certificates as specified by the Illinois Tollway.

Asbestos Abatement Experience:

A. Company Experience: Prior to starting work, the Contractor shall supply evidence that he/she has been prequalified with the Illinois Capital Development Board and that he/she has been included on the Illinois Department of Public Health's list of approved Contractors.

B. Personnel Experience:

1. For Superintendent, the Contractor shall supply:

a. Evidence of knowledge of applicable regulations in safety and environmental protection is required as well as training in asbestos abatement as evidenced by the successful completion of a training course in supervision of asbestos abatement as specified in 40 CFR 763, Subpart E, Appendix C, EPA Model Contractor Accreditation Plan. A copy of the certificate of successful completion shall be provided to the Engineer prior to the start of work.

b. Documentation of experience with abatement work in a supervisory position as evidenced through supervising at least two asbestos abatement projects; provide names, contact, phone number, and locations of two projects in which the individual(s) has worked in a supervisory capacity.

2. For workers involved in the removal of friable and non-friable asbestos, the Contractor shall provide training as evidenced by the participation and successful completion of an accredited training course for asbestos abatement workers as specified in 40 CFR 763, Subpart E, Appendix C, EPA Model Contractor Accreditation Plan. A copy of the certificate of successful completion shall be provided to all employees who will be working on this project.

After the completion of the final clean and when all surfaces in the critical barriers are dry, the contractor, and the Engineer shall inspect the area inside the critical barriers for visible residue. If the area is clear of residue, the contractor and the Engineer shall notify an air sampling professional that the contained area is ready for clearance air monitoring.

Abatement Air Monitoring:

The Contractor shall comply with the following:

A. Personal Monitoring: All personal monitoring shall be conducted per specifications listed in OSHA regulation, Title 29, Code of Federal Regulation 1926.58. All area sampling shall be conducted according to 40 CFR Part 763.90. All air monitoring equipment shall be calibrated and maintained in proper operating condition. Excursion limits shall be monitored daily. Personal monitoring is the responsibility of the Contractor. Additional personal samples may be required by the Engineer at any time during the project.

B. Contained Work Areas for Removal of Friable Asbestos: Area samples shall be collected within the work area daily. A minimum of one sample shall be taken outside of the abatement area removal operations. The Engineer will also have the option to require additional personal samples and/or clearance samples during this type of work.

C. Interior Non-Friable Asbestos-Containing Materials: The Contractor shall perform personal air monitoring during removal of all nonfriable Transite and floor tile removal operations. The Engineer will also have the option to require additional personal samples and/or clearance samples during this type of work.

D. Exterior Non-Friable Asbestos-Containing Materials: The Contractor shall perform personal air monitoring during removal of all nonfriable cementitious panels, piping, roofing felts, and built up roofing materials that contain asbestos.

The Contractor shall conduct down wind area sampling to monitor airborne fiber levels at a frequency of no less than three per day.

E. Air Monitoring Professional

1. All air sampling shall be conducted by a qualified Air Sampling Professional supplied by the Contractor. The Air Sampling Professional shall submit documentation of successful completion of the National Institute for Occupational Safety and Health (NIOSH) course #582 - "Sampling and Evaluating Airborne Asbestos Dust".

2. Air sampling shall be conducted according to NIOSH Method 7400. The results of these tests shall be provided to the Engineer within 24 hours of the collection of air samples.

Upon completion of the abatement and clearance air monitoring the contractor shall provide all air monitoring results and waste disposal chain-of-custody to the Engineer. These records shall be maintained for a period not less than 3 years.

Upon satisfaction of the Engineer that the requirements above have been met the building will be released for demolition.

The volume and cost of the abatement shall be determined through the Inspection and Report and shall be paid on a force account basis under Contract Allowances under DISPOSAL OF UNIDENTIFIED HAZARDOUS WASTE.

Demolition

Work under this Contract includes:

- Board up and securing of identified structures to be demolished
- Utility disconnections
- Demolition of all identified structures and items within the site limits of building removal on property parcels at the above indicated locations
- Site Erosion Control
- Proper disposal of all demolition debris off site
- Site stabilization and clean-up
- Application for and acquisition of all permits, licenses, certifications and associated fee payments.

Board up. Upon written notification from the Engineer, the Contractor shall board up and secure identified buildings using emergency board up techniques generally used by the insurance industry. Board up and secure services shall be performed within 48 hours of written notification from the Engineer. Board up includes but is not limited to covering windows, doors and other openings into the structure. The Contractor must provide temporary secured access to the building interior if determined by the Engineer to be necessary for inspection or environmental remediation.

Signs: Immediately upon written notification of authorization to proceed with work on each building demolition site and prior to the wrecking of any structures, the Contractor shall be required to paint or stencil, in contrasting colors of an oil base paint, on all four sides of each residence and two opposite sides of other structures, the following sign:

PROPERTY FOR
HIGHWAY CONSTRUCTION
TO BE DEMOLISHED BY THE
(NAME OF COMPANY)
(ADDRESS)
VANDALS WILL BE PROSECUTED

The signs shall be positioned in a prominent location on the structure so that they can be easily seen and read and at a sufficient height to prevent defacing. The Contractor shall not paint signs nor start demolition of any building(s) prior to the time that the Illinois Tollway becomes the owner of the respective building(s).

Discontinuance of Utilities: The Contractor shall arrange for the discontinuance of all utility services that serve the building(s) according to the respective requirements and regulations of the Village, City, County, or utility companies involved. The Contractor shall disconnect and seal, in an approved manner, all service outlets that serve any building(s) he/she is to remove.

Existing water and sewer services shall be removed and disconnected by the Contractor as shown on the plans. Water services shall be capped at the locations shown on the plans according to City of Des Plaines requirements. Sanitary sewer services shall be plugged as shown on the plans. The Contractor shall schedule and coordinate the work with the City of Des Plaines.

Building Demolition. It shall be the responsibility of the Contractor to determine the limitations imposed by local ordinances with respect to construction operations, equipment noise, dust and working time restrictions. The Contractor shall prosecute the work without delays or extended time intervals between activities. The Contractor shall obtain a demolition permit from the City of Des Plaines.

Prior to and during demolition activities, the site shall be secured with Temporary Chain Link Fence (Portable) located along the site limits of building removal shown on the plans and provide such barricades as is necessary to prevent unauthorized access to the site. Existing Tollway right-of-way fencing may be used to secure the site by closing gaps between the existing right-of-way fencing (which is outside the site limits of building removal) and the proposed site limits of building removal shown on the plans. The temporary chain link fence shall be a minimum of 6 feet high mounted and on stands or other such devices as approved by the Engineer so that the fence is portable and easily relocated as conditions change during construction. The individual fence panels shall be securely fastened together and the stands or other mounting devices shall be weighted with sandbags as necessary to prevent movement. The Contractor shall submit a catalog cut or details of the fence, gates, mounting stands, hardware, and other appurtenances for acceptance by the Engineer. The furnishing, installation, relocation and removal of temporary chain link fence shall not be paid for separately, but shall be included in the cost of BUILDING REMOVAL.

The Contractor is responsible for any damage to adjacent properties and facilities and shall promptly repair any damages to the satisfaction of the Engineer and the property owner at no additional cost. The use of explosives is prohibited.

Open burning of any type is not allowed. Haul routes for debris and access shall be maintained and kept free of dust and debris.

Foundations shall be completely removed. Any holes shall be backfilled with suitable excavated material approved by the Engineer. Backfill shall be deposited in uniform lifts not exceeding 6-inch thick loose measure and compacted.

All asbestos shall be removed from the building(s) prior to demolition.

Erosion Control. The Contractor shall provide erosion control measures for each building site to stabilize disturbed areas as shown on the plans and as described in S.P. 111.2. It is recommended that the minimum area of the site be disturbed.

Best Management Practices. The Illinois Tollway is committed to the reduction of solid and construction waste from landfills and in the recycling of excess material generated by construction activities. It is strongly recommended that the Contractor seek every opportunity to properly recycle all construction material removed from the project sites.

The Contractor will be required to submit a Construction and Demolition Debris Recycling Plan for each demolition site based on the use of Best Management Practices (BMP's) prior to the start of the project to show a good faith effort in recycling material and reducing excess material sent to landfills. This plan shall be submitted at the release of any building to be removed. This plan must also include any recycling efforts of any subcontractor.

The following materials should be considered for recycling efforts:

- Asphalt material (bituminous concrete surfaces/driveways, asphalt shingles, tar paper)
- Portland Cement Concrete material (pavement, curb and gutter, foundations, floors, sidewalks, driveways, barrier walls)
- Metal material (piping, duct work, door/window frames, roof joints, poles and posts, support columns)
- Aluminum materials (siding, wiring, door/window frames)
- Brick (decorative, face, paving)
- Copper material (wire and cable)
- Landscape material (trees, chips, topsoil, plants, sod)
- Site material (aggregate, natural clean sands or soils, topsoil)
- Building components (cabinets, finished wood trim/millwork, windows, doors, window/door frames, plumbing fixtures, heating and cooling equipment, wood flooring, carpeting, lighting fixtures, insulation)

The form at the end of this Special Provision shall be used as a guideline for Construction and Demolition Debris Recycling Plan to document the type of material and volume to be recycled and the location or final disposal of material. This form shall be completed for each building demolition site.

Site Removals. The site shall have all ancillary buildings, structures, and pavements and other above ground items removed, including but not limited to: sidewalks, curbs and gutters, guardrail, fences, flag poles, posts, bollards, foundations, loose portland cement and asphalt concrete, wheel stops, delineators, walls, signs, garbage cans and bins, air pumps, vacuums, and electric vehicle charging stations, and the site shall be cleared of all trees, logs, shrubs, bushes, saplings, stumps, and rubbish of whatever nature. Trees as defined in Article 201.02 shall be removed to a depth of not less than 12 inches below the ground line. The foundations and supports of all items shall be completely removed and holes shall be filled with suitable excavated material approved by the Engineer. Backfill shall be deposited in uniform lifts not exceeding 6-inch thick loose measure and compacted.

The Contractor shall arrange for the discontinuance of all utility services that serve signs and other items as applicable according to the respective requirements and regulations of the utility companies involved. The Contractor shall disconnect and seal, in an approved manner, all service outlets that the serve the sign to be removed.

Utility Removals. The Contractor shall remove the following utilities within the site removal limits:

- water service lines and mains and associated items including but not limited to tees and bends, fire hydrants, vaults, corporation stops, valves and valve boxes
- sanitary, storm, and combined sewers and associated items including, but not limited to, pipes, culverts, manholes, catch basins, inlets, headwalls, and end sections
- lighting and associated items including, but not limited to, poles, mast arms, fixtures, foundations, controllers/cabinets, and conduits
- electrical power facilities including, but not limited to, lines and conduits, meters, poles, transformers and electrical cabinets, and pedestals to the location shown on the plans
- communication facilities including, but not limited to, lines and conduits, meters, poles, cabinets, and pedestals to the location shown on the plans
- gas facilities including, but not limited to, conduits, meters, and valves to the location shown on the plans
- observation wells

The foundations and supports of all items shall be completely removed and holes shall be filled with suitable excavated material approved by the Engineer. Backfill shall be deposited in uniform lifts not exceeding 6-inch thick loose measure and compacted.

Certain public or private utility facilities will be removed by the responsible utility company. The Contractor shall coordinate with and provide access to utility owners for such work.

Excavation of trenches for removal of utilities shall be performed according to the applicable requirements of Article 550.04 of the Standard Specifications. The trench shall be backfilled to the natural line or finished surface. The backfill material shall consist of trench backfill according to Article 550.02 of the Standard Specifications at the locations specified on the plans or excavated material from the trench at all other locations. Backfill shall be deposited and compacted as specified in Method 1 of Article 550.07 of the Standard Specifications.

Excavations for removal of oil separator systems and underground storage tanks shall be backfilled with suitable materials according to the applicable requirements of Article 550.07 of the Standard Specifications unless porous granular embankment is specified on the plans.

Site Grading and Restoration

The Contractor shall grade the site to drain and seed all bare earth areas within the site limits of building removal shown on the plans. Topsoil within the grading limits shall be stripped and stockpiled according to the special provision for Topsoil Stripping and Stockpiling.

The Contractor shall submit a Post-Construction topographic survey of the Project Area representing as-built conditions to the Engineer. The work associated with preparing the topographic survey shall be performed by an Illinois Professional Land Surveyor. The deliverables shall include Computer Aided Design & Drafting (CADD) and Triangulated Irregular Network (TIN) files per the standards and guidelines in the Illinois Tollway CADD Standards Manual.

Method of Measurement: Quantities of items to be removed within the site limits of building removal, of the numbers listed, are approximate and are shown on the plans for the Contractor's information only and may not be completely representative of the field conditions. No additional compensation will be given to the Contractor should actual quantities differ from what is shown in the plans.

All items to be removed within the site limits of building removal will not be measured for payment unless otherwise specified herein or on the building removal plans.

Trench backfill will be measured for payment according to Article 208.03.

Porous granular embankment will be measured for payment according to the special provision Porous Granular Embankment (Illinois Tollway).

Transportation and proper disposal of contaminated soil and water will be measured for payment according to Article 669.15 of the Standard Specifications.

Topsoil stripping and stockpiling will be measured for payment according to the special provision Topsoil Stripping and Stockpiling (Illinois Tollway).

Basis of Payment: This work will be paid for at the lump sum price for BUILDING REMOVAL, of the numbers listed. Payment will be according to the following schedule:

- a) Upon completion of site security and perimeter fencing installation, 10% of this item will be paid.
- b) The remaining 90% will be pro-rated over the time remaining for demolition and associated work required herein and paid in monthly installments.

Seeding and erosion control measures will be paid for separately.

Trench backfill will be paid for according to Article 208.04 of the Standard Specifications.

Porous granular embankment will be paid for according to the special provision Porous Granular Embankment (Illinois Tollway).

Transportation and proper disposal of contaminated soil and water will be paid for according to Article 669.16 of the Standard Specifications.

Topsoil stripping and stockpiling will be paid for according to the special provision Topsoil Stripping and Stockpiling (Illinois Tollway).

| Pay Item Number | Designation | Unit of Measure |
|-----------------|------------------------|-----------------|
| Z0007601 | BUILDING REMOVAL NO. 1 | L SUM |
| Z0007602 | BUILDING REMOVAL NO. 2 | L SUM |

Construction and Demolition Debris Recycling Plan

Site Location Number: _____

Site Address: _____

| MATERIAL TO BE RECYCLED | VOLUME (cu. yd., sf, ton, etc) | DISPOSITION | DATE |
|-------------------------|--------------------------------|-------------|------|
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We certify that the materials listed above were recycled as listed. Other miscellaneous debris was properly disposed of at an approved site. Proof of proper disposal will be provided upon request.

Company: _____

Submitted by : _____

Title: _____

DRAINAGE SCUPPERS (SPECIAL)

Description: This work shall consist of furnishing and installing Drainage Scuppers along with all necessary hardware in accordance with the Plans, Section 1208 or the Illinois Tollway Supplemental Specifications, and as directed by the Engineer. This work shall include the scupper (frame and grate), downspout, anchor studs, and all appurtenances.

Method of Measurement: This work will be measured for payment per each furnished, installed, and accepted.

Basis of Payment: The work will be paid for at the contract unit price per each for DRAINAGE SCUPPERS (SPECIAL).

| Pay Item Number | Designation | Unit of Measure |
|--------------------|-----------------------------|--------------------|
| Z0018000 | DRAINAGE SCUPPERS (SPECIAL) | EACH |

DRAINAGE STRUCTURE TO BE REMOVED

Description: This work shall consist of removing Drainage Structures, Type 4 that are located outside of the Site Limits of Building Removal No. 1 and No 2. This work shall be in accordance with Section 605 of the Standard Specifications except as modified herein. Any references to “manholes, catch basins, and inlets” in Section 605 shall be interpreted as “Drainage Structures, Type 4.”

Method of Measurement: This work will be measured for payment per each drainage structure removed.

Basis of Payment: This work will be paid for at the contract unit price per each for DRAINAGE STRUCTURE TO BE REMOVED.

| Pay Item Number | Designation | Unit of Measure |
|--------------------|----------------------------------|--------------------|
| Z0018700 | DRAINAGE STRUCTURE TO BE REMOVED | EACH |

POROUS GRANULAR EMBANKMENT (Illinois Tollway)

Effective: June 18, 2015

Revised: April 1, 2016

Description. This work shall consist of the furnishing, transporting, placing, compacting and finishing of an aggregate of porous granular embankment material, including the capping aggregate and undercuts, constructed on the finished subgrade in accordance with this special provision and to the lines, dimensions, and cross sections shown on the Plans, or within any undercut area as required by the Engineer.

Materials. The materials used for POROUS GRANULAR EMBANKMENT shall consist of coarse aggregate for porous granular embankment in accordance with Article 1004.05 of the Standard Specifications except as follows:

1. Crushed Stone, Crushed Blast Furnace Slag, and Crushed Concrete* will be permitted. Virgin steel slag and other expansive materials as determined through testing by the Illinois Tollway will not be permitted.

| <u>Sieve Size</u> | <u>Percent Passing With all Materials Processed Through a Stationary Crusher</u> | <u>Percent Passing With Recycled Concrete Processed Through a Mobile Crusher</u> |
|-------------------|--|--|
| 6 inches (150 mm) | 97±3 | 97±3 |
| 4 inches (100 mm) | 90±10 | 90±10 |
| 2 inches (50 mm) | 45±25 | 40±20 |
| #4 (4.75 mm) | - | 15±10 |
| #200 (75 µm) | 5±5 | 5±5 |

2. Gravel, Crushed Gravel, and Pit Run Gravel

| <u>Sieve Size</u> | <u>Percent Passing</u> |
|-------------------|------------------------|
| 6 inches (150 mm) | 97±3 |
| 4 inches (100 mm) | 90±10 |
| 2 inches (50 mm) | 55±25 |
| #4 (4.75 mm) | 30±20 |
| #200 (75 µm) | 5±5 |

3. Crushed Concrete* with Reclaimed Asphalt Pavement (RAP) **

| <u>Sieve Size</u> | <u>Percent Passing</u> |
|-------------------|------------------------|
| 6 inches (150 mm) | 97±3 |
| 4 inches (100 mm) | 90±10 |
| 2 inches (50 mm) | 45±25 |
| #4 (4.75 mm) | 20±20 |
| #200 (75 µm) | 5±5 |

* The production of crushed concrete shall be through stationary crushers that comply with the current IDOT Bureau of Materials and Physical Research Policy

Memorandum, "Recycling Portland Cement Concrete into Aggregate", or with a mobile crusher that complies with the Illinois Tollway's current Construction Bulletin 12-02 for "Production of Certified Aggregate From Reclaimed Roadways and Structures Using Mobile Crushers". The Engineer shall approve the concrete removal method or stockpiled reclaimed material prior to crushing. With stationary crushers stockpile pads shall be provided at the crushing location to assure that acceptable material is not contaminated prior to use. Existing subbase aggregates shall not be intermixed with the recycled concrete either when picking up the broken concrete, feeding the concrete into the crusher, or when stockpiling the recycled aggregate.

- ** The RAP shall be separated and mechanically blended with the crushed concrete so that the bituminous material does not exceed 40% of the final product. The top size of the RAP in the final product shall be less than 4 inches.

The source of aggregate materials shall be optional to the Contractor unless otherwise noted on the Plans.

CONSTRUCTION REQUIREMENTS

The aggregate shall be placed in single lifts not exceeding 12 inches in thickness with a minimum thickness of 9 inches. With the placement of any lift, the material shall be spread uniformly free from segregation. A vibratory roller meeting the requirements of Article 1101.01(g) of the Standard Specifications shall be used to roll any lift of the material to obtain the desired keying or interlock and necessary compaction. The Engineer will verify that adequate keying has been obtained.

When a recommended remedial treatment for unstable subgrades is included in the contract that includes the allowance to use Porous Granular Embankment as a backfill aggregate, the lower lift of porous granular embankment as specified herein may not be placed simultaneously with the special grade of porous granular embankment material required for the SUBGRADE AGGREGATE, SPECIAL.

Method of Measurement. This work will be measured for payment in cubic yards.

Basis of Payment. This work will be paid at the contract unit price per cubic yard for POROUS GRANULAR EMBANKMENT.

| Pay Item Number | Designation | Unit of Measure |
|-----------------|----------------------------|-----------------|
| J1209030 | POROUS GRANULAR EMBANKMENT | CU YD |

TOPSOIL AND COMPOST (Illinois Tollway)

Effective: February 10, 2014

Revised: April 1, 2016

Description. This work shall consist of furnishing, excavating, transportation of topsoil to locations throughout the limits of the contract, temporary stockpiling, placing topsoil, placing special types of topsoil, placing compost, disposal of surplus excavated topsoil, or permanently stockpiling surplus excavated topsoil for the future use.

Materials. Materials shall be according to the following provisions of the Standard Specifications:

| <u>Item</u> | <u>Article/Section</u> |
|--|------------------------|
| (a) Topsoil (Furnished from outside of the R.O.W.) | 1081.05(a) |
| (b) Compost | 1081.05(b) |

CONSTRUCTION REQUIREMENTS

Excavating Topsoil. Topsoil shall be obtained from within the limits of the Illinois Tollway right-of-way at the locations designated in the plans or approved by the Engineer.

When special types of topsoil are specified, each type shall be handled separately and not allowed to mix with any other material. When special types of topsoil (Hydric, Prairie or Woodland) are specified, the seeds and plants within the excavated special topsoils are desirable to maintain. To keep these seeds and plants viable, the topsoil shall be excavated then placed as directed by the Engineer or as specified in the contract.

If, at the time of stripping, the topsoil cannot be placed in its final location as shown on the plans, the material shall be handled in one of the following ways, as directed by the Engineer:

- a) Temporarily stockpiled.
- b) Disposed of. Only applicable to surplus topsoil.
- c) Permanently stockpiled for the future use by the Illinois Tollway. The permanent stockpile location(s) shall be as shown in the plans or designated by the Engineer.

When stockpiling, special measures, such as watering the stockpile, dust control, temporary seeding, and silt fence shall be required as directed by the Engineer and will be paid according to Article 104.02 of the Illinois Tollway Supplemental Specifications.

Furnishing Topsoil. If additional topsoil is required to complete the contract to the lines, grades and depth as shown on the plans, the Contractor shall furnish the additional topsoil from areas outside the limits of the Illinois Tollway right-of-way. This additional topsoil obtained from outside the Illinois Tollway right-of-way shall be tested in accordance with Section 1081.05(a) of the Standard Specifications and approved by the Engineer prior to its use. The Contractor is responsible for all testing of material obtained from an outside source.

Placing Topsoil and Compost. Topsoil shall not be placed until the area to be covered has been shaped, trimmed, and finished according to Section 212 of the Standard Specifications. All irregularities or depressions in the surface due to weathering or other causes shall be filled or smoothed out before the topsoil is placed. If the existing surface has become hardened or crusted, it shall be disked or raked or otherwise broken up so as to provide a bond with the lift of topsoil to be applied, as directed by the engineer.

When compost is specified, it shall be placed at the specified depth on top of the topsoil. The Engineer will verify that the proper topsoil and compost depths have been applied. After verification of proper depth, the Contractor shall completely incorporate the compost into the topsoil by disking or tilling.

Finishing. The surface of the topsoil or compost/topsoil blend shall be free from clods, stones, sticks and debris and shall be according to the lines, grades and the minimum depth as shown on the plans or as directed by the Engineer. A single pass from a track or roller over the entire surface shall be made. Care must be taken to avoid excessive compaction of the topsoil.

Surplus Topsoil. Surplus topsoil shall not be disposed of before topsoil placement is complete unless otherwise approved by the Engineer. Surplus topsoil shall be disposed of in a licensed landfill, recycled, reused, or otherwise disposed of as allowed by State or Federal solid waste disposal laws and regulations and solid waste determinations of the Illinois Environmental Protection agency (IEPA). Surplus topsoil shall not be thickened on site without prior approval from the Engineer.

When the contractor proposes to dispose of surplus topsoil off the Illinois Tollway right-of-way, the Contractor shall obtain and file with the Engineer permission in writing, from the property owner, for the use of the property for this purpose. The approval of the proposed disposal site shall be in according to Article 107.22 of the Illinois Tollway Supplemental Specifications. Any such disposal shall not create an unsightly or objectionable appearance or detract from the natural topographical features, nor be placed at an elevation higher than that of the adjacent roadway without permission from the Engineer.

Method of Measurement. This work will be measured for payment as follows:

Topsoil excavation shall be that material obtained from within the limits of the Illinois Tollway right-of-way in the areas designated on the plans which will be measured in cubic yards in its original position. The volume will be computed by the method of average end areas. Topsoil excavation shall include the excavating, hauling, and stockpiling of the material in the locations approved by the Engineer. Temporary stockpiling of topsoil will not be measured separately for payment.

Topsoil placement will be measured in place in square yards and multiplied by the specified or agreed upon depth to establish a volumetric quantity. Topsoil disposal and/or topsoil permanently stockpiled for the future use by the Illinois Tollway will be calculated as the difference between the topsoil excavation quantity and the topsoil placement volumetric quantity. If the topsoil placement depth is thickened from what is shown on the plans the associated Topsoil Excavation and Disposal quantities will be adjusted accordingly.

Topsoil furnish and place, and compost furnish and place shall be that material obtained from outside the Illinois Tollway right-of-way and will be measured in place in square yards, at the depth specified.

Excavation and embankment quantities for the roadway have been computed on the basis of cut and fill after the topsoil is stripped.

Basis of Payment. That portion of the excavated topsoil material that will be placed within the lines and grades specified in the Contract will be paid per cubic yard as TOPSOIL EXCAVATION AND PLACEMENT. That portion of the excavated topsoil material that will be disposed of or permanently stockpiled for future use by the Illinois Tollway will be paid per cubic yard as TOPSOIL EXCAVATION AND DISPOSAL.

Topsoil and compost brought from outside the Illinois Tollway right-of-way will be paid for at the contract unit prices per square yard for TOPSOIL FURNISH AND PLACE, of the thickness specified and COMPOST FURNISH AND PLACE, of the thickness specified.

| Pay Item Number | Designation | Unit of Measurement |
|--------------------|----------------------------------|------------------------|
| J1211110 | TOPSOIL EXCAVATION AND PLACEMENT | CU YD |

TOPSOIL STRIPPING AND STOCKPILING

DESCRIPTION

This work shall consist of stripping topsoil from within the contract limits to the depths designated on the plans or approved by the Engineer and to stockpile topsoil at the locations shown in the plans or as directed by the Engineer.

Topsoil stockpile locations as shown on the plans shall not be constructed until the area to be covered has been shaped, trimmed and finished according to Section 211 and Section 212 of the Standard Specifications.

METHOD OF MEASUREMENT

Topsoil stripping and stockpiling will be measured in cubic yards in its original position. In no case shall the width and depth used for measurement differ from the dimensions shown on the plans unless such changes have been approved in writing by the Engineer.

BASIS OF PAYMENT

This work will be paid for at the contract unit price per cubic yard for TOPSOIL STRIPPING AND STOCKPILING.

| Pay Item Number | Designation | Unit of Measure |
|--------------------|-----------------------------------|--------------------|
| J1211160 | TOPSOIL STRIPPING AND STOCKPILING | CU YD |

EXPLORATION TRENCH, UTILITIES (Illinois Tollway)

Effective: January 1, 2007

Revised: April 1, 2016

Description. This work shall consist of locating and excavating, by methods of hand excavation or vacuum excavation approved by the Engineer, to verify the horizontal and vertical location of existing regulated (e.g., electric, natural gas, telephone) unregulated (e.g., water, sewer, oil) and Illinois Tollway-owned (e.g., roadway lighting, fiber optic cables) utilities within the Contract Limits shown on the Plans and/or as directed by the Engineer.

Materials. The Materials used for Porous Granular Embankment and backfill shall consist of coarse aggregate meeting the gradation of CA-18 in accordance with Article 1004.05 of the Standard Specifications.

GENERAL REQUIREMENTS

In non-emergency conditions and unless specified elsewhere, the Contractor shall contact the owner of the utility at least seventy-two (72) hours prior to exploratory digging, to provide the anticipated location and to be available during exploration activities. The depth and width of the exploration shall be sufficient to allow positive identification of the type, size and depth of the utility(s). The number of exploration trenches for utilities running along the Illinois Tollway shall be as directed by the Engineer.

When an existing utility is encountered, the Contractor shall verify the type of facility, obtain the horizontal and vertical (to the top of conduit or pipe) data, and transmit a copy of this data to the Engineer. Located utilities shall be marked with lath, flags or any other suitable method which will provide positive identification throughout construction.

Any costs resulting from damage incurred to any utility (including interruption of service provided) shall be the sole responsibility of the Contractor, per Article 105.07 of the Illinois Tollway Supplemental Specifications. Costs relating to damaging the Illinois Tollway facilities on Illinois Tollway right-of-way are as specified in S.P. 115.

After positive location, the Engineer will direct the Contractor as follows:

- Backfill and/or restore the excavated area.
- Leave the excavated area open and protected. The excavated material shall either be stockpiled in an acceptable location and provided with suitable erosion control measures, or disposed of off-site in accordance with Article 202.03 of the Standard Specifications.

Method of Measurement. Exploration trench, utilities (hand excavation) will be measured for payment in feet based on the actual horizontal length along the utility line. Exploration trench, utilities (vacuum excavation) will be measured for payment in feet based on the actual vertical length from the ground down to the top of the utility.

Basis of Payment. This work will be paid for at the contract unit price per foot for EXPLORATION TRENCH, UTILITIES (HAND EXCAVATION) or EXPLORATION TRENCH, UTILITIES (VACUUM EXCAVATION).

| Pay Item Number | Designation | Unit of Measure |
|--------------------|--|--------------------|
| J1213004 | EXPLORATION TRENCH, UTILITIES (HAND EXCAVATION) | FOOT |
| J1213006 | EXPLORATION TRENCH, UTILITIES (VACUUM EXCAVATION) | FOOT |

ASPHALT – TACK COAT (Illinois Tollway)

Effective: April 1, 2016

Revised: May 2, 2018

Description. This work shall consist of furnishing and applying bituminous tack coat material to exposed asphalt or concrete surfaces when constructing asphalt in multiple lifts or to existing pavement surfaces that are being overlaid. The work will be in accordance with Sections 406, 407, 1032, 1101, and 1102 of the Standard Specifications except as modified herein. Any references to HMA in the Standard Specifications or in this special provision shall be construed to include warm-mix asphalt (WMA) and stone matrix asphalt (SMA), as applicable.

Add the following to Note 1 of Article 406.02 of the Standard Specifications:

When ASPHALT TACK COAT (NON-TRACKING) is specified, the bituminous material used for tack coat shall be the SS-1vh type or a Tollway approved equivalent.

Revise Article 406.05(b) of the Standard Specifications to read:

“(b) Tack Coat. The bituminous material shall be prepared according to Article 403.05 and applied according to Article 403.10. The use of RC-70 shall be limited to air temperatures less than 60°F.

(1) Brick, Concrete or HMA Bases. The base shall be cleaned of all dust, debris and any substance that will prevent the tack coat from adhering to the base. Cleaning shall be accomplished by sweeping to remove all large particles and air blasting to remove dust. As an alternative to air blasting, a vacuum sweeper may be used to accomplish the dust removal. The base shall be free of standing water at the time of application. The tack coat shall be applied uniformly and at a rate that will provide a residual asphalt rate on the prepared surface as specified in the following table:

| Type of Surface to be Tacked | Residual Asphalt Rate lb/sq ft |
|--|--------------------------------|
| Milled HMA, Aged Non-Milled HMA, Milled Concrete, Non-Milled Concrete & Tined Concrete | 0.055 |
| HMA Lifts, IL-4.75 & Brick | 0.035 |

The bituminous material for the tack coat shall be placed one lane at a time. Any vertical or inclined face that is to be paved against shall be coated at the above specified rate for the material of the tacked face. If a spray paver is not used, the tacked lane shall remain closed until the tack coat is fully cured and does not pickup under traffic. When placing tack coat through an intersection where it is not possible to keep the lane closed, the tack coat may be covered immediately following its application with fine aggregate mechanically spread at a uniform rate of 2 to 4 lb/sq yd.

(2) Aggregate Bases. The tack coat shall not be applied to aggregate bases.

The residual asphalt rate will be verified by the Tollway a minimum of once per week or 10,000 tons placed per type of mixture to be tacked as specified herein for which at least 2000 tons of HMA will be placed. The test will be according to the IDOT “Determination of Residual Asphalt in Prime and Tack Coat Materials” test procedure. Residual asphalt rate shall be tested

sufficiently to ensure proper application. If failing results are encountered, each application shall be tested until passing results are found. Payment deduction will be enforced for all pavement affected by failing results. A failing test applies to all areas from the beginning of the job or the most recent passing result. Payment for areas with less than required tack coat shall be applied according to the following table:

| Tack Quantity less than Specified (lb/sq-ft) | Deduction from unit price of HMA lift above tack placement |
|---|--|
| 0.001 – 0.010* | \$1.00/ton |
| 0.011 – 0.020* | \$2.00/ton |
| 0.021 – 0.030* | \$5.00/ton |
| > 0.030* | Remove and replace HMA lift above tack placement at contractor's expense |

*If tack quantity results are available before subsequent lift of HMA is placed, the contractor will have the opportunity to place additional tack in order to get the quantity within specification.

Tack coat shall be fully cured prior to placement of HMA to prevent pickup by haul trucks or paving equipment. If pickup occurs, paving shall cease in order to provide additional cure time, and all areas where the pickup occurred shall be repaired.

If after five days, loss of tack coat is evident prior to covering with HMA, additional tack coat shall be placed as determined by the Engineer at no additional cost to the Illinois Tollway."

Replace 406.14 of the Standard Specifications with the following:

"Basis of Payment

This work will be paid for at the contract unit price per pound of residual asphalt applied for ASPHALT TACK COAT, ASPHALT POLYMERIZED TACK COAT and ASPHALT TACK COAT (NON-TRACKING).

| Pay Item Number | Designation | Unit of Measure |
|--------------------|-------------------|--------------------|
| J1406107 | ASPHALT TACK COAT | POUND |

BRIDGE APPROACH SLAB

Description. This work shall consist of a cast-in-place reinforced concrete bridge approach slab composed of Portland Cement Concrete, constructed on a prepared Subbase in accordance with details shown in the plans.

Except as modified herein, the work performed under this Section will conform to the applicable portions of Sections 420, 503 and 520 of the Standard Specifications.

Materials. All materials shall conform to the requirements of Sections 420, 503 and 520 of the Standard Specifications except as follows:

- a) Concrete placement for Bridge Approach Slabs shall be in accordance with Article 503.16 of the Standard Specifications.
- b) Concrete materials shall be in accordance with the Illinois Tollway special provision Performance-Related Special Provision for High Performance Concrete Mix Designs for Concrete Superstructure.
- c) Reinforcement Bars shall be in accordance with Article 1006.10 of the Standard Specifications.
- d) Granular Subbase shall be in accordance with the latest Illinois Tollway special provision for Granular Subbase Special.
- e) Expansion anchors, anchor studs, bolts, nuts, and washers shall be in accordance with Article 1006.09 of the Standard Specifications.
- f) Steel plates shall be in accordance with Article 1006.04 Grade 36 of the Standard Specifications.
- g) Dowels shall be in accordance with Article 1006.11 of the Standard Specifications.
- h) Hot-poured, low modulus polymer sealant shall meet the requirements of ASTM D6690.
- i) Steel plates, bolts, nuts and washers shall be hot-dipped galvanized in accordance with AASHTO M 111.
- j) Protective Coat shall be in accordance with Section 1023 of the Standard Specifications.
- k) The Elastomeric sheet shall be in accordance with Article 1083.02(a) of the Standard Specifications.

Equipment. Equipment shall conform to the applicable requirements of Sections 420, 503 and 520 of the Standard Specifications, except as modified herein in accordance with the construction requirements, and shall be subject to the approval of the Engineer.

CONSTRUCTION REQUIREMENTS

The bridge approach slab shall be constructed according to the details shown in the plans.

Approach Slab concrete shall be placed when the temperature is expected to rise for a minimum of 8 hours after the concrete reaches its initial set.

The granular subbase shall be constructed according to the Illinois Tollway Special Provision for Granular Subbase Special.

Protective Coat shall be in accordance with Article 420.18 of the Standard Specifications.

The bridge deck grooving of the Approach Slab shall be in accordance with Article 503.16(a)(3)b of the Standard Specifications. Stop bridge deck grooving 2 in. +/- 1 in. from the saw cut longitudinal and transverse joints, and formed joints between abutment and approach slab.

Method of Measurement. This work will be measured for payment in place, and the area computed in square yards. The dimensions used will not exceed those shown on the plans or ordered in writing by the Engineer.

Sealant, backer rod, polyethylene sheeting bond breaker, drilling and grouting of dowels, dowel bar assemblies, expansion anchors, mechanical couplers, granular subbase, elastomeric sheet, anchor studs, steel plates, concrete, reinforcing steel, protective coat and bridge deck grooving will not be measured for payment and will be considered included in the cost of BRIDGE APPROACH SLAB.

Basis of Payment. This work will be paid for at the contract unit price per square yard for BRIDGE APPROACH SLAB.

| Pay Item Number | Designation | Unit of Measure |
|-----------------|----------------------|-----------------|
| JI420040 | BRIDGE APPROACH SLAB | SQ YD |

CONCRETE MEDIAN BARRIER AND BASE REMOVAL

This work shall be performed in accordance with Section 440 of the Standard Specifications except as modified herein.

Revise Article 440.01 of the Standard Specifications to read:

“440.01 Description. This work shall consist of the removal of the existing concrete shoulder barrier wall or median barrier wall along with any barrier wall base at locations designated on the plans and in accordance with the applicable portions of Sections 440 of the Standard Specifications. The portion of the existing wall to be removed shall be saw cut full depth with a concrete saw without causing damage to the portion of the existing concrete barrier wall to remain. The Contractor shall be responsible for all damage to existing concrete barrier wall and other appurtenances to remain in place. All damage to these items shall be repaired or replaced at the Contractor’s own expense, and to the satisfaction of the Engineer.”

Add the following to Article 440.02 of the Standard Specifications:

“(b) Concrete Saw. The concrete saw shall be equipped with a diamond blade of sufficient size to saw cut reinforced concrete barrier wall full-depth and be capable of accurately maintaining cutting depth and alignment.”

Revise Article 440.07 of the Standard Specifications to read:

“440.07 Method of Measurement. This work will be measured for payment in feet. The measurement for payment will be made along the top edge of concrete barrier wall.

Full depth saw cuts will not be measured for payment but shall be included in the cost of concrete barrier removal.”

Revise Article 440.08 of the Standard Specifications to read as follows:

“Basis of Payment. This work will be paid for at the contract unit price per foot for CONCRETE MEDIAN BARRIER AND BASE REMOVAL, which price shall be payment in full for all labor, equipment and materials necessary to remove and dispose of the concrete barrier wall and concrete barrier wall base.”

| Pay Item Number | Designation | Unit of Measure |
|-----------------|--|-----------------|
| J1440010 | CONCRETE MEDIAN BARRIER AND BASE REMOVAL | FOOT |

ASPHALT SHOULDERS (Illinois Tollway)

Effective: March 26, 2010

Revised: January 25, 2018

Description. This work shall consist of constructing Asphalt Shoulders using hot mix asphalt (HMA) or warm mix asphalt (WMA) according to Section 482, of the Standard Specifications except as modified herein. When WMA mixtures are required by design, a HMA mixture may be utilized for special or low tonnage applications in lieu of WMA mixtures upon approval by the Engineer at no additional cost to the Illinois Tollway. When HMA mixtures are required by design, a WMA mix may be utilized for special or low tonnage application in lieu of HMA mixtures upon approval by the Engineer at no additional cost to the Illinois Tollway.

Revise Article 482.02 of the Standard Specifications to read:

482.02 Materials. Materials shall be according to Section 406 and Section 1030 of the Standard Specifications except at modified herein.

“For construction or resurfacing projects when the HMA or WMA binder and surface course mixtures option is used, the asphalt cement used in the top lift shall not be increased above the amount required in the mix design.

Reclaimed Asphalt Shingles (RAS) used in any mixture shall be according to the Illinois Tollway special provision for RECLAIMED ASPHALT SHINGLES.

For construction or resurfacing projects when the WMA binder and surface course mixtures are used, the WMA mix designs, production and placement shall be in accordance with the special provision for ASPHALT BINDER AND SURFACE COURSE MIXTURES and herein.

For Shoulder mixes containing more than 20 percent binder replacement, a chemical additive shall be used as the WMA technology.

Revise Note 2 of Article 1030.02 of the Standard Specifications to read as follows:

“Note 2. The Contractor shall use the asphalt binder grade as shown below:

N50 Binder Mixture

| Reclaimed Material | Binder Replacement % | Asphalt Binder Grade |
|---------------------------------------|-----------------------------|-----------------------------|
| RAS/RAP/FRAP | 0-20 | PG 64-22 |
| Category 1 or 2 FRAP only or with RAS | 21-40 | PG 58-28 |
| Category 1 or 2 FRAP with RAS | 41-60 ¹ | PG 52-34 ^{2,3} |

1/ DCT (ASTM D7313) value as tested both in design and 1st day of construction after an approved Test Strip shall meet or exceed 400 J/m² when tested at -12 °C. DCT test to be performed by an AMRL certified Laboratory.

2/ PG 46-34 shall be considered an equivalent to PG 52-34

3/ Alternate Grades or Modifiers may be considered with approval of the engineer for mixtures to be used on the shoulder.

N70 Surface Mixture

| Reclaimed Material | Binder Replacement % | Asphalt Binder Grade |
|--|-----------------------------|-----------------------------|
| RAS/RAP/FRAP | 0-20 | PG 64-22 |
| RAS by itself or with Category 1 or 2 FRAP | 21-40 | PG 58-28 |
| RAS with Category 1 or Category 2 FRAP | 41-50 ¹ | PG 52-34 ^{2,3} |

1/ DCT (ASTM D7313) value as tested both in design and 1st day of production after an approved Test Strip shall meet or exceed 400 J/m² when tested at -12 °C. DCT test to be performed by an AMRL certified Laboratory.

2/ PG 46-34 shall be considered an equivalent to PG 52-34

3/ Alternate Grades or Modifiers may be considered with approval of the engineer for mixtures to be used on the shoulder.

Add the following to Article 1030.04 (b) of the Standard Specifications:

“(4) HMA and WMA N50 Binder

| VOLUMETRIC REQUIREMENTS Illinois Tollway Shoulder Binder | | | |
|---|-----------------------------|---|---|
| Ndesign | Design Air Voids Target% | Design Voids in the Mineral Aggregate (VMA), % minimum | Design Voids Filled with Asphalt Binder (VFA), % |
| 50 | 3.0 | 12.5 | 65-78 |

Revise the Density Control Limits table in Article 1030.05(d)(4) of the Standard Specifications to read as follows:

| DENSITY CONTROL LIMITS | | |
|--------------------------|---------------------|-----------------|
| Mixture Composition | Parameter | Individual Test |
| IL-9.5, IL-12.5 | Ndesign ≥ 90 | 92.0 – 96.0 % |
| IL-9.5, IL-9.5L, IL-12.5 | Ndesign < 90 | 92.5 – 97.4 % |
| IL-19.0, | Ndesign ≥ 90 | 93.0 – 96.0 % |
| IL-19.0, IL-19.0L | Ndesign ≥ 70 & < 90 | 93.0 – 97.4 % |
| IL-19.0, IL-19.0L | Ndesign = 50 | 94.0 – 98.4% |
| | | |

Method of Measurement. This work will be measured for payment in accordance with Article 482.07 of the Standard Specifications.

Basis of Payment. This work will be paid for in accordance with Article 482.08 of the Standard Specifications except as modified herein.

Add the following to Article 482.08 of the Standard Specifications:

HOT-MIX ASPHALT SHOULDERS or WARM-MIX ASPHALT SHOULDERS of the specified thickness will be paid for under its respective item. If permissive use of an HMA mixture in place of a specified WMA mixture is granted by the Engineer, a new pay item will be established for the HMA with the same unit price. If permissive use of a WMA mixture in place of a specified HMA mixture is granted by the Engineer, a new pay item will be established for the WMA with the same unit price.”

| Pay Item Number | Designation | Unit of Measure |
|--------------------|------------------------------------|--------------------|
| JI482112 | WARM-MIX ASPHALT SHOULDERS (9 IN.) | SQ YD |

TEMPORARY PAVEMENT

Description. This work shall consist of constructing a temporary pavement for bridge approach slab protection at the locations shown on the plans or as directed by the Engineer.

TEMPORARY PAVEMENT, CLASS 2 shall be for temporary pavements that are designed to be opened for a period of more than 6 months and shall consist of an undoweled Portland cement concrete in accordance with Sections 353 and 354 of the Standard Specifications except final finish shall be according to Article 420.09(e)(2). The variable thickness of the temporary pavement shall be as shown on the plans.

Bond breakers shall be furnished and installed as shown on the plans.

Materials. Concrete used for temporary pavements shall be Class PV concrete in accordance with Section 1020 of the Standard Specifications.

Method of Measurement. This work will be measured in place and the area computed in square yards.

Basis of Payment. This work will be paid for at the contract unit price per square yard for TEMPORARY PAVEMENT, CLASS 2.

| Pay Item Number | Designation | Unit of Measure |
|-----------------|-----------------------------|-----------------|
| J1485020 | TEMPORARY PAVEMENT, CLASS 2 | SQ YD |

CONCRETE STRUCTURES (Illinois Tollway GBSP)

Effective: July 22, 2014

Revised: April 1, 2016

Description. This special provision shall consist of constructing cast-in-place concrete structures that shall include bridge deck and diaphragm elements of the superstructure constructed in one continuous operation between expansion or construction joints specified with Illinois Tollway Class HP high performance concrete. The concrete structure shall also include concrete parapets and railing elements of the superstructure that shall not be placed monolithically with the deck and shall be constructed using standard IDOT Class BS concrete. Section 503 of the Standard Specifications shall apply, except as modified herein.

Materials. Replace Article 503.02(a) of the Standard Specifications with the following:

“(a) Portland Cement Concrete for all portions of the structure excluding the bridge deck and diaphragms shall be in accordance with Section 1020 of the Standard Specifications. High Performance Concrete for deck and diaphragms of the concrete superstructure shall be Illinois Tollway Class HP concrete designed in accordance with the Illinois Tollway’s “Performance Related Special Provision for High Performance Concrete Mix Designs for Concrete Superstructure.”

CONSTRUCTION REQUIREMENTS

Add this sentence to the end of the ninth paragraph of Article 503.06 of the Standard Specifications:

“Where stainless steel reinforcement bars are specified, all metal items to remain in the concrete structure, such as tie bars, bolts, anchorages, and metal ties, shall be fabricated with stainless steel.”

Add this sentence to the end of the first paragraph of Article 503.06(b) of the Standard Specifications to read:

“Where stainless steel reinforcement bars are specified, all metal tie rods, bolts, anchorages, brackets, and other forming hardware which is incorporated into the bridge deck shall be stainless steel.”

Revise the Second Paragraph of Article 503.06(b) of the Standard Specifications to read as follows.

“When the Contractor uses cantilever forming brackets on exterior beams or girders, additional requirements shall be as follows.”

Revise Article 503.06(b)(1) of the Standard Specifications to read as follows.

“(1) Bracket Placement. The spacing of brackets shall be per the manufacturer’s published design specifications for the size of the overhang and the construction loads anticipated. The resulting force of the leg brace of the cantilever bracket shall bear on the web within 6 inches of the bottom flange of the beam or girder.”

Revise Article 503.06(b)(2) of the Standard Specifications to read as follows.

“(2) Beam Ties. The top flange of exterior steel beams or girders supporting the cantilever forming brackets shall be tied to the bottom flange of the next interior beam. The top flange of exterior concrete beams supporting the cantilever forming brackets shall be tied to the top flange of the next interior beam. The ties shall be spaced at 4 foot centers. Permanent cross frames on steel girders may be considered a tie. Ties shall be a minimum of ½-inch diameter threaded rod with an adjusting mechanism for drawing the tie taut. The ties shall utilize hanger brackets or clips which hook onto the flange of steel beams. No welding will be permitted to the structural steel or stud shear connectors, or to reinforcement bars of concrete beams, for the installation of the tie bar system. After installation of the ties and blocking, the tie shall be drawn taut until the tie does not vary from a straight line from beam to beam. Where stainless steel reinforcement bars are specified, ties shall be a minimum of No. 4 stainless steel reinforcement bars, and steel items contained in the tie bar stabilizing system shall be fabricated with stainless steel. The tie system shall be approved by the Engineer.”

Revise Article 503.06(b)(3) of the Standard Specifications to read as follows.

“(3) Beam Blocks. Suitable beam blocks of 4 inch x 4 inch timbers or metal structural shapes of equivalent strength or better, acceptable to the Engineer, shall be wedged between the webs of the two beams tied together, within 6 inches of the bottom flange at each location where they are tied. When it is not feasible to have the resulting force from the leg brace of the cantilever brackets transmitted to the web within 6 inches of the bottom flange, then additional blocking shall be placed at each bracket to transmit the resulting force to within 6 inches of the bottom flange of the next interior beam or girder.”

Delete the last paragraph of Article 503.06(b) of the Standard Specifications.

Revise the third paragraph of Article 503.16 of the Standard Specifications to read as follows.

“Fogging equipment shall be in operation during the bridge deck placement. Fogging equipment shall be adequate to reach or cover the entire pour from behind the finishing machine or vibrating screed to the point of curing covering application, and shall be operated in a manner which shall not accumulate water on the deck until the curing covering has been placed.”

Revise the third paragraph of Article 503.16(a)(1) of the Standard Specifications to read as follows.

“At the Contractor’s option, a vibrating screed may be used in lieu of a finishing machine for superstructures with a pour width less than or equal to 24 feet. After the concrete is placed and consolidated, it shall be struck off with a vibrating screed allowing for camber, if required. The vibrating screed shall be of a type approved by the Engineer. A slight excess of concrete shall be kept in front of the cutting edge at all times during the striking off operation. After screeding, the entire surface shall be finished with hand-operated longitudinal floats having blades not

less than 10 feet in length and 6 inches in width. Decks so finished need not be straightedge tested as specified in 503.16(a)(2).”

Delete the fifth paragraph of 503.16(a)(1) of the Standard Specifications.

Revise Article 503.16(a)(2) of the Standard Specifications to read as follows.

“(2) Straightedge Testing and Surface Correction. After the finishing has been completed and while the concrete is still plastic, the surface shall be tested for trueness with a 10 foot straightedge, or a hand-operated longitudinal float having blades not less than 10 feet in length and 6 inches in width. The Contractor shall furnish and use an accurate 10 foot straightedge or float which has a handle not less than 3 feet longer than one-half of the pour width. The straightedge or float shall be held in contact with the surface and passed gradually from one side of the superstructure to the other. Advance along the surface shall be in successive stages of not more than one-half the length of the straightedge or float. Any depressions found shall be immediately filled with freshly mixed concrete, struck off, consolidated, and refinished. High areas shall be cut down and refinished.”

Revise Article 503.17 of the Standard Specifications to read as follows.

“Concrete shall be cured according to Article 1020.13 with exception to the Illinois Tollway Class HP concrete for bridge decks that will be cured in accordance with the Illinois Tollway special provision for High Performance Concrete Mix Designs for Concrete Superstructure.”

Replace the second sentence of the first paragraph of Article 1020.13(a)(5) of the Standard Specifications with the following sentences.

“Cotton mats in poor condition will not be allowed. The cotton mats shall be placed in a manner which will not create indentations greater than ¼-inch in the concrete surface. Minor marring of the surface is tolerable and is secondary to the importance of timely curing.”

Revise Article 1103.13(a) of the Standard Specifications to read as follows.

“(a) Bridge Deck. The finishing machine shall be equipped with: (1) a mechanical strike off device; (2) either a rotating cylinder(s) or a longitudinal oscillating screed which transversely finishes the surface of the concrete. The Contractor may attach other equipment to the finishing machine to enhance the final finish when approved by the Engineer. The finishing machine shall produce a deck surface of uniform texture, free from porous areas, and with the required surface smoothness.

The finishing machine shall be operated on rails or other supports that will not deflect under the applied loads. The maximum length of rail segments supported on top of beams and within the pour shall be 10 feet. The supports shall be adjustable for elevation and shall be completely in place to allow the finishing machine to be used for the full length of the area to be finished. The supports shall be approved by the Engineer before placing of the concrete is started.”

Revise Article 1103.17(k) of the Standard Specifications to read as follows.

“(k) Fogging Equipment. Fogging equipment shall be hand held fogging equipment for humidity control. The equipment shall be capable of atomizing water to produce a fog blanket by the use of pressure 2500 psi minimum and an industrial fire hose fogging nozzle or equivalent. Fogging equipment attached to the finishing machine will not be permitted.”

Method of Measurement. This work will be measured in accordance with Article 503.21 of the Standard Specifications.

Reinforcement bars will be measured for payment according to the Illinois Tollway special provision for Reinforcement Bars, and/or Article 508.07 of the Standard Specifications.

Basis of Payment. This work will be paid in accordance with Article 503.22 of the Standard Specifications except as follows:

Revise the first paragraph of Article 503.22 of the Standard Specifications to read:

“This work will be paid for at the contract unit price per cubic yard for CONCRETE STRUCTURES, CONCRETE SUPERSTRUCTURE, and HIGH PERFORMANCE CONCRETE SUPERSTRUCTURE.”

Reinforcement bars will be paid for according to the Illinois Tollway special provision for Reinforcement Bars, and/or Article 508.10 of the Standard Specifications.

| Pay Item Number | Designation | Unit of Measure |
|-----------------|--|-----------------|
| J1503010 | HIGH PERFORMANCE CONCRETE SUPERSTRUCTURE | CU YD |

MECHANICALLY STABILIZED EARTH RETAINING WALL (Illinois Tollway GBSP)

Effective: April 1, 2016

Revised: October 21, 2016

Description. This work shall consist of furnishing and constructing the retaining wall system, as specified to the lines, grades, and dimensions shown on the plans and as directed by the Engineer in accordance with Section 522 of the Standard Specifications except as modified herein..

Replace the first paragraph of Article 522.09(a) of the Standard Specifications with the following:

Design Criteria. Design computations and shop drawings shall be submitted according to Article 522.05. The Contractor shall be responsible for all internal stability aspects of the wall design and shall submit to the Engineer computations for each designed wall section. Settlement, bearing capacity and overall slope stability must be analyzed by previous soil investigations at the job site and results should be included in the plans. If conditions encountered in the field are different than those indicated, the Contractor shall notify the Engineer to determine if additional analysis is required. The wall shall not be designed for seismic loading unless noted on the plans.

Replace the 1st paragraph of Article 522.09(a)(1) of the Standard Specifications with the following:

MSE Walls. The reduced section of the soil reinforcing system shall be sized to allowable stress levels at the end of a 75-year design life. For walls in front of bridge abutments, a 100-year design life is required. The design life for epoxy and aluminizing shall be assumed to be 16 years. The corrosion protection for the balance of the design life shall be provided using a sacrificial steel thickness computed for all surfaces.

Replace the 4th paragraph of Article 522.09(b)(1) of the Standard Specifications with the following:

When pile sleeves are specified they are to reduce skin friction between the select fill and pile. The pile sleeve material, shape, and wall thickness shall be submitted to the Engineer for approval. It shall have adequate strength to withstand the select fill pressures without collapse until after the completion of the wall settlement. The sleeve size shall be as specified on the plans. If the sleeve size is not specified on the plans, the annulus between the pile and the sleeve shall be as small as possible while still allowing it to be filled with loose, dry sand after wall erection.

Add the following to Article 522.09 of the Standard Specifications:

- (c) For all MSE Walls not designated as Temporary, the Contractor shall submit all System Supplier's warranties for materials incorporated into the Work in accordance with Article 105.18 of the Illinois Tollway Supplemental Specifications except as modified herein. The warranty shall be in accordance with Article 109.08(a) Guaranty Against Defective Work of the Illinois Tollway Supplemental Specifications. A 3-year Contractor warranty period shall be provided. In the event any defects occur, the Contractor shall complete the repairs at no additional cost to

the Illinois Tollway, within 60 days of written notification of such defects. The warranty shall be cosigned by a nationally registered bonding company and acceptable to the Illinois Tollway. A 5-year Manufacturer/System Supplier warranty period shall be provided. In the event the system fails to meet the 5-year warranty period, the Manufacturer/System Supplier shall complete the repairs at no additional cost to the Illinois Tollway within 60 days of written notification of such defects.

Basis of Payment. This work will be paid for in accordance with of Article 522.16 of the Standard Specifications except as modified herein.

Replace the 1st paragraph of Article 522.16 of the Standard Specifications with the following:

This work will be paid at the contract unit price per square foot, for MECHANICALLY STABILIZED EARTH RETAINING WALL or TEMPORARY MECHANICALLY STABILIZED EARTH RETAINING WALL.

Replace the 2nd paragraph of Article 522.16 of the Standard Specifications with the following:

Concrete coping, coping seal and coping preformed joint seal for MSE walls, when specified on the plans, will not be paid for separately. Other concrete appurtenances for MSE walls such as anchorage slabs, parapets, abutments caps, etc., are not included in this work and will be paid for separately.

| Pay Item Number | Designation | Unit of Measure |
|-----------------|--|-----------------|
| J1522500 | MECHANICALLY STABILIZED EARTH RETAINING WALL | SQ FT |

FORM LINER SIMULATED LIMESTONE SURFACE AND FORM LINER MOCKUP (Illinois Tollway)

Effective: May 17, 2007

Revised: April 1, 2016

DESCRIPTION

This work shall consist of designing, developing, furnishing and installing form liners and forming concrete using reusable, high-strength urethane form liners to achieve the various concrete treatments as shown in the plans. This work also consists of providing and applying a concrete stain to the textured surface to replicate actual stone. Form lined surfaces shall include areas of wall facings, where shown in the plans. The form liner pattern used for each wall type may vary to convey a uniform appearance as indicated on the plans. This Work shall also be performed in accordance with applicable portions of Sections 503 and 504 of the Standard Specifications.

Form liners shall be installed 12" below finish grade unless otherwise shown on the plans. The form liner shall match the exact size of concrete units and adhere to the provisions listed herein and in the Plans. The form liner stone module is to be integrated into the specified surfaces such that there are no joints crossing the stone modules.

FABRICATOR REQUIREMENTS

The form liner manufacturers included herein have been pre-approved to provide form liners. Other manufacturer's products will be considered, provided sufficient information is submitted 30-days prior to use to allow the Illinois Tollway to determine that products proposed are equivalent to those named. All manufacturers of form liners shall adhere to the provisions listed herein and in the Plans.

SHOP DRAWINGS

Shop drawings of the concrete facing patterns shall be submitted for each area of textured concrete. Shop drawing submittals shall include:

1. Individual form liner pattern descriptions, dimensions, and sequencing of form liner sections. Include details showing typical cross sections, joints, corners, step footings, stone relief, stone size, pitch/working line, mortar joint and bed depths, joint locations, edge treatments, and any other special conditions.
2. Elevation views of the form liner panel layouts for the texture showing the full length and height of the structures including the footings with each form liner panel outlined. The arrangement of the form liner panels shall provide a continuous pattern of desired textures and colors with no interruption of the pattern made at the panel joints.

To minimize the possibility of preparing an unsatisfactory Cast Concrete Mockup as described herein, the Contractor may elect to provide shop drawings for the Mockups.

MATERIALS

Form liners shall be high quality, highly reusable and capable of withstanding anticipated concrete pour pressures without causing leakage or causing physical defects. Form liners shall attach easily to pour-in-place forms and be removable without causing concrete surface damage or weakness in the substrate. Liners used for the texture shall be made from high-strength elastomeric urethane material which shall not compress more than 0.02 feet when poured at a rate of 10 vertical feet per hour. Form release agents shall be non-staining, non-

residual, non-reactive and shall not contribute to the degradation of the form liner material. Forms for smooth faced surfaces shall be plastic coated or metal to provide a smooth surface free of any impression or pattern. If the contractor elects to use form ties for concrete forming, only fiberglass form ties will be permitted. Use of removable metallic form ties will not be allowed.

Store concrete stain materials in an area where temperatures will not be less than 50°F (10°C) or more than 100°F (38°C) and in accordance with OSHA and local Fire Code Requirements.

Deliver materials in original and sealed containers, clearly marked with the manufacturer's name, brand name, type of material, batch number, and date of manufacture.

FORM LINER MOCKUP

The Contractor shall provide a cast concrete mockup containing the form liner surface. The form liner manufacturer's technical representative shall be on-site for technical supervision during the installation and removal operations.

Purpose of the mockup is to select and verify the pattern and concrete stain to be used.

1. Locate mockup on site as directed by the Engineer.
2. The cast-in-place mockup shall be a minimum 10 ft x 10 ft x 6 in. thick minimum and the pre-cast mock-up shall consist of a minimum of 3 modules. Size shall be varied as required to demonstrate patterning.
3. Using the same substrate and application techniques that will occur in the final structure, apply the concrete stain to the front face of the mock-up wall located on the jobsite. Stain shall be of type and color which will be used on actual walls. Application procedures and absorption rates shall be as hereinafter specified, unless otherwise recommended by the manufacturer in writing to achieve color uniformity.
 - a. Acceptance by the Engineer shall serve as a standard of comparison with respect to color and overall appearance.
 - b. General application to actual surfaces on the retaining wall shall not proceed until jobsite mockup has been approved in writing by the Engineer.
4. Include examples of each condition required for construction i.e. liner joints, construction joints, expansion joints, steps, corners, and special conditions due to topography or man-made elements, etc.
5. Upon receipt of comments from inspection of the mockup, adjustments or corrections shall be made to the molds where imperfections are found. If required, additional mockups shall be prepared when the initial mockup is found to be unsatisfactory.
6. After concrete work on mockup is completed and cured and after surface is determined to be acceptable for coloring, apply color stain system.
7. After coloring is determined to be acceptable by the Engineer, construction of project may proceed, using mockup as quality standard.

QUALIFICATIONS OF CONTRACTOR

The concrete stain applicator shall have a minimum of one (1) year demonstrated experience in applying stains. The Contractor shall submit evidence of appropriate experience, job listings, and project photographs from previous work.

CAST-IN-PLACE CONCRETE

The following form liner manufacturers have been pre-approved to provide the listed pattern for the limestone surface form liner for use with the cast-in-place concrete units.

- a. Custom Rock International, St. Paul, MN (Jim Rogers; 800-637-2447) #1102 Rectangular Cut Stone (24").
- b. Milestone Incorporated, Hudson, WI (Paul Nasvik; 715-381-9660) MS-#1012 24" weathered Limestone.

Other manufacturer's products will be considered, provided sufficient information is submitted 30-days prior to use to allow the Engineer to determine that products proposed are equivalent to those named.

All manufacturers of form liners shall fabricate form liners to match the provisions listed herein and in the Plans. The form liner stone module is to be integrated into the face panel such that there are no joints crossing the stone modules.

The relief shall be 2 ½" average and no greater than 4½" maximum.

A pattern "exhibit A" is provided below, illustrating the appearance desired.



Exhibit A- Cast-in place Pattern

PRECAST CONCRETE PANELS

The precast concrete panels shall be furnished in the System Supplier's standard dimensions except for the following conditions:

1. Panels at the bottom tier and panels at the top tier of a wall with a level top line may be cut horizontally so that they shall have an exposed face area not less than one-third the face area of the standard panel.
2. Exposed face areas of panels may be any area required to fill in at the top tier to produce a sloped and continuous (straight or curved) line at the top of the wall.

The maximum panel size shall be 50 square feet. The length to height ratio of the panel shall be greater than or equal to 1.0 but not to exceed 3.0. The minimum panel thickness shall be 5½ inches.

The panels shall be positively interlocked by means of clips, pins or continuous ship laps or tongues and grooves in the top, bottom, and sides of the panels. Panels shall be designed to conceal joints and bearing pads.

1. The following form liner manufacturers have been pre-approved to provide the listed pattern for the limestone surface form liner for use with the Precast Concrete Units.
 - a. Custom Rock International, St. Paul, MN. (Jim Rogers; 800-637-2447) # 1104-R2

- (14 ¾") or # 11016 random Cut Stone (16").
- b. Milestones Incorporated, Hudson, WI. (Paul Nasvik; 715-381-9660) MS-1018, 16" Weathered Limestone.
 - c. Architectural Polymers, New Ringgold, PA. (Rick Fasching; 610-824-3322) # 893 14" Quarry Stone or # 894 – 16" Quarry Stone.

Other manufacturer's products will be considered, provided sufficient information is submitted 30-days prior to use to allow the Engineer to determine that products proposed are equivalent to those named. A pattern "exhibit" is provided below, illustrating the appearance desired.

The appropriate number of molds and subsequent form liners shall be provided to ensure that the natural and continuous stone pattern be maintained throughout all panels, including stone coursing, mortar joint and relief.

The relief shall be approximately 1 ½" average and no greater than 2 1/2 maximum.

A pattern "exhibit B" is provided below, illustrating the appearance desired.



Exhibit B- Precast Concrete Panels Pattern

GRAVITY TYPE RETAINING WALL, FORM LINERS

The following form liner manufacturers have been pre-approved to provide the listed pattern for the limestone surface form liner for use with the Gravity Type Retaining Wall System, Precast Concrete Units.

- a. Custom Rock International, St. Paul, MN. (Jim Rogers; 800-637-2447) # 11016 random Cut Stone (16").
- b. Milestones Incorporated, Hudson, WI. (Paul Nasvik; 715-381-9660) MS-1018, 16" Weathered Limestone.
- c. Architectural Polymers, New Ringgold, PA. (Rick Fasching; 610-824-3322) # 893A – 15" Quarry Stone or # 897A- 14 ¾" Quarry Stone.

Other manufacturer's products will be considered, provided sufficient information is submitted 30-days prior to use to allow the Engineer to determine that products proposed are equivalent to those named. A pattern "exhibit" is provided below, illustrating the appearance desired.

All manufacturers of form liners shall fabricate form liners to match the exact size of the precast concrete unit face panels and adhere to the provisions listed herein and in the Plans. The form liner stone module is to be integrated into the face panel such that there are no joints crossing the stone modules.

The form liner pattern is to be as shown below. The panel ratio of shall be 2/1 length/height. The panel height dimension shall be between 23" and 36".

The desired form liner pattern appearance is to be as shown below. The relief shall be approximately 1 1/2" average and no greater than 2 1/2" maximum.

A pattern "exhibit C" is provided below, illustrating the appearance desired.



Exhibit C- Gravity Type Precast concrete Units Pattern

CONCRETE STAIN

The stain color shall be Siberian Haze by H&C concrete staining or approved equal. The Contractor shall submit manufacturer's literature, certificates and color samples to the Engineer for review and acceptance.

Stain shall create a surface finish that is breathable (allowing water vapor transmission), and that resists deterioration from water, acid, alkali, fungi, sunlight or weathering. Stain mix shall be a water borne, low V.O.C. material, less than 1.5 lbs./gal, and shall meet requirements for weathering resistance of 2000 hours accelerated exposure.

INSTALLATION

Form liners shall be installed in accordance with the manufacturer's recommendations to achieve the highest quality concrete appearance possible. Form liners shall withstand concrete placement pressures without leakage causing physical or visual defects. A form release agent shall be applied to all surfaces of the liner which will come in contact with concrete as per the manufacturer's recommendations. After each use, liners shall be cleaned and made free of build-up prior to the next placement, and visually inspected for blemishes or tears. If necessary, the form liners shall be repaired in accordance with the manufacturer's recommendations. All form liner panels that will not perform as intended or are no longer repairable shall be replaced at no additional cost to the Illinois Tollway. An on-site inventory of each panel type shall be established based on the approved form liner shop drawings and anticipated useful life for each form liner type.

The liner shall be securely attached to the forms according to the manufacturer's recommendations. Liners shall be attached to each other with flush seams and seams filled as necessary to eliminate visible evidence of seams in cast concrete. Liner butt joints shall be blended into the pattern so as to create no visible vertical or horizontal seams or conspicuous form butt joint marks. Liner joints must fall within pattern joints or reveals. Finished textures shall be continuous without visual disruption and properly aligned over adjacent and multiple liner panels. Continuous or single liner panels shall be used where liner joints may interrupt the intended pattern. Panel remnants shall not be pieced together. At locations where differing form liner patterns abut, such as when a cast-in-place pattern should connect to a precast concrete wall pattern, a vertical 6-inch wide smooth finish transition strip without relief shall be provided at the abutting ends of each wall to separate the two dissimilar patterns. This transition strip shall also be introduced at appropriate corner sections of all patterned wall systems.

When the top of cast-in-place, precast or gravity type retaining walls are exposed, a 12-inch high smooth finish strip without relief shall be provided along the top of the vertical wall surface. A $\frac{3}{4}$ " chamfer shall be provided on the top edges of the wall and on edges between the smooth finish strip and form liner pattern changes.

The Contractor shall coordinate concrete pours to prevent visible differences between individual pours or batches. Concrete pours shall be continuous between construction or expansion joints. Cold joints shall not occur within continuous form liner pattern fields. Wall ties shall be coordinated with the liner and form to achieve the least visible result. Liners shall be stripped between 12 and 24 hours as recommended by the manufacturer. Curing methods shall be compatible with the desired aesthetic result. Use of curing compounds will not be allowed. Concrete slump requirements shall meet the form liner manufacturer's recommendations for

optimizing the concrete finish, as well as the Illinois Tollway's material specifications and special provisions.

With the use of standard Portland cement concrete mixtures, the Contractor shall employ proper consolidation methods to ensure the highest quality finish. Internal vibration shall be achieved with a vibrator of appropriate size, the highest frequency and low to moderate amplitude. Concrete placement shall be in lifts not to exceed 1.5 feet. Internal vibrator operation shall be at appropriate intervals and depths and withdrawn slowly enough to assure a minimal amount of surface air voids and the best possible finish without causing segregation. External form vibrators may be required to assure the proper results. Any use of external form vibrators must be approved by the form liner manufacturer and the Illinois Tollway. The use of internal or external vibratory action shall not be allowed with the use of self-consolidating concrete mixtures. It is the intention of this specification that no rubbing of flat areas or other repairs shall be required after form removal. The finished exposed formed concrete surfaces shall be free of visible vertical seams, horizontal seams, and butt joint marks. Grinding and chipping of finished formed surfaces shall be avoided.

APPLYING COLOR STAIN

Clean surface prior to application of stain materials to assure that surface is free of latency, dirt, dust, grease, efflorescence, paint, or other foreign material, following manufacturer's instructions for surface preparation. Do not sandblast. Preferred method to remove latency is pressure washing with water, minimum 3000 psi (a rate of three to four gallons per minute), using fan nozzle perpendicular to and at a distance of one or two feet from surface. Completed surface shall be free of blemishes, discoloration, surface voids and unnatural form marks.

Surfaces to receive stain shall be structurally sound, clean, dry, fully cured, and free from dust, curing agents or form release agents, efflorescence, scale, or other foreign materials. Methods and materials used for cleaning of substrate shall be as recommended by the manufacturer of the water-repellent stain. Concrete shall be at least 30 days old prior to concrete stain application. Curing agents must be removed a minimum of 14 days prior to coating to allow the concrete to dry out.

The stain shall be thoroughly mixed in accordance with the manufacturer's directions using an air-driven or other explosion-proof power mixer. Mix all containers thoroughly prior to application. Do not thin the material.

Materials shall be applied at the rate as recommended by the manufacturer. Absorption rates could be increased or decreased depending upon surface texture and porosity of the substrate so as to achieve even staining.

Temperature and relative humidity conditions during time of concrete stain application shall be per manufacturer's application instructions. Do not apply materials under rainy conditions or within three (3) days after surfaces become wet from rainfall or other moisture. Do not apply when weather is foggy or overcast. Take precaution to ensure that workmen and work areas are adequately protected from fire and health hazards resulting from handling, mixing and application of materials. Furnish all the necessary equipment to complete the work. Provide drop cloths and other forms of protection necessary to protect all adjoining work and surfaces to render them completely free of overspray and splash from the concrete stain work. Any surfaces, which have been damaged or splattered, shall be cleaned, restored, or replaced to the satisfaction of the Engineer.

Avoid staining the “mortar joints” by providing suitable protection over the joints during the staining process.

The concrete staining work described herein shall be performed after the grading is finished.

Sequencing: Schedule color stain application with earthwork and back-filling of any wall areas making sure that all simulated stone texture is colored to the minimum distance below grade. Delay adjacent plantings until color application is completed. Coordinate work to permit coloring applications without interference from other trades.

Where exposed soil or pavement is adjacent which may spatter dirt or soil from rainfall, or where surface may be subject to over-spray from other processes, provide temporary cover of completed work.

GUIDELINES FOR USE OF FORM LINERS

Form liners are being used on this project to achieve very specific architectural results. The Contractor shall not deviate from the guidelines contained herein unless authorized by the Engineer in writing.

METHOD of MEASUREMENT

This work will not be measured for payment.

BASIS of PAYMENT

This work will not be paid for separately but shall be included in the respective wall system pay item.

Required adjustments or corrections needed to address mockup comments and the cost of additional mockups, if required, will not be paid for separately, but shall be included in respective wall system pay item.

FORM LINER TEXTURED SURFACE (SPECIAL)

DESCRIPTION

This work shall be provided in accordance with Section 503 of the Standard Specifications, as specified herein, shown on the Plans and as directed by the Engineer. This work shall include submittals and mockups, form liner fabrication and installation of the pattern form liner as shown on the plans.

The pattern on the bridge parapets as shown on the plans will be:

Rough Slate Texture Pattern #T311 or approved equal
Manufacturer: Custom Rock Formliner
2020 West 7th Street
St. Paul, MN 55116
800-637-2447
www.customrock.com

BASIS OF MEASUREMENT

The pattern form liner will be measured for payment in place and the area computed in square feet as shown on plan drawings.

BASIS OF PAYMENT

This work will be paid for at the contract unit price per square feet for FORM LINER TEXTURED SURFACE (SPECIAL).

| Pay Item Number | Designation | Unit of Measure |
|--------------------|---------------------------------------|--------------------|
| J1599040 | FORM LINER TEXTURED SURFACE (SPECIAL) | SQ FT |

PIPE UNDERDRAINS (Illinois Tollway)

Effective: August 9, 2016

Description. This work shall consist of furnishing and installing Pipe Underdrains, Fabric Lined Trench, and Pipe Underdrains (Special), of the size specified at locations shown on the plans or as directed by the Engineer.

Materials. The materials shall be in accordance with the following.

- (a) Pipe Underdrains, Fabric Lined Trench. Materials for pipe underdrains, fabric lined trench shall be according to the following Article/Section of the Standard Specifications.

| Item | Article/Section |
|--|-----------------|
| (1) Perforated Corrugated Steel Pipe (Note 1) (Note 3) | 1006.01 |
| (2) Perforated Polyvinyl Chloride (PVC) Pipe (Note 3) | 1040.03 |
| (3) Perforated Corrugated Polyvinyl Chloride (PVC) Pipe with a Smooth Interior (Note 3) | 1040.03 |
| (4) Perforated Corrugated Polyethylene (PE) Pipe (Note 2) (Note 3) | 1040.04 |
| (5) Perforated Corrugated Polyethylene (PE) Pipe with a Smooth Interior (Note 3) | 1040.04 |
| (6) Fine Aggregate for Bedding and Backfill | 1003.04 |
| (7) Fabric Envelope for Pipe Underdrains | 1080.01 |
| (8) Geotechnical Fabric for Trench (Note 4) | 1080.05 |
| (9) Grout | 1024.01 |

- (b) Pipe Underdrains (Special). Materials for pipe underdrains (special) shall be according to the following Article/Section of the Standard Specifications.

| Item | Article/Section |
|--|-----------------|
| (1) Corrugated Polyvinyl Chloride (PVC) Pipe with a Smooth Interior | 1040.03 |
| (2) Corrugated Polyethylene (PE) Pipe with a Smooth Interior | 1040.04 |
| (3) Grout | 1024.01 |

Note 1. The thickness for steel and aluminum pipe shall be as shown in tables 1B and 1C of Article 542.03 of the Standard Specifications for pipe having up to 3 ft of cover over the top of the pipe. The thickness for corrugated steel pipe shall be 0.052 in. for a pipe with a nominal diameter of 6 in. and 0.064 in. for a pipe with a nominal diameter of 8 in. Corrugations of 1 1/2 x 1/4 in. shall be used in lieu of 2 2/3 x 1/2 in. corrugations for 6 in. and 8 in. diameter pipes. The thickness for corrugated aluminum alloy pipe shall be 0.048 in. for a pipe with a nominal diameter of 6 in. and 0.060 in. for a pipe with a nominal diameter of 8 in.

Note 2. This material is limited to 4 in. diameter.

Note 3. This material shall be encased in a fabric envelope.

Note 4. Non-woven fabric shall not be allowed

CONSTRUCTION REQUIREMENTS

Construction and installation shall conform to the details shown in the Plans, Illinois Tollway Standard Drawing B24, and all applicable portions of Section 601 of the Standard Specifications except as otherwise specified herein.

The trench of the pipe underdrains, fabric lined trench under the paved shoulder shall be backfilled as specified, except CA 16 shall be used in lieu of FA 1 or FA 2 for trench backfill. The CA 16 shall be according to Article 1004.05 and Article 1004.01 of the Standard Specifications, except in the table, Coarse Aggregate Gradation, the percent passing the No. 16 sieve shall be $4 \pm 4\%$. The trench shall be wrapped using a fabric envelope. The fabric encompassing the trench shall be in addition to the fabric required to be placed in direct contact with the pipe.

The portion of the pipe underdrain (special) under the paved shoulder shall be backfilled with CA-16 grade granular backfill as specified for pipe underdrains. The remaining portion shall be backfilled with select material meeting the approval of the Engineer

Where a filter fabric envelope is designated on the plans to prevent fines from entering the bedding material, backfill, or the pipe perforations, it shall be installed as shown on the plans.

Pipe underdrains, fabric lined trench shall be located and constructed as shown in the plans, including the placement of filter fabric, flexible perforated tubing and the specified granular backfill in a trench with a minimum flowline gradient as indicated in Illinois Tollway Standard Drawing B24. The trench shall be constructed in such a manner that the sides and bottom retain a firm, clean surface. Provide any necessary temporary sheeting or bracing required for the excavation of the trench and construction of the pipe underdrain, fabric lined trench.

Following trench excavation, the approved filter fabric shall be unrolled directly over the trench in such a position that the centerline of the fabric width is directly over the ditch centerline. The fabric shall be carefully depressed into the trench, maintaining precise alignment of the fabric with the trench. The perforated tubing and granular backfill shall then be carefully placed in the trench in accordance with the details and dimensions shown in the Plans. After placement of granular backfill to the satisfaction of the Engineer, the remaining exposed filter fabric shall be lapped closed at the top of the trench as shown in the plan details.

Connecting pipe underdrains into proposed and existing drainage structures shall be done according to the details shown in the Plans. The method of connecting proposed underdrains into the structures shall be approved by the Engineer. The invert of the connection is to be determined in the field to ensure positive drainage away from the roadway subgrade. When connecting pipe underdrains into existing drainage structures the Contractor shall carefully core a hole into the existing drainage structure or culvert to the same size as the external diameter of the proposed pipe underdrain, at the line and grade as shown in the plans. The protrusion of the proposed pipe underdrain into the drainage structure or culvert must not exceed one inch. After the pipe underdrain is installed, the drainage structure or culvert shall be mortared with an approved non-shrink concrete grout.

Rodent shield shall be included as shown in Illinois Tollway Standard Drawing B24.

Method of Measurement. This work will be measured for payment of the size specified in feet along the centerline of the pipe, in place, excluding manholes, catch basins and inlets, but including pipe embedded in the walls of manholes, catch basins, inlets or other structures.

Concrete headwalls for pipe drains, pipe underdrains (special), and pipe underdrains, fabric lined trench will be measured separately.

Basis of Payment. This work shall be paid for at the contract unit price per foot for the diameter specified for PIPE UNDERDRAINS (SPECIAL) and PIPE UNDERDRAINS, FABRIC LINED TRENCH.

Concrete headwalls for pipe drains, pipe underdrains (special), and pipe underdrains, fabric lined trench shall be paid for separately.

| Pay Item Number | Designation | Unit of Measure |
|-----------------|--------------------------------|-----------------|
| J1601298 | PIPE UNDERDRAINS, 4" (SPECIAL) | FOOT |

DRAINAGE STRUCTURES, TYPE 4

DESCRIPTION

This work shall consist of constructing drainage structures in accordance with applicable portions of Section 602 of the Standard Specifications and the applicable portions of IDOT Highway Standard 602106 and as specified herein. Type 20A Frame and grate should be in accordance with Tollway Standard B25.

This work shall include excavation and backfilling, furnishing, installing and removing excavation shoring, cleaning out structures, disposing of surplus materials and all ancillary work needed.

MATERIALS

Materials shall be in accordance with Article 602.02 of the Standard Specifications.

CONSTRUCTION REQUIREMENTS

Construction shall conform to Details shown in the Plans and applicable portions of IDOT highway Standard 602106 and shall be in accordance with Article 602.04 and/or Article 602.07 of the Standard Specifications. A concrete riser shall be included for locations with different rim elevations.

SUBMITTAL

Shop drawings shall be submitted to the Engineer for review and approval. The drawings shall be approved by the Engineer prior to construction.

METHOD OF MEASUREMENT

This work will be measured for payment, in place, in units of each.

BASIS OF PAYMENT

This work will be paid for at the contract unit price per each for DRAINAGE STRUCTURES, TYPE 4 WITH ONE TYPE 20A FRAME AND GRATE and DRAINAGE STRUCTURES, TYPE 4 WITH TWO TYPE 20A FRAME AND GRATE.

| Pay Item Number | Designation | Unit of Measure |
|-----------------|---|-----------------|
| J1602740 | DRAINAGE STRUCTURES, TYPE 4 WITH TWO TYPE 20A FRAME AND GRATE | EACH |

GUTTER, TYPE G

Description. This work shall consist of constructing gutter in accordance with the applicable portions of Illinois Tollway Standard Drawing B1 Gutter and Curb Details, the details shown on the plans, and Section 606 of the Standard Specifications.

Protective cost, when required, shall be constructed according to Article 420.18 of the Standard Specifications.

Method of Measurement. Concrete gutter will be measured for payment in feet in the flow line of the gutter.

PROTECTIVE COAT will be measured for payment in place and the area computed in square yards.

Basis of Payment. This work will be paid for at the contract unit price per foot for GUTTER, of the type specified.

Protective coat will be paid for according to Article 420.20 of the Standard Specifications.

| Pay Item Number | Designation | Unit of Measure |
|-----------------|----------------------------|-----------------|
| J1606015 | GUTTER, TYPE G-2, MODIFIED | FOOT |

CONCRETE GUTTER (SPECIAL)

Description. This work shall consist of constructing Concrete Gutter (Special) at locations shown and dimensions detailed in the plans.

The concrete gutter shall be constructed in conjunction with variable height barrier and base and at locations adjacent to median foundations and bridges pier crashwalls.

Construction Requirements. The concrete gutter shall be constructed per the plan details (of the width shown), in accordance with the applicable portions of Section 606 of the Standard Specifications, and in accordance with the Special Provision for CONCRETE BARRIER (ILLINOIS TOLLWAY).

Method of Measurement. CONCRETE GUTTER (SPECIAL) will be measured for payment in feet in the flow line of the gutter.

PROTECTIVE COAT will be measured for payment in place and the area computed in square yards.

Basis of Payment. This work will be paid for at the contract unit price per foot for CONCRETE GUTTER (SPECIAL). No additional compensation will be provided for different width or varying width sections of CONCRETE GUTTER (SPECIAL).

Protective coat will be paid for according to Article 420.20 of the Standard Specifications.

| Pay Item Number | Designation | Unit of Measure |
|-----------------|---------------------------|-----------------|
| J1606050 | CONCRETE GUTTER (SPECIAL) | FOOT |

CONCRETE BARRIER

Description. This work shall consist of constructing Concrete Barrier and Concrete Barrier Base according to Section 637 of the Standard Specifications except as modified herein.

Add the following sentence to Article 637.08 of the Standard Specifications:

“The Contractor shall drill and grout tie bars into the existing barrier and base at locations as shown on the plans. Drill and grout tie bars shall be constructed in accordance with the applicable portions of Article 420.05(b) of the Standard Specifications.”

Revise Article 637.02 of the Standard Specifications to read:

“637.02 Materials. Materials for the barrier and the Portland cement concrete base shall conform to the requirements of the following Articles/Sections of Division 1000 - Materials:

| Item | Article/Section |
|--|-------------------|
| (a) Portland Cement Concrete | 1020 |
| (b) Tie Bars (Note 1) | 1006.10(a)(2) |
| (c) Dowel Bars | 1006.11(b) |
| (d) Protective Coat..... | 1023 |
| (e) Non-Shrink Grout | 1024.02 |
| (f) Chemical Adhesive Resin System | 1027.01 |
| (g) Preformed Expansion Joint Filler | 1051.01 – 1051.08 |
| (h) Reinforcement Bars | 1006.10(a)(2) |

Note 1. Tie bars shall meet the requirements of ASTM A 706, Grade 60 AASHTO M312, Grade 60 (400).

The coarse aggregate to be used in the concrete barrier walls shall conform to the requirements for the coarse aggregate that is used for superstructure concrete.

Hot mix asphalt (HMA) base shall not be allowed.”

Add the following to Article 637.06 of the Standard Specifications:

“When a reinforced single face barrier is specified, the required reinforcing shall be as detailed in the plans.”

Revise Article 637.11(b) of the Standard Specifications to read:

“(b) Measured Quantities. Concrete barrier base will be measured for payment in feet in place, along the centerline of the barrier base.

Concrete barrier will be measured for payment in feet in place, along the centerline of the concrete barrier.

Concrete barrier transition will be measured for payment in feet in place, along the centerline of the transition.

Concrete gutter when used in conjunction with variable height barrier and base will be measured and paid for separately.

The cost of reinforcement bars shall be included in the cost of the CONCRETE BARRIER, SINGLE FACE, REINFORCED.

The cost of reinforcement bars shall be included in the cost of the CONCRETE BARRIER BASE FOR SINGLE FACE BARRIER, REINFORCED.

Protective coat will be measured for payment in place and the area computed in square yards.”

Revise Article 637.12 of the Standard Specifications to read as follows:

“637.12 Basis of Payment. This work will be paid for at the contract unit price per foot for CONCRETE BARRIER BASE; CONCRETE BARRIER, DOUBLE FACE, VARIABLE HEIGHT; CONCRETE BARRIER BASE, 5’; CONCRETE BARRIER BASE, 7’; CONCRETE BARRIER BASE, VARIABLE HEIGHT, 7’; CONCRETE BARRIER BASE FOR SINGLE FACE; CONCRETE BARRIER, DOUBLE FACE, of the height specified; CONCRETE BARRIER, DOUBLE FACE, SPECIAL; CONCRETE BARRIER, SINGLE FACE, of the height specified; CONCRETE BARRIER, SINGLE FACE, SPECIAL of the height specified; CONCRETE BARRIER, SINGLE FACE, REINFORCED of the height specified; CONCRETE BARRIER BASE FOR SINGLE FACE BARRIER, REINFORCED of the height specified; and CONCRETE BARRIER TRANSITION, CONCRETE BARRIER, DOUBLE FACE, VARIABLE HEIGHT.

Protective coat will be paid at the contract unit price per square yard.”

| Pay Item Number | Designation | Unit of Measure |
|-----------------|--|-----------------|
| JI637003 | CONCRETE BARRIER, DOUBLE FACE, 42 INCH | FOOT |
| JI637012 | CONCRETE BARRIER TRANSITION | FOOT |
| JI637052 | CONCRETE BARRIER BASE, 7’ | FOOT |

CONCRETE MEDIAN BARRIER TRANSITION, TYPE V-F (TOLLWAY)

Description. This work shall consist of constructing concrete median barrier transition and median barrier base in accordance with the applicable portions of Illinois Tollway Standard Drawing C13, Section 637 of the Standard Specifications, and as shown on the Plans.

Construction Requirements. This work shall follow the applicable portions of Section 637 of the Standard Specifications for Road and Bridge Construction.

The Contractor shall drill and grout tie bars into the existing barrier and base at locations as shown on the plans. Drill and grout tie bars shall be constructed in accordance with the applicable portions of Article 420.05(b) of the Standard Specifications.

Method of Measurement. CONCRETE BARRIER TRANSITION, TYPE V-F will be measured for payment in feet in place along the centerline of the transition.

CONCRETE BARRIER BASE (SPECIAL), both separate and monolithic, will be measured in feet in place along the centerline of the base or barrier.

PROTECTIVE COAT will be measured for payment in place and the area computed in square yards.

Basis of Payment. This work shall be paid for at the contract unit price per foot for CONCRETE MEDIAN BARRIER TRANSITION, TYPE V-F, and CONCRETE BARRIER BASE (SPECIAL) which price will constitute full compensation for the satisfactory completion of the work specified herein. Protective coat will be paid for according to Article 420.20.

| Pay Item Number | Designation | Unit of Measure |
|-----------------|--|-----------------|
| J1637017 | CONCRETE BARRIER BASE (SPECIAL) | FOOT |
| JT637023 | CONCRETE MEDIAN BARRIER TRANSITION, TYPE V-F | FOOT |

RIGHT-OF-WAY FENCE, TYPE 1 (Illinois Tollway)

Effective: December 4, 2009

Revised: March 6, 2017

Description: This work shall consist of furnishing and erecting right-of-way fencing, including pedestrian and vehicular gates, stream (flood) gates, and other appurtenances, in conformance with the Plans, or as directed by the Engineer.

Materials. Materials shall be according to Article 664.02 of the Standard Specifications, except as modified herein.

| Use | Shape | Size (Inches) | Nominal Weight (lb/ft) |
|--|-----------------|---------------|------------------------|
| End, Corner, Pull, Angle & Terminal Braced Posts | Pipe | 2.875 | 5.79 |
| | Pipe | 2.875 | 4.64 |
| | RF Corner | 3 1/2 x 3 1/2 | 5.10 |
| Line Post | Heavy C-Section | 2 1/4 X 1 5/8 | 2.70 |
| Horizontal Braces | Pipe | 1.660 | 2.27 |
| | Pipe | 1.660 | 1.82 |
| | RF Section | 1 5/8 x 1 1/4 | 1.25 |
| Gate Posts | Pipe | 2.875 | 5.79 |
| | Pipe | 2.875 | 4.64 |
| Gate Frames | Pipe | 1.660 | 2.27 |
| | Pipe | 1.660 | 1.82 |

(a) Pipe Size: Outside Diameter.

CONSTRUCTION REQUIREMENTS

General. The Contractor's activities and operations shall be confined to the area immediately adjacent to the right-of-way lines and within the Illinois Tollway right-of-way, except that where permitted by the Illinois Tollway, the Contractor may expand his/her operations to adjacent areas owned by, or under the control of, the Illinois Tollway.

The Contractor shall be fully responsible for arranging with and obtaining from adjacent property owners all permits or permissions required for the erection of the right-of-way fencing shown in the Plans. Erection of fencing at any location shall not commence until the Contractor has shown conclusively and to the Illinois Tollway's satisfaction that all necessary permits or permissions have been obtained from the property owners involved. The Contractor shall be fully liable for and shall indemnify the Illinois Tollway against all damages to or on adjacent properties resulting from his/her operations.

The erection of certain portions or lengths of right-of-way fence may be more essential to the needs of the Illinois Tollway than other portions or lengths. The Engineer will designate these segments of priority installations and the Contractor shall conduct his/her operations as to give priority to the erection of such segments or lengths.

Clearing. Prior to constructing the right of way fence, the Contractor shall clear the area, from the line of fence to a line approximately 4 feet within the line of fence, according to Section 201 of the Standard Specifications, and as directed by the Engineer. Such clearing shall be conducted in a manner to leave intact valuable trees and selected native growth. Only such trees as are directly on the line of the fence, or that would otherwise, in the opinion of the Engineer, interfere with the construction of the fence, shall be cut flush with the ground. No separate payment will be made for such clearing, but the costs thereof shall be considered as included in the Contract unit prices for the various fence items.

Materials removed during clearing operations shall be promptly disposed of by the Contractor as directed by the Engineer. Disposal of clearing materials within the right-of-way will be permitted only when specifically approved in writing by the Engineer. All such disposal shall be at no additional cost to the Illinois Tollway.

Trench Excavation. Whenever irregular terrain exists along proposed fence lines, it may be necessary to excavate trenches to secure the specified clearances between the ground line and the bottom of the fence fabric to be installed. The trenches shall be excavated to a line and grade established by the Engineer ensuring adequate drainage and shall be of the cross sections indicated in the Plans. No separate payment will be made for such trench excavation, but the cost therefore shall be considered as included in the Contract unit price for fence to be installed. All materials excavated to form trenches shall be spread evenly over the adjacent area within the Illinois Tollway right-of-way or otherwise disposed of by the Contractor as directed by the Engineer.

Installing Posts. All terminal corner, end, pull and/or gate posts shall be properly spaced and set in concrete. All line posts shall be properly spaced and set into the ground as in the Illinois Tollway's Standard Drawing D1.

Concrete footings shall be of Class SI concrete meeting the requirements of Section 1020 of the Standard Specifications. The footings shall be constructed to the depths shown in the Plans. The top of all footings shall extend slightly above the ground line and shall be troweled to a smooth finish with a slope to drain away from the posts. Post, braces, and other units shall be centered in the footings. Fence shall not be erected until the concrete encasement around the posts has cured for at least seven days.

All excess excavation from the footings, shall be disposed of in a manner satisfactory to the Engineer. All such disposal shall be at no additional cost to the Illinois Tollway.

Wherever right-of-way markers are omitted, the posts shall be set with back of post flush with the right-of-way line.

Post Set in existing Solid Surface. The Contractor's attention is directed to the fact that some posts may have to be placed in existing boulder beds, in old concrete foundations or other similarly solid materials. No separate payment will be made for breaking up of such material or for any material and work required to set the posts, but the cost thereof shall be considered as included in the Contract unit prices for the various fence items.

Right-of-Way Fence, Type 1. The fence shall be erected to line and gradient established by the Engineer. The fence shall be true to line, taut, and shall comply with the best practice of fence construction.

Posts shall be spaced in line at 10-foot centers with a tolerance of minus 2 feet. Spacing of posts shall be as uniform as conditions of terrain will permit.

Additional posts shall be placed at each abrupt change in the ground line profile when required. All line posts shall be driven to the depth indicated in the Plan details in vertical plumb position, and in line, with no perceptible horizontal misalignment when sighted by eye from corner to corner.

Pull posts shall be placed at intervals of no more than 500 feet in straight runs and at each predetermined vertical angle point.

Corner posts shall be placed at each horizontal angle point. When the distance between corner posts exceeds 500 feet, pull posts shall be installed to maintain the maximum 500-foot interval.

Post Tops. Post tops shall be according to Article 664.05 of the Standard Specifications.

Tension Wire. Tension wire shall be according to Article 664.06 of the Standard Specifications.

Braces. Braces shall be according to Article 664.07 of the Standard Specifications.

Fabric. Fabric shall be according to Article 664.08 of the Standard Specifications. The fence fabric shall be placed normally at 1 1/2 inches above the ground line. However, over irregular terrain, a minimum clearance of one inch and a maximum clearance of 6 inches will be permitted for a distance not to exceed 8 feet. Any excavation required in order to comply with these provisions shall be made as specified in Trench Excavation of this specification.

Gates. Gates shall be according to Article 664.09 of the Standard Specifications with the addition of the following:

Right-of-Way Fence, Type 1 gates shall consist of pedestrian gates and single and/or double vehicular gates of the types and sizes shown in the Plans.

Fabric for gates shall be of the same type as used in the adjoining fence.

Gates shall be equipped with approved latches, stops, hinges, and locking devices.

Hinges shall be heavy-duty malleable iron, pivot type, with large bearing surfaces for clamping onto the posts. Hinges shall not twist or turn under the action of the gate, and shall be so arranged that a closed gate cannot be lifted off its hinges to obtain entry.

Vehicular gates shall have a 180 degree opening swing. Pedestrian gates shall be equipped with a positive stop which will not permit the gate to swing toward the Toll Highway and shall provide a satisfactory spring or other positive means to maintain the gate in a closed position.

The pedestrian and vehicular gate installation shall include gate frames, tie rods, stretcher bars, filler fabric, latches, stops, locking device, padlock, hinges, gate posts with braces, tie rods, turnbuckles, stretcher bars and caps, and all fittings and details for gates and gate posts, all as specified and as shown in the Plans, and as required to make a complete installation.

The Contractor shall furnish an approved-type padlock for each gate. Each padlock shall be master keyed to the Illinois Tollway's lock system as directed.

Stream Gates (Flood Gates). The Contractor shall furnish and erect stream gates (flood gates) for stream and culvert crossings in conformance with, and at the locations shown in the Plans and as specified herein. Prior to fabricating any gates, the Contractor shall investigate the conditions at the site and shall prepare shop drawings in accordance with Article 105.04 (d) of the Illinois Tollway Supplemental Specifications showing the details of the proposed installation. Four complete sets of the shop drawings shall be submitted to the Engineer for approval. Fabrication of gates shall not be started until the shop drawings have been approved by the Engineer.

Stream Crossing. Where RIGHT-OF-WAY FENCE, TYPE 1 crosses streams, drainage channels, or sharp depressions in the terrain, Stream Crossing will be required at the locations shown in the Plans and/or directed by the Engineer.

Stream crossings shall be constructed in accordance with the Plan details for TYPE 1 or TYPE 2 as indicated in the Plans or directed by the Engineer. In the usual circumstances, TYPE 1 STREAM CROSSING will be required for locations where there normally is no flow of water.

Extra-length posts will be required at stream crossings. Posts at stream crossings may be driven, except that posts more than 9 feet in length shall be set in concrete. The openings below the fence fabric or gate at stream crossings shall be closed with No. 12-1/2 gage barbed wire stretched between the posts as shown in the Plans.

The finished fence shall be plumb, taut, true to line and ground contour, and complete in every detail. Where directed, the Contractor will be required to stake down the chain link fence at several points between posts.

Existing Fence Connections. Existing fence connections shall be according to Article 664.10 of the Standard Specifications.

Connection to Bridge Abutment. Fence post connections adjacent to the concrete abutments at bridge structures shall be connected to the abutments in accordance with the details shown on Illinois Tollway Standard Drawing D1 or in the Plans. The bands around the posts may be of rolled, pressed, or forged steel or of malleable iron, and shall have a tight fit around posts. Bands and connection angles shall be hot-dip galvanized in conformity with ASTM A123. Bolts shall be unfinished and shall have hexagonal head and nut and standard thread. Bolts shall be drawn up tight and the threads burred with a pointed tool.

Protective Electrical Ground. Protective electric ground shall be according to Article 664.11 of the Standard Specifications.

Painting. Metal parts which are protected by galvanizing shall not be painted. After erection is completed, all fencing under the Contract will be inspected by the Engineer, and all parts of fences, gates, stream gates, etc. (including bolts and nuts), from which the galvanizing has been abraded so that the base metal is exposed, shall be spot painted with an approved aluminum paint.

Method of Measurement. The fencing work will be measured for payment, complete in place, in units as specified herein:

RIGHT-OF-WAY FENCE, TYPE 1 will be measured for payment in feet for fence erected, from center to center of end or terminal posts and will exclude the lengths occupied by pedestrian and vehicular gates, stream crossings and stream gates. The measured length of fencing will be basis for payment of fabric, barb and tension wire, line posts, and all connections required to erect the fencing.

CORNER POSTS, PULL POSTS, END POSTS, and END POSTS CONNECTED TO STRUCTURES will be measured for payment on a unit basis for each type of post erected and will include all bracing, tension rods, concrete, and necessary connections.

PEDESTRIAN GATE, SINGLE VEHICULAR GATE, and DOUBLE VEHICULAR GATE will be measured for payment on a unit basis for each type and size of gate erected and will include the gate posts, bracing, tension rods, concrete, and other necessary fastenings and connections.

STREAM or FLOOD GATES will be measured for payment per square foot for the size and type specified.

STREAM CROSSINGS will be measured for payment in feet for each type of stream crossing erected, and will include Right-of-Way Fence, Type 1 and the barb wire below the right-of-way fencing. Measurement will be from end to end of the crossing section as determined by the Engineer.

Basis of Payment. The fencing work will be paid for at the contract unit price as specified herein:

Payment for RIGHT-OF-WAY FENCE, TYPE 1, will be made at the Contract unit price per foot as specified, complete in place and accepted.

Payment for CORNER POST, PULL POST and END POST will be made at the Contract unit price per each, complete in place and accepted, for posts of the lengths shown in the Plans for RIGHT-OF-WAY FENCE, TYPE 1.

Payment for PEDESTRIAN GATE, SINGLE VEHICULAR GATE and DOUBLE VEHICULAR GATE will be made at the Contract unit price per each, complete in place and accepted, for gates of the description shown in the Plans for RIGHT-OF-WAY FENCE, TYPE 1.

Payment for STREAM OR FLOOD GATE will be made at the Contract unit price per square foot, complete in place and accepted.

Payment for STREAM CROSSING will be made at the Contract unit price per foot for the type specified, complete in place and accepted, as shown in the Plans for one or both of the following: STREAM CROSSING, TYPE 1 and/or STREAM CROSSING, TYPE 2

| Pay Item Number | Designation | Unit of Measure |
|--------------------|--|--------------------|
| J1664305 | RIGHT-OF-WAY FENCE, TYPE 1, 6' | FOOT |
| J1664310 | CORNER POST, RIGHT-OF-WAY FENCE, TYPE 1 | EACH |
| J1664335 | DOUBLE VEHICLE GATE, RIGHT-OF-WAY FENCE, TYPE 1 | EACH |

REMOVE ABANDONED OIL PIPELINE

DESCRIPTION

This work shall consist of the removal, transportation, and proper disposal of underground abandoned oil pipelines, their content to the point where the pipe removal is terminated, including determining the content types and estimated quantities. This work shall also include the removal, transportation and proper disposal of the content of the abandoned oil pipeline to remain in place at the locations shown on the plans.

This work shall be according to the applicable portions of Section 669 of the Standard Specifications except as modified herein. Any references to “underground storage tanks (UST)” in Section 669 shall be interpreted as “underground abandoned oil pipeline.”

CONSTRUCTION REQUIREMENTS

Excavation of trenches shall be performed according to the applicable requirements of Article 550.04 of the Standard Specifications. The trench shall be backfilled to the natural line or finished surface. The backfill material shall consist of trench backfill according to Article 550.02 of the Standard Specifications at the locations specified on the plans or excavated material from the trench at all other locations. Backfill shall be deposited and compacted as specified in Method 1 of Article 550.07 of the Standard Specifications.

The pipe shall be evaluated for the presence of asbestos containing materials (ACM) asbestos abatement and removal shall be completed according to the applicable portions of the “Building Removal” special provision.

Revise the first paragraph of Article 669.13 of the Standard Specifications to read:

“Underground Abandoned Oil Pipeline. The Contractor shall backfill the trenches where underground abandoned oil pipeline removal has occurred.”

METHOD OF MEASUREMENT

This work will be measured in accordance with Article 669.15 of the Standard Specifications except as follows:

Add the following to Article 669.15 of the Standard Specifications:

“Underground abandoned oil pipeline removal, soil excavation, soil and content sampling, and the excavated soil, underground abandoned oil pipeline content, and underground abandoned oil pipeline disposal will be measured for payment in feet. The length measured will be the overall length along the centerline of the pipe through all fittings and valves.”

The removal, transportation and proper disposal of the content of the abandoned oil pipeline to remain in place will not be measured for payment.

Trench backfill will be measured for payment according to Article 208.03, except an addition will be made for one-half of the volume of the pipe removed.

BASIS OF PAYMENT

This work will be paid in accordance with Article 669.16 of the Standard Specifications except as follows:

The volume and cost of asbestos abatement shall be paid on a force account basis under Contract Allowances under DISPOSAL OF UNIDENTIFIED HAZARDOUS WASTE.

Revise the first paragraph of Article 669.16 of the Standard Specifications to read:

"Underground abandoned oil pipeline removal, soil excavation, soil and content sampling, and the excavated soil, underground abandoned oil pipeline content, and underground abandoned oil pipeline disposal will be paid for at the contract unit price per foot for REMOVE ABANDONED OIL PIPELINE."

The removal, transportation and proper disposal of the content of the abandoned oil pipeline to remain in place will not be paid for separately but shall be considered as included in the unit bid price for REMOVE ABANDONED OIL PIPELINE.

Trench backfill will be paid for according to Article 208.04 of the Standard Specifications.

| Pay Item Number | Designation | Unit of Measure |
|-----------------|-------------------------------|-----------------|
| J1669200 | REMOVE ABANDONED OIL PIPELINE | FOOT |

FILL ABANDONED OIL PIPELINE

DESCRIPTION

This work shall consist of the filling of underground abandoned oil pipeline to remain in place at the locations shown on the plans.

MATERIALS

Material for filling underground abandoned oil pipeline shall consist of a flowable grout mixture according to Section 1019 of the Standard Specifications except as modified herein. The grout mixture shall be modified with a high range water reducer in conformance with Article 1021.03 as required to obtain suitable flowable characteristics to completely fill the inside of the pipe, and as approved by the Engineer.

CONSTRUCTION REQUIREMENTS

The ends of the underground abandoned oil pipeline to remain in place shall be sealed as approved by the Engineer. The inside of the pipe shall be filled with the grout mixture at the locations shown on the plans. Mixing of the grout and filling of the pipe shall be according to the requirements for mixing and placing of controlled low-strength material in Article 593.03 of the Standard Specifications.

METHOD OF MEASUREMENT

This work will be measured for payment in place in cubic yards. The volume will be the theoretical volume computed using the nominal inside diameter of the pipe and the overall length of the pipe calculated along the centerline of the pipe to be filled.

BASIS OF PAYMENT

This work will be paid for at the contract unit price per cubic yard for FILL ABANDONED OIL PIPELINE.

The removal, transportation and proper disposal of the content of the abandoned oil pipeline to remain in place will not be paid for separately but shall be considered as included in the unit bid price for REMOVE ABANDONED OIL PIPELINE.

| Pay Item Number | Designation | Unit of Measure |
|-----------------|-----------------------------|-----------------|
| J1669210 | FILL ABANDONED OIL PIPELINE | CU YD |

REMOVE OIL SEPARATOR SYSTEM

DESCRIPTION

This work shall consist of the removal, transportation, and proper disposal of oil separator systems and their content.

This work shall be according to the applicable portions of Section 669 of the Standard Specifications except as modified herein. Any references to “underground storage tanks (UST)” in Section 669 shall be interpreted as “oil separator systems.”

CONSTRUCTION REQUIREMENTS

Excavation for removal of the oil separator system shall be performed according to the applicable requirements of Article 550.04 of the Standard Specifications. The excavation shall be backfilled to the natural line or finished surface. The backfill material shall consist of porous granular embankment according to the special provision POROUS GRANULAR EMBANKMENT (Illinois Tollway) at the locations specified on the plans or excavated material at all other locations. Backfill shall be deposited and compacted as specified in Method 1 of Article 550.07 of the Standard Specifications.

Revise the first paragraph of Article 669.13 of the Standard Specifications to read:

“Oil Separator System. The Contractor shall backfill the excavation where oil separator system removal has occurred.”

METHOD OF MEASUREMENT

This work will be measured in accordance with Article 669.15 of the Standard Specifications except as follows:

Add the following to Article 669.15 of the Standard Specifications:

“This work will be measured for payment as each, where each is defined as one complete oil separator system.”

Where used, porous granular embankment will be measured for payment according to the special provision POROUS GRANULAR EMBANKMENT (Illinois Tollway).

BASIS OF PAYMENT

This work will be paid in accordance with Article 669.16 of the Standard Specifications except as follows:

Revise the first paragraph of Article 669.16 of the Standard Specifications to read:

“Oil separator system removal, soil excavation, soil and content sampling, and the excavated soil, oil separator system content, and oil separator system disposal will be paid for at the contract unit price per foot for REMOVE OIL SEPARATOR SYSTEM.”

Where used, porous granular embankment will be paid for according to the special provision POROUS GRANULAR EMBANKMENT (Illinois Tollway).

| Pay Item Number | Designation | Unit of Measure |
|--------------------|-----------------------------|--------------------|
| JI669220 | REMOVE OIL SEPARATOR SYSTEM | EACH |

HEADWALL AND SLOPED HEADWALL

DESCRIPTION

This work shall consist of constructing a cast-in-place or precast concrete headwall in accordance with the applicable portions of Sections 503 and 504 of the Standard Specifications and the Plans and/or as directed by the Engineer. This work shall include all excavation, backfilling, restoration, ditch grading and incidentals necessary to complete the work as specified.

MATERIALS

Materials shall be in accordance with Articles 503.02 and 504.02 of the Standard Specifications. Portland Cement Concrete (Class SI) and Reinforcement Steel (Epoxy Coated) shall be used throughout the structure.

CONSTRUCTION REQUIREMENTS

Construction shall conform to the details shown in the Plans, all applicable Tollway Standard Drawings and all applicable portions of Sections 503 of the Standard Specifications.

Headwalls and sloped headwalls are to be used only in slopes specified per the Tollway Standard Drawings and shall be constructed flush with the existing or proposed final grade.

For locations specified on the plans where a 6" sloped headwall is connecting to a 4" pipe underdrain, grout should be used to fill the gap between the pipe and headwall opening.

METHOD OF MEASUREMENT

This work will be measured for payment, complete in place and accepted, in units of each.

Grates for Headwalls Type III and IV will be measured and paid for separately.

Non-shrink grout used to fill between the headwall or sloped headwall and the pipe(s) will not be measured for payment.

BASIS OF PAYMENT

This work will be paid for at the contract unit price per each, for HEADWALL or SLOPED HEADWALL of the type and diameter specified, and of the slope specified.

Grates for Headwalls Type III and IV will be measured and paid for separately.

| Pay Item Number | Designation | Unit of Measure |
|-----------------|-----------------------------------|-----------------|
| J1680030 | HEADWALL TYPE III, 18", 1:10 | EACH |
| J1680120 | SLOPED HEADWALL TYPE III, 6", 1:3 | EACH |

TEMPORARY CONCRETE BARRIER (Illinois Tollway)

Effective: June 23, 2014

Revised: April 1, 2016

Replace Section 704 of the Standard Specifications in its entirety with the following.

“704.01 Description. This work shall consist of furnishing, placing, maintaining, repairing, relocating, and removing precast concrete barrier at temporary locations.

704.02 Materials. Materials shall be according to the following.

| Item | Article |
|--|------------|
| (a) Precast Temporary Concrete Barrier..... | 1042.14 |
| (b) Reinforcement Bars..... | 1006.10(a) |
| (c) Connecting Pins and Anchor Pins | 1006.09 |
| (d) Connecting Loop Bars (Note 1) | |
| (e) Nonshrink Grout (Note 2) | |
| (f) Packaged Rapid Hardening Mortar or Concrete (Note 3) | |

Note 1. Connecting loop bars shall be smooth bars according to the requirements of ASTM A 36.”

Note 2. Nonshrink Grout: The prepackaged product shall be mixed and placed according to the manufacturer’s instructions, except the addition of aggregate to the prepackaged product will not be permitted. Water shall not exceed the minimum needed for placement and finishing. Nonshrink grout shall be in accordance with Illinois Modified ASTM C 1107. The nonshrink grout shall have a water soluble chloride ion content of less than 0.40 lb/cy yd. The Department will maintain an “Approved List of Nonshrink Grouts”. Water shall be according to Section 1002 of the Standard Specifications.

Note 3. Packaged Rapid Hardening Mortar or Concrete: The R1 or R2 Mortar shall be from the Illinois Department of Transportation approved list of Packaged, Dry, Rapid Hardening, Cementitious Materials for Concrete Repairs with coarse aggregate added. The amount of coarse aggregate added to the R1 or R2 Mortar shall be per the manufacturer’s recommendations. The coarse aggregate gradation shall be CA 16 from an Aggregate Gradation Control System source or a packaged aggregate meeting Article 1004.02 of the Standard Specifications with a maximum size of 1/2 inch. The R1 or R2 Mortar and coarse aggregate mixture shall comply with the air content and strength requirements for Class SI concrete, except the cement factor shall be a minimum 6.65 cwt/cu. Yd., the coarse aggregate shall be a CA 16, and the strength shall be a minimum 4000 psi compressive or 675 psi flexural at 14 days. Mixing shall be per the manufacturer’s recommendations, except that the water/cement ratio shall not exceed the value specified for Class SI concrete as indicated above. A high range water-reducing admixture shall be used to obtain a 5-7 in. slump. Water shall be according to Section 1002 of the Standard Specifications.

704.03 General. Precast concrete barrier shall be the F shape as detailed on the plans.

704.04 Installation. The barriers shall be seated on bare, clean pavement or paved shoulder and connected together in a smooth, continuous line at the locations provided by the Engineer.

Except on bridge decks, or where alternate anchoring details are shown on the plans, the barrier unit at each end of an installation shall be anchored to the pavement or paved shoulder using six anchor pins and protected with an impact attenuator as shown on the plans. When pinning of additional barrier units within the installation is specified on the plans, three anchor pins shall be installed in the traffic side holes of the required barriers.

Where both anchored and free-standing barrier units are used in a continuous installation, a transition shall be provided between them. The transition from anchored to free-standing barrier shall consist of two anchor pins installed in the end holes on the traffic side of the first barrier beyond the anchored section and one anchor pin installed in the middle hole on the traffic side of the second barrier beyond the anchored section. The third barrier beyond the anchored section shall then be free-standing.

The temporary concrete barrier wall shall be installed according to Highway Standard 704001 and as shown on the Plans. Improper installation, including anchoring, of the temporary concrete barrier wall shall be subject to penalty in accordance with Illinois Tollway Supplemental Specifications Article 701.01(b)(1). An incident of non-compliance for the temporary concrete barrier wall installation shall be defined anytime the Engineer finds during the daily inspection, the temporary concrete barrier wall is missing anchors, has incorrect anchors, and/or has improper embedment depth of anchors.

Barriers located on bridge decks shall be restrained as shown in the plans. Anchor pins shall not be installed through bridge decks, bridge approach slabs or transition approach slabs, unless otherwise noted.

Temporary concrete barriers or attachments that are damaged during transportation, placement or relocation and determined to be unacceptable by the Engineer shall be repaired or replaced. The Engineer will be the sole judgement in determining which units or attachments require repair or replacement.

The barriers shall be removed when no longer required by the contract. After removal, all anchor holes in the pavement or paved shoulder shall be filled with a rapid hardening mortar or concrete. Only enough water to permit placement and consolidation by rodding shall be used and the material shall be struck-off flush.

704.05 Inspection. The Engineer is responsible for the inspection, documentation and acceptance of the temporary concrete barrier. The Engineer will inspect the temporary concrete barrier prior to the transport of the temporary concrete barrier to the job site, and will inspect the installation and anchorage of the temporary concrete barrier during placement. The Contractor may appeal to the Corridor Construction Manager or the Illinois Tollway Project Manager to resolve disagreements regarding the acceptability of temporary concrete barrier.

704.06 Repairs. Repairs on temporary concrete barrier prior to the transport to the job site shall be performed at an off-site location accessible to the Engineer. Repairs to temporary

concrete barrier adjacent to a travel lane shall not be performed without prior approval of the Engineer. Materials used for repairs shall be in accordance with the materials specified herein.

Spalled or Delaminated Concrete shall be repaired as follows:

- (a) Concrete spalling and delamination of depths less than 1.5 inches will not require patching as long as the exposed cavity has side slopes of at least 1:3. Grinding of the concrete cavity perimeter will be allowed to satisfy the required 1:3 (V:H) side slope.
- (b) Concrete spalling and delamination of a depth 1.5 inches to a depth of 2.5 inches shall be repaired utilizing approved material as describe herein.
- (c) Concrete spalling and delamination of depths greater than 2.5 inches will be considered for repair by methods proposed by the Contractor and approved by the Engineer.

704.07 Method of Measurement. This work will be measured for payment in feet in place along the centerline of the barrier. When the barrier is relocated within the limits of the jobsite, the relocated barrier will be measured for payment in feet in place along the centerline of the barrier.

Anchor pins will not be measured for payment

Impact attenuators will be measured separately.

704.08 Basis of Payment. This work will be paid for at the contract unit price per foot for TEMPORARY CONCRETE BARRIER or RELOCATE TEMPORARY CONCRETE BARRIER. All repairs shall be included in the contract unit price.

Furnishing and installing anchor pins will not be paid for separately but will be included in the price for TEMPORARY CONCRETE BARRIER or RELOCATE TEMPORARY CONCRETE BARRIER.

Impact attenuators will be paid for separately.”

| Pay Item Number | Designation | Unit of Measure |
|-----------------|-------------------------------------|-----------------|
| J1704000 | TEMPORARY CONCRETE BARRIER | FOOT |
| J1704005 | RELOCATE TEMPORARY CONCRETE BARRIER | FOOT |

BARRIER WALL REFLECTORS, TYPE C (Illinois Tollway)

Effective: April 1, 2016

Description. This work shall consist of furnishing and installing barrier wall reflectors, Type C on concrete barrier wall and temporary concrete barrier as shown in the Plans and/or as directed by the Engineer.

Materials. Materials for barrier wall reflectors, Type C shall be in accordance with Section 1097 of the Standard Specifications, except as modified herein.

The reflector reflective face shall be fabricated from either methyl methacrylate (acrylic) plastic or a high-performance retroreflective sheeting material.

The plastic prismatic barrier reflectors shall be according to minimum specific intensities per Article 1097.02 of the Standard Specifications.

The flexible reflective sheeting face fabricated of a high-performance retroreflective sheeting according to Article 1091.03 of the Standard Specifications.

CONSTRUCTION REQUIREMENTS.

Reflectors. The direct applied barrier wall reflectors shall be rectangular in shape, mono-directional, and have a minimum of 9.0 sq in. of effective reflective area in accordance with Plans.

The Contractor shall furnish written documentation from the sheeting manufacturer stating that the reflector unit conforms to these specification requirements. The reflectors shall be furnished in either amber or crystal as specified and shall be ready for mounting. The base assembly of the reflector units shall be free of cracks and checks, and fabrication shall be accomplished in a uniform and professional manner.

The manufacturer's name, model and date of manufacture shall be clearly identified on the base of the reflectors so that it is visible after installation.

For qualification purposes only, ten (10) samples required for tests set forth in these Specifications shall be submitted by the Contractor. In addition, the Engineer will have the right to select 10 samples at random from each shipment for acceptance purposes.

Installation. Barrier wall reflectors, Type C shall be installed at the spacing and elevations shown in the Plans or as directed by the Engineer.

Only the Illinois Tollway's specified type of reflector and geometric shape will be permitted within the limits of a contract.

The surface of the barrier to which the unit is to be applied shall be free of foreign matter and any material which would adversely affect the bond of the adhesive. Cleaning of the surfaces shall be to the satisfaction of the Engineer.

Barrier wall reflectors, Type C shall be installed using an adhesive meeting the reflector unit manufacturer's specifications. The adhesive shall be placed either on the surface of the

barrier or the bottom of the unit in sufficient quantity to ensure complete coverage of the contact area with no voids present and with a slight excess after the unit is pressed firmly in place.

The Contractor shall exercise care that the reflectors are placed in a satisfactory and uniform alignment both horizontally and vertically. Acceptance of the reflectors installation will include, in addition to ordinary inspection, a night inspection shall be made by the Engineer and Contractor from an automobile. Reflectors not having satisfactory and uniform night appearance shall be moved and adjusted or replaced as required at the Contractor's expense until they do conform to the requirements herein and are found to be acceptable to the Engineer.

Method of Measurement. This work will be measured for payment in place in units of each.

Basis of Payment. This work will be paid for at the contract unit price per each, for BARRIER WALL REFLECTORS, TYPE C.

| Pay Item Number | Designation | Unit of Measure |
|-----------------|---------------------------------|-----------------|
| J1782022 | BARRIER WALL REFLECTORS, TYPE C | EACH |

CONDUIT ATTACHED TO STRUCTURE, 4" DIA STAINLESS STEEL

DESCRIPTION

This work shall consist of furnishing and installing conduit attached to structure, 4" dia., stainless steel raceways, fittings, and accessories attached to structure.

MATERIALS

Materials shall be according to latest edition of Section 1088.01(a)(6) of the Illinois Tollway Supplemental Specifications and the latest edition of the IDOT Standard Specifications for Road and Bridge Construction, as applicable.

Stainless Steel Conduit. The conduit shall be Type 304 or Type 316 stainless steel, shall be manufactured according to UL 6A, and shall meet ANSI C80.1. Conduit fittings shall be Type 304 or Type 316 stainless steel and shall be manufactured according to UL 514B.

All conduit supports, straps, clamps, and other attachments shall be Type 304 or Type 316 stainless steel. Attachment hardware shall be stainless steel according to Article 1006.31 of the Illinois Tollway Supplemental Specifications and the latest edition of the IDOT Standard Specifications for Road and Bridge Construction, as applicable.

METHOD OF MEASUREMENT

This work will be measured for payment in feet in place. Measurements will be made in straight lines along the centerline of the conduits between ends and changes in direction. Changes in direction shall assume perfect straight lines runs, ignoring actual raceway sweeps.

BASIS OF PAYMENT

This work will be paid for at the contract unit price per foot for CONDUIT ATTACHED TO STRUCTURE, 4" DIA., STAINLESS STEEL. Couplings and other connectors required to connect stainless steel conduits to conduits of other types, as shown on the plans, will not be paid separately but are included in the contract unit price for this item.

| Pay Item Number | Designation | Unit of Measure |
|-----------------|---|-----------------|
| J1811282 | CONDUIT ATTACHED TO STRUCTURE, 4" DIA STAINLESS STEEL | FOOT |

MAINTENANCE OF TRAFFIC

DESCRIPTION

This work shall include traffic control required for this Contract in accordance with Section 701 of the Illinois Tollway Supplemental Specifications except as modified herein.

GENERAL

Traffic conditions, accidents, and other unforeseen emergency conditions may require the Engineer to restrict, modify, or remove lane closures or channelization shown in the plans. The Contractor shall make the necessary adjustments, as directed by the Engineer, without delay.

All traffic control devices used for maintenance of traffic and detailed on the plans shall be new or in acceptable condition prior to the initial installation, and cleaned, refurbished or replaced as necessary through the duration of the Contract. The Contractor shall refer to the Illinois Tollway's Quality Standard for Work Zone Traffic Control Devices, latest edition.

All traffic control devices including but not limited to drums, vertical panels, and barricades immediately adjacent to the edge of the traveled way shall be equipped with mono-directional steady burn lights. Device spacing shall be in accordance with applicable standards.

Standard signs referred to in Article 701.01(a) of the Supplemental Specifications include those signs which appear in Tollway Standards.

Maintenance of traffic on the I-90 roadway is required for the construction of the proposed Ramps X3 & X4 Bridges over I-90 (Bridge Nos. 1681 & 1682), ITS fiber optic cable removal and installation (including disconnections and splicing work to be completed By Others), median sign structure foundation construction, oasis ramp closures and all miscellaneous work.

The Contractor shall provide traffic control and protection for the complete closure of the I-90 roadway during beam erection for the proposed structures. These closures shall be in accordance with Article 701.14 of the Illinois Tollway Supplemental Specifications.

The Contractor shall provide traffic control and protection for the removal of the existing Des Plaines Oasis signing (ground mounted signs and overhead truss mounted sign panels), installation of overhead truss mounted sign panels, and the permanent closure of the existing Oasis exit ramp terminals. Temporary two-lane and four-lane closures of the I-90 traffic lanes and shoulder will be required for the removal of the existing sign panels and temporary two-lane closures of the I-90 traffic lanes and shoulder will be required for the installation of the proposed sign panels.

The Contractor shall provide traffic control and protection for the installation of Type III barricades, Type II barricades/drums, and signing along I-90 in accordance with the Maintenance of Traffic Stage II Oasis Ramp Closure details shown in the Plans. Westbound "Exit Only" auxiliary lane closure, temporary outside one-lane closures of the I-90 traffic lanes and outside shoulder will be required as shown on the plans. The Westbound Des Plaines Oasis "Exit Only" auxiliary lane shall be closed for a maximum of four (4) calendar days during oasis exit ramp gore area pavement marking removal and lane ends taper pavement marking, as directed by the Engineer and as shown on the plans.

The Contractor shall provide traffic control and protection for the installation of Type III barricades and signing along local routes, including Service Drive and Jarvis Avenue, as shown on the plans.

The Contractor shall provide traffic control and protection, including flaggers and advance signing, for vehicles entering and exiting the MWRDGC Stockpile B Borrow Site.

Maintenance of traffic on the I-90 roadway may also be required for other construction activities involving temporary closures requested by the Contractor and approved by the Engineer.

All lane closures shall be in accordance with the Allowable Lane Closure timeframes and requirements as further defined in this Special Provision.

ALLOWABLE LANE CLOSURES

Temporary lane closures on I-90 within the Contract limits will be permitted only with the Illinois Tollway's approval. All lane closures shall be submitted by the Contractor to the Construction Manager no later than 7:00 a.m. weekdays at least one day prior to closure. The lane closure coordination must be routed through the Construction Manager and no contact shall be made directly with the Illinois Tollway. Closures shall be in accordance with the Illinois Tollway Traffic Control and Communication Guidelines, and Illinois Tollway's Standard E2, and the times listed below:

| DAY | ALLOWABLE 1-LANE CLOSURE TIMES M.P. 68.2 to M.P. 70.7 | |
|-----------|--|-------------|
| | Eastbound | Westbound |
| MONDAY | 9:00 P.M. – 5:00 A.M. TUES. | NOT ALLOWED |
| TUESDAY | 9:00 P.M. – 5:00 A.M. WED. | NOT ALLOWED |
| WEDNESDAY | 9:00 P.M. – 5:00 A.M. THURS. | NOT ALLOWED |
| THURSDAY | 9:00 P.M. – 5:00 A.M. FRI. | NOT ALLOWED |
| FRIDAY | 10:00 P.M. – 7:00 A.M. SAT. | NOT ALLOWED |
| SATURDAY | 11:00 P.M. – 9:00 A.M. SUN. | NOT ALLOWED |
| SUNDAY | 9:00 P.M. – 5:00 A.M. MON. | NOT ALLOWED |

| DAY | ALLOWABLE 1-LANE CLOSURE TIMES M.P. 70.7 to M.P. 76.1 | |
|-----------|--|------------------------------|
| | Eastbound | Westbound |
| MONDAY | 9:00 P.M. – 5:00 A.M. TUES. | 9:00 P.M. – 6:00 A.M. TUES. |
| TUESDAY | 9:00 P.M. – 5:00 A.M. WED. | 9:00 P.M. – 6:00 A.M. WED. |
| WEDNESDAY | 9:00 P.M. – 5:00 A.M. THURS. | 9:00 P.M. – 6:00 A.M. THURS. |
| THURSDAY | 9:00 P.M. – 5:00 A.M. FRI. | 9:00 P.M. – 6:00 A.M. FRI. |
| FRIDAY | 10:00 P.M. – 7:00 A.M. SAT. | 9:00 P.M. – 8:00 A.M. SAT. |
| SATURDAY | 11:00 P.M. – 9:00 A.M. SUN. | 9:00 P.M. – 9:00 A.M. SUN. |
| SUNDAY | 9:00 P.M. – 5:00 A.M. MON. | 9:00 P.M. – 6:00 A.M. MON. |

| DAY | ALLOWABLE 1-LANE CLOSURE TIMES M.P. 76.1 to M.P. 77.3 | |
|-----------|--|------------------------------|
| | Eastbound | Westbound |
| MONDAY | NOT ALLOWED | 9:00 P.M. – 6:00 A.M. TUES. |
| TUESDAY | NOT ALLOWED | 9:00 P.M. – 6:00 A.M. WED. |
| WEDNESDAY | NOT ALLOWED | 9:00 P.M. – 6:00 A.M. THURS. |
| THURSAY | NOT ALLOWED | 9:00 P.M. – 6:00 A.M. FRI. |
| FRIDAY | NOT ALLOWED | 9:00 P.M. – 8:00 A.M. SAT. |
| SATURDAY | NOT ALLOWED | 9:00 P.M. – 9:00 A.M. SUN. |
| SUNDAY | NOT ALLOWED | 9:00 P.M. – 6:00 A.M. MON. |

| DAY | ALLOWABLE 2-LANE CLOSURE TIMES M.P. 68.2 to M.P. 73.5 | |
|-----------|--|-------------|
| | Eastbound | Westbound |
| MONDAY | NOT ALLOWED | NOT ALLOWED |
| TUESDAY | NOT ALLOWED | NOT ALLOWED |
| WEDNESDAY | NOT ALLOWED | NOT ALLOWED |
| THURSAY | NOT ALLOWED | NOT ALLOWED |
| FRIDAY | NOT ALLOWED | NOT ALLOWED |
| SATURDAY | 12:00 a.m. – 6:00 a.m. | NOT ALLOWED |
| SUNDAY | 1:00 a.m. – 7:00 a.m. | NOT ALLOWED |

| DAY | ALLOWABLE 2-LANE CLOSURE TIMES M.P. 73.5 to M.P. 74.4 | |
|-----------|--|-------------|
| | Eastbound | Westbound |
| MONDAY | NOT ALLOWED | NOT ALLOWED |
| TUESDAY | NOT ALLOWED | NOT ALLOWED |
| WEDNESDAY | NOT ALLOWED | NOT ALLOWED |
| THURSAY | NOT ALLOWED | NOT ALLOWED |
| FRIDAY | NOT ALLOWED | NOT ALLOWED |
| SATURDAY | NOT ALLOWED | NOT ALLOWED |
| SUNDAY | NOT ALLOWED | NOT ALLOWED |

| DAY | ALLOWABLE 2-LANE CLOSURE TIMES M.P. 74.4 to M.P. 77.3 | |
|-----------|--|-----------------------|
| | Eastbound | Westbound |
| MONDAY | NOT ALLOWED | NOT ALLOWED |
| TUESDAY | NOT ALLOWED | NOT ALLOWED |
| WEDNESDAY | NOT ALLOWED | NOT ALLOWED |
| THURSAY | NOT ALLOWED | NOT ALLOWED |
| FRIDAY | NOT ALLOWED | NOT ALLOWED |
| SATURDAY | NOT ALLOWED | 12:00 A.M. – 6:00 a.m |
| SUNDAY | NOT ALLOWED | 1:00 a.m. – 7:00 a.m. |

| DAY | ALLOWABLE 4-LANE CLOSURE TIMES M.P. 68.2 to M.P. 73.5 | |
|-----------|--|-------------|
| | Eastbound | Westbound |
| MONDAY | NOT ALLOWED | NOT ALLOWED |
| TUESDAY | NOT ALLOWED | NOT ALLOWED |
| WEDNESDAY | NOT ALLOWED | NOT ALLOWED |
| THURSDAY | NOT ALLOWED | NOT ALLOWED |
| FRIDAY | NOT ALLOWED | NOT ALLOWED |
| SATURDAY | 12:00 a.m. – 6:00 a.m. | NOT ALLOWED |
| SUNDAY | 1:00 a.m. – 7:00 a.m. | NOT ALLOWED |

3-Lane Closures will not be allowed except during girder erection work when 15-minute full closures are implemented.

The Contractor shall strictly adhere to the temporary lane closure times set out above throughout the duration of the contract. Temporary lane closures will not be allowed, or must be removed, if so directed by the Engineer, due to inclement weather or heavy traffic.

No lane closure signs shall be erected any earlier than one-half (1/2) hour before the starting hours listed above. Also, these signs should be taken down within one-half (1/2) hour after the closure is removed.

When temporary lane closures are required, a portable changeable message sign shall be installed 1 week prior to the closure and shall be placed 3 miles in advance of the closure. The wording and location shall be determined by the Engineer. All signs and sign appurtenance that have been taken down shall be properly stored outside the roadway clear zone or 35 feet from the edge of the pavement whichever is greater and the location shall be approved by the Engineer.

In all cases, the Contractor is expected to be working in the areas closed due to the temporary lane closures. The Contractor shall remove the temporary lane closure when the scheduled work shift is over or when so required by the Contract Documents, whichever occurs first.

HOLIDAY PERIODS

Holiday Periods shall apply per Article 701.12 of the Illinois Tollway Supplemental Specifications except the length of the Holiday Period for Thanksgiving shall be extended as defined under the PUBLIC CONVENIENCE AND SAFETY (D-1) Special Provision along with the following additions:

A. Labor Day Weekend (2018)

12:00 Noon, Friday August 31, 2018 through 9:00 A.M., Tuesday September 4, 2018

B. Thanksgiving Weekend

5:00 A.M., Wednesday November 21, 2018 through 9:00 A.M., Monday November 26, 2018

C. Christmas Day/New Year's Day (2018)

12:00 Noon, Friday December 21, 2018 through 9:00 A.M., Wednesday January 2, 2019

D. Easter Weekend (2019)

12:00 Noon, Thursday April 18, 2019 through 9:00 A.M., Monday April 22, 2019

E. Memorial Day Weekend (2019)

12:00 Noon, Friday May 24, 2019 through 9:00 A.M., Tuesday May 28, 2019

F. Independence Day (2019)

12:00 Noon, Wednesday July 3, 2019 through 9:00 A.M., Monday July 8, 2019

G. Labor Day Weekend (2019)

12:00 Noon, Friday August 30, 2019 through 9:00 A.M., Tuesday September 3, 2019

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

This work will be measured and paid for in accordance with Article 701.15 of the Illinois Tollway Supplemental Specifications.

| Pay Item Number | Designation | Unit of Measure |
|-----------------|------------------------|-----------------|
| JS701010 | MAINTENANCE OF TRAFFIC | L SUM |

TEMPORARY LUMINAIRE, SODIUM VAPOR, HIGH MAST, HORIZONTAL MOUNT, 750 WATT

Description. This work shall consist of furnishing and installing temporary 750-watt high mast luminaires, according to Sections 821 and 1067 of Illinois Tollway Supplemental Specifications except as modified herein.

Replace Article 821.04 (a) with the following:

(a) Luminaire. Luminaires shall be 750-watt high pressure sodium as specified on the plans.

Where 750-watt high pressure sodium luminaires are installed, luminaires manufactured by Holophane, IES file No. HMSC750HP00B9 or approved equal shall be used.

The selected luminaire shall meet the following Luminaire Performance Table:

LUMINAIRE PERFORMANCE TABLE

I-###

| GIVEN CONDITIONS | | |
|------------------------|--|--------------|
| ROADWAY DATA | Pavement Width | 51 (ft) |
| | Number of Lanes | 4 |
| | I.E.S. Surface Classification | R3 |
| | Q-Zero Value | .07 |
| LIGHT POLE DATA | Mounting Height | 65 (ft) |
| | Mast Arm Length | 15 (ft) |
| | Pole Set-Back From Edge of Pavement | 56 (ft) |
| LUMINAIRE DATA | Lamp Type | HPS |
| | Lamp Lumens | 110000 |
| | I.E.S. Vertical Distribution | Medium |
| | I.E.S. Control Of Distribution | Cutoff |
| | I.E.S. Lateral Distribution | Type III |
| | Total Light Loss Factor | 0.60 |
| LAYOUT DATA | Spacing | 185(ft) |
| | Configuration | Single Sided |
| | Luminaire Overhang over edge of pavement | -36 (ft) |

NOTE: Variations from the above specified I.E.S. distribution pattern may be requested and acceptance of variations will be subject to review by the Engineer based on how well the performance requirements are met.

| PERFORMANCE REQUIREMENTS |
|--------------------------|
|--------------------------|

NOTE: These performance requirements shall be the minimum acceptable standards of photometric performance for the luminaire, based on the given conditions listed above.

| | | |
|------------------|--|-----------------------------|
| LUMINANCE | Average Luminance, L_{AVE} | 0.6 Cd/m ² (Max) |
| | Uniformity Ratio, L_{AVE}/L_{MIN} | 3.5 (Max) |
| | Uniformity Ratio, L_{MAX}/L_{MIN} | 6.0 (Max) |
| | Veiling Luminance Ratio, L_V/L_{AVE} | 0.3 (Max) |

Revise Article 821.09 to read:

821.09 Basis of Payment. This work will be paid at the contract unit price per each for TEMPORARY LUMINAIRE, SODIUM VAPOR, HIGH MAST, HORIZONTAL MOUNT, 750 WATT.

| Pay Item Number | Designation | Unit of Measure |
|--------------------|---|--------------------|
| JS821009 | TEMPORARY LUMINAIRE, SODIUM VAPOR, HIGH MAST, HORIZONTAL MOUNT, 750 WATT | EACH |

SOLAR POWERED GENERATOR ASSEMBLY (Illinois Tollway)

Effective: February 17, 2015

Revised: January 18, 2018

DESCRIPTION

This work shall consist of furnishing, installing, calibrating, and testing a pole mounted solar power generator assembly as shown on the Plans and as directed by the Engineer. The system consists of a solar power generator which is mounted on a shorter pole located near an ITS Pole Mounted Enclosure (CCTV or MVDS) provided separately.

Pole mounted solar power generator assembly shall consist of:

- Solar Panels
- Solar Charge Controller
- Batteries
- DC to AC Inverter
- Cabinet/Enclosure to house batteries and electronics
- 6 Ft. Aluminum Pole
- Grounding System
- Mounting Brackets and Framing
- Conduit and Cable to connect Generator to Camera Electronics

MATERIALS

The Contractor shall furnish components for each solar powered generator assembly in accordance with the Plans and as specified herein.

Pole Mounted Solar Power Generator.

The following requirements shall be met for the solar powered generator assembly:

- All components shall be rated for a hardened operating temperature environment.
- The minimum operating temperature range shall be -4 degrees Fahrenheit (-20° C) to +140 degrees Fahrenheit (+60° C).
- The solar power generator shall consist of a minimum of:
 - Six (6) 300 watt (nominal) solar panels with Ironridge mounting system
 - Four (4) six (6) volt batteries
 - Solar charge controller with battery temperature sensor (Morningstar TriStar MPPT-60)
 - Photovoltaic (PV) Combiner, with circuit breakers to disconnect solar panels
 - 24V DC to 120V AC Inverter
 - All necessary panels, brackets, battery cables, wiring, conduit, and circuit breakers required for a complete and operational system

The following electrical requirements shall be met for the solar powered generator assembly components:

- 1) Each 300 watt (nominal) solar panel shall meet or exceed the following requirements:
 - a. Surface area of less than 21 sq. ft.
 - b. Less than 52 pounds weight

- c. Minimum Rated Current (Impp) at NOTC: 6.5 Amps
- 2) Individual Battery Voltage: 6 V Absorbent Glass Mat (AGM) style
 - a. Each Battery shall be minimum 400 Amp hour (Ahr) rated based on 24hr rate @ 77 degrees Fahrenheit (+25° C)
- 3) Output Voltages: 24Vdc (battery array) and 120Vac (to external load, i.e. ITS Pole Mounted Enclosure (CCTV or MVDS))
- 4) Vented Stainless Steel NEMA 3R enclosure minimum size of 30"w x 36"h x 16" d with locking clasp
- 5) Pole mounting kit for enclosure (Hoffman CPMK30)
- 6) 2" RGS conduit between the Solar Generator and the External Load (i.e. ITS Pole Mounted Enclosure (CCTV or MVDS))
- 7) DC to AC Inverter has Minimum Continuous Power Output of 2000VA at 77 degrees Fahrenheit (+25°C)
- 8) Tilt Range: 15-65 degrees
- 9) Ground Bar (Hoffman PGS2K)
- 10) DIN Rail

The installation shall meet applicable International Building Construction (IBC) requirements and National Electrical Code (NEC) standards.

Solar Power System Cabinet/Enclosure.

The vented Stainless Steel cabinet shall have a full-length hinged door as manufactured by Hoffman NEMA 3R with a lock system and aluminum back panel. The cabinet shall be furnished with mounting brackets necessary for attachment to the pole. Raceways and other openings, including foundation, shall be sealed to prevent the intrusion of insects, rodents, pests, and debris and shall be installed as shown on the Plans. The minimum size of the enclosure shall be 30"w x 36"h x 16"d. The contractor shall upsize the cabinet as necessary to accommodate the batteries, DC to AC Inverter, breakers and solar charge controller. Any upsizing of the enclosure shall be subject to approval by the Engineer.

Batteries.

Batteries shall be fully charged and tested by the manufacturer. Prior to their installation in the solar power generator, battery test results shall be submitted to the Engineer for approval. The batteries shall be fully charged for 48 hours after the solar power generator is complete, prior to connecting an external load that is to be powered from the generator system.

Solar Generator Support Pole and Solar Panel Mount.

The Solar Panel pole shall be a minimum 6 feet high, 6-inch constant diameter, 0.25-inch-thick aluminum pole with a welded anchor base plate and shall rest on a leveling plate that shall rest on a helix foundation. The pole shall conform to the Plans and the applicable requirements of Section 830 of the Illinois Tollway Supplemental Specifications for Light Poles. To prevent rodent entry into the pole, the Contractor shall install a flat steel plate, drilled to accept conduits/raceways connecting to the solar power system cabinet/enclosure, with surrounding stainless steel mesh panel between the anchor base and the pole. The Contractor's shop drawings shall include this detail for Engineer's review and approval prior to its installation in field.

A rack-mounted system for fixed mount pole top attachment of solar panels with ability to tilt at least within +/- 10 degrees of Latitude shall be manufactured by IRONRIDGE – Series UNI-TP to accommodate six (6) solar panels of the dimensions of the solar panels provided by the contractor for the solar power generator.

Grounding System

The Powered Generator ground shall be connected to the ITS Pole Mounted Enclosure (CCTV and MVDS) ground system along with the external Master Ground Bus connections. For more detail pertaining to the grounding system, see the Illinois Tollway special provision ITS ELEMENT SITE GROUNDING.

CONSTRUCTION REQUIREMENTS

The Contractor shall closely coordinate with the Engineer. This includes, but is not limited to, the following:

Pre-Procurement Documentation Approval

- Within 10 business days from Notice to Proceed, the Contractor shall submit for approval by the Engineer, a detailed schedule showing dates for: product submittals and approvals; device configuration by the Illinois Tollway; construction/installation; calibration; testing; burn-in period; and warranty of each Solar Powered Generator Assembly. This detailed schedule shall be included in the project schedule, as required per Illinois Tollway Supplemental Specifications Article 108.02. Schedules for each Solar Powered Generator Assembly to be deployed within the larger construction contract and shall be staggered based on resources to be employed.
 - If this installation is part of a larger ITS deployment or construction project, then the furnishing, installation, and testing of the Solar Powered Generator Assembly site(s), shall be specifically noted in the overall project schedule.
- Within 10 business days from Notice to Proceed, the Contractor shall submit for approval by the Engineer, a completed Contractor Shop Drawing Submittal Checklist (attached to this special provision).
- Within 10 business days from Notice to Proceed, the Contractor shall submit for approval by the Engineer, associated submittals for catalog cut sheets, wiring diagrams, and shop/detail drawings.

The Contractor shall make all submissions through the Illinois Tollway's Web Based Program Management (WBPM) to the Engineer.

The Contractor must obtain approval of the schedule, catalog cut sheets, wiring diagrams, and shop/detail drawings from the Engineer prior to purchasing any equipment and subsequently performing the installation per the approved documents, and contract plans.

Pre-Installation Requirements.

The plans identify the approximate location for the solar powered generator assembly. The Contractor shall stake in the field the location of the pole mounted solar generator, concurrent to staking nearby ITS equipment to be powered by the solar generator, for approval by the Engineer.

Installation.

The pole assemblies and foundations shall be installed outside the clear zone or in areas shielded by guard rail. Breakaway poles or devices shall not be used.

The Contractor shall install the pole, cabinet, and solar panels at the location necessary to provide a working system as approved by the Engineer.

The solar panels shall be mounted in an orientation open 186 degrees from magnetic North and tilted 57 degrees, then optimized to achieve maximum possible solar exposure. The Contractor must submit the orientation and tilt to the Engineer for approval. The Contractor shall document the orientation and tilt in the as-built record drawings.

A separate ground rod from the ITS pole installation shall be installed for the solar powered generator assembly, with a bare No. 2 AWG ground cable installed between the two ground rods and cadwelded to each ground rod.

The components shall be installed in the solar generator cabinet in accordance with the approved contractor detail drawings. Once all equipment is installed at the solar power generator, the battery system must be fully charged before connecting an external load. The Contractor shall submit documentation to the Engineer of the initial solar package turn-on time. Once the batteries are fully charged, the component subsystem testing shall be performed by the Contractor as described herein and per the manufacturer's recommendations. The contractor shall complete the cabling from the solar generator to the external load (i.e. ITS Pole Mounted Enclosure (CCTV or MVDS)). The Contractor shall submit documentation to the Engineer of the time in which the external load (i.e. ITS Pole Mounted Enclosure (CCTV or MVDS)) is connected and receiving power from the solar generator. The solar generator package shall be completed in time to allow testing of associated CCTV and/or MVDS systems.

TESTING

The Contractor shall be required to perform the following tests after the installation of the Solar Powered Generator Assembly. The Contractor shall use the test plans within this special provision to conduct the following tests in the presence of the Engineer.

- First Unit Factory Visual Inspection
- Site Test
- 30-Day Burn-in Period
- Final System Acceptance and Training

First Unit Factory Visual Inspection.

The Contractor (or the Contractor's equipment fabricator) shall completely assemble a Solar Powered Generator Assembly unit which includes the cabinet, solar array, batteries, solar charge controller, inverter, components and complete all internal wiring (including labeling), then provide 5 business days' notice via Web-Based Program Management System (WBPM) that this unit is ready for inspection. The Contractor shall have one set of contract plans and two sets of shop drawings on site to be redlined with any discrepancies noted. One set of redlines will be retained by the Engineer. The Contractor shall follow the Illinois Tollway ITS Labeling Guide for all labeling of components. The manual can be found on the Illinois Tollway's website.

In lieu of the Factory Visual Inspection, the Contractor can obtain from the manufacturer a product validation certification illustrating that the manufacturer has followed their quality

processes and verifies that the unit meets the specifications for operations. This certificate must be submitted to the Engineer for review and approval.

Site Testing

The purpose of the Site Test is to have the Contractor demonstrate to the Engineer that all Solar Powered Generator Assembly components have been installed, connected, labeled, and configured correctly as per contract plans and per the manufacturer's requirements, utilizing quality workmanship. This installation shall result in a reliable, fully functional solar powered generator for service to an external load (i.e. ITS Pole Mounted Enclosure (CCTV or MVDS)).

The Site Test shall be performed in conjunction with all associated equipment installed at a common site, including but not limited to the following elements. A Site Test shall not be performed at the element or component level. Site Tests shall be performed for all relevant elements at a common site, meeting any Site Test requirements specified for each element.

- CLOSED CIRCUIT TELEVISION (CCTV) CAMERA, ITS ASSEMBLY
- MICROWAVE VEHICLE DETECTION SYSTEM (MVDS), ITS ASSEMBLY
- ITS POLE MOUNTED ENCLOSURE, ITS ASSEMBLY (CCTV or MVDS)
- FIBER OPTIC COMMUNICATIONS, ITS ASSEMBLY
- WIRELESS COMMUNICATIONS, ITS ASSEMBLY
- STATIC SIGN FLASHING BEACON ASSEMBLY INSTALLATION
- SOLAR POWERED GENERATOR ASSEMBLY
- ITS ELEMENT SITE GROUNDING
- MONOPOLE CLOSED CIRCUIT TELEVISION (CCTV) CAMERA TOWER ASSEMBLY

The Contractor shall provide the Latitude and Longitude coordinates of the Solar Powered Generator Assembly prior to the start of the Site Test. For the Site Test to be accepted, the Contractor shall demonstrate to the Engineer that:

- The installation has been performed per Plans and per the manufacturer's recommendations.
- All enclosure components are properly wired and demonstrate continuity and correct grounding utilizing good workmanship.
- The enclosure is attached/orientated to the pole and properly grounded.
- All conduits are secured and sealed, as required.
- All enclosure components demonstrate correct input and/or output voltages when powered/unpowered.
- All connections are tight and cannot be dislodged by incidental contact from the Engineer.
- All Solar Powered Generator Assembly equipment is properly labeled as per the ITS Labeling Guide (located on the Illinois Tollway website). Verify solar power generator functionality.
 - Adequate power is generated on a sunny day until the batteries become fully charged. Check the current, voltages, and charges at various stages.
 - Input solar array, battery bank, input 24V inverter, and output 120V inverter voltages meet requirements.

30-Day "Burn-in" Period Requirements.

The purpose of the 30-Day Burn-in Period is to demonstrate the capabilities of the Solar Powered Generator Assembly, as well as the functionalities of the Local Field Test,

troubleshooting, and diagnostics over the Burn-in Period.

For the 30-Day Burn-in Period to be accepted, the Contractor shall demonstrate to the Engineer that:

- The Engineer, TOC Manager, Operations Manager, Illinois Tollway ITS Maintenance Manager have not submitted any trouble tickets or written (via email or Illinois Tollway WBPM system) failure notifications within the 30-Day period.
- Failure notification shall include, but not be limited to:
 - Power loss or fluctuations.
 - Any operations anomaly that the Contractor cannot explain or rectify.
- For every one (1) day the Contractor is required to mitigate/fix a problem, an additional one (1) day per testing will be added to the 30-Day test. An additional one (1) day will be added to the 30-Day test of any associated external loads undergoing a concurrent 30-Day test.
- Receive written approval (via the WBPM system) from the Engineer verifying the 30-Day Burn-In period has been successfully completed.

Final System Acceptance.

Final acceptance of the work associated with this Solar Powered Generator Assembly will be made after the Contractor has demonstrated to the Engineer the:

- Successful completion of the project final walk-through by the Illinois Tollway's ITS General Engineering Consultant (GEC).
- All Record Drawings and Warranty documents including an electronic computer file (Microstation and PDF) including a sketch of each solar powered generator assembly, user/operator manuals, listing each device's location, identification number, and GPS coordinates have been submitted (via Illinois Tollway WBPM system) and been approved in writing by the Engineer.
 - Contractor shall work with the Engineer to develop record drawings of all solar power generators and connections (inclusive of electrical). Final documentation shall reflect all field changes, including but not limited to final coordinates solar powered generator assembly locations to the level of accuracy of 10 feet. Contractor shall submit these plans, maps, and/or drawings to reflect as-built condition, incorporating all changes made during installation and testing period within the 15 days prior to final acceptance.
 - The Contractor shall provide three hard and three electronic (PDF) copies of each of the operation and maintenance manuals to the Engineer for approval.
 - The Contractor shall add a new or updated laminated cabinet wiring diagram to each enclosure.
 - The Contractor shall conduct two training classes for up to 8 Illinois Tollway approved personnel on the solar powered generator assembly. The training shall cover both classroom and field training and provide a detail review of the solar panels, batteries, all enclosure components, connections, wiring and required maintenance of the system. Training shall be conducted prior to completion of the 30-Day test and prior to the end of the Warranty period.

The Engineer shall notify the Contractor of Final Acceptance in writing (via Illinois Tollway WBPM system).

WARRANTY.

All equipment and system components shall be warranted and guaranteed against defects and/or failure in design, materials, and workmanship within the warranty period. The Contractor shall submit the warranty terms as part of each material item's shop drawing submittal for approval.

The warranty shall provide that, in the event of a malfunction during the warranty period, the defective system component shall be replaced with a new component by the manufacturer or his/her representative.

Any system component that, in the opinion of the Engineer, fails three (3) times prior to the expiration of the warranty will be judged as an unsuitable system and shall require the entire system be replaced by the device manufacturer or representative with a new system of the same type at no additional cost to the Illinois Tollway. The unsuitable system shall be permanently removed from the project. A failure shall also be defined as the field device becoming unable to comply with all applicable standards at the time of original construction.

All manufacturer's equipment guarantees or warranties shall be included in the maintenance manuals for the subject equipment.

METHOD OF MEASUREMENT

This work will be measured in units of each, completed in place and accepted.

BASIS OF PAYMENT

This work will be paid for at the contract unit price per each for SOLAR POWERED GENERATOR ASSEMBLY.

The payment to the Contractor will adhere to the following schedule:

Ten percent (10%) of the contract unit price will be paid upon receipt of submission and approval of all product submittal documentation, shop drawings, and calculations.

Sixty-five percent (65%) of the contract unit price will be paid at completion of the Site Test of the solar powered generator assembly location.

The final twenty-five percent (25%) of the contract unit price will be paid after Final System Acceptance by the Engineer and Training by the Contractor. Written (via Illinois Tollway WBPM system) approval from the Engineer of Final System Acceptance is required before payment is released.

| Pay Item Number | Designation | Unit of Measure |
|-----------------|----------------------------------|-----------------|
| JT130700 | SOLAR POWERED GENERATOR ASSEMBLY | EACH |

SOLAR POWERED GENERATOR ASSEMBLY SUBMITTAL CHECKLIST

PAY ITEM # JT130700
Contract #
e-Builder Submittal Package #:
e-Builder Submittal Date:
Reviewed By (CM Staff Name):
Review Date:

SUBMITTAL STATUS
 APPROVED
 APPROVED AS NOTED
 REJECTED

| LOCATION OF REFERENCE | DETAIL SHEET ITEM | ITEM DESCRIPTION | APPROVED MANUFACTURER | APPROVED MODEL No. | SUBMITTED AS SPECIFIED? | MANUFACTURER | MODEL No. | PROPOSED EQUIVALENT DETAILS | NOTES |
|--|-------------------|---|-----------------------|--------------------|-------------------------|--------------|-----------|-----------------------------|-------|
| SOLAR GENERATOR / MOUNTING HARDWARE | | | | | | | | | |
| SPEC. PROV. | | SOLAR PANELS, 300W, RATED CURRENT @NOTC = 6.5A (MIN) | | | | | | | |
| SPEC. PROV. | | PANEL BRACKETS | RONRIDGE | | | | | | |
| SPEC. PROV. | | SOLAR CONTROLLER | MDRININGSTAR | TRISTAR MPPT-60 | | | | | |
| SPEC. PROV. | | PV COMBINER WITH CIRCUIT BREAKERS | | | | | | | |
| SPEC. PROV. | | 6-VOLT AGM BATTERIES - 400 A HR @ 20 HR RATE25° C | | | | | | | |
| DETAIL DWG. | | CONDUIT | | | | | | | |
| SPEC. PROV. | | CABLES AND WIRING | | | | | | | |
| CABINET ENCLOSURE AND ALL ASSOCIATED MATERIALS | | | | | | | | | |
| SPEC. PROV. | | VENTED SS NEMA 3R ENCLOSURE (MIN. 30"W X 36"H X 18"D) | | | | | | | |
| DETAIL DWG. | | ENCLOSURE BACKPANEL (24"W X 14"H MIN) | | | | | | | |
| SPEC. PROV. | | SHELVING (AS REQUIRED) | | | | | | | |
| SPEC. PROV. | | POLE MOUNTING KIT FOR ENCLOSURE | HOFFMAN | CRM30 | | | | | |
| SPEC. PROV. | | TERMINAL BLOCKS | ALLEN BRADLEY | 1492-CC8 | | | | | |
| SPEC. PROV. | | GROUNDING BAR | HOFFMAN | PSS2K | | | | | |
| DETAIL DWG. | | 50 AMP CIRCUIT BREAKER (combiner to controller) | | | | | | | |
| DETAIL DWG. | | 60 AMP CIRCUIT BREAKER (controller to batt) | | | | | | | |
| DETAIL DWG. | | 60 AMP CIRCUIT BREAKER (batt to inverter) | | | | | | | |
| DETAIL DWG. | | DN RAIL | | | | | | | |
| GROUNDING MATERIAL- SEE " ITS ELEMENT SITE GROUNDING" FOR DETAILS | | | | | | | | | |
| REFER TO "ITS ELEMENT SITE GROUNDING" CHECKLIST | | | | | | | | | |

RE-AIMING MICROWAVE VEHICLE DETECTION SYSTEM (MVDS) UNITS (Illinois Tollway)

Effective: November 20, 2014

Revised: March 1, 2018

DESCRIPTION

This work shall consist of re-aiming and re-calibrating existing Microwave Vehicle Detection Sensors manufactured by Electronic Integrated Systems, Wavetronix or Image Sensing Systems. This work shall also include site and system testing of the sensors as described herein by either manufacture unit, or a combination there of.

CONSTRUCTION REQUIREMENTS

The Contractor shall re-aim and re-calibrate the existing vehicle detection sensor units when directed to do so within the contract documents or as directed by the Engineer. Prior to initiating this work, the Contractor shall provide confirmation from the Traffic Operations Center (TOC) Manager, via the Illinois Tollway Web Based Program Management (WBPM) system, that the vehicle detection unit(s) are collecting and transmitting data back to the TOC. During the calibration step, the proper equipment shall be onsite to support any re-aiming of the detection sensor that is required.

Ten days prior to any scheduled shift in traffic lanes the Contractor shall submit for approval by the Engineer, a detailed plan with the names of qualified personnel for the re-aiming and re-calibrating of the applicable vehicle detection sensor units. After approval of the Contractor's plan by the Engineer, and in coordination with the planned shift in traffic lanes, the Contractor shall re-aim and re-calibrate the applicable sensors and have the required documentation, including the completed calibration worksheets available to the Engineer through the Illinois Tollway WBPM system within 1 business day of calibration of each unit.

Aiming and Calibration

The Contractor shall download and use the current version of the manufacturer's calibration software. The Contractor is NOT to rely solely on the manufacturer's calibration wizard in automatic mode as it alone usually does not achieve the accuracy specified.

The Contractor shall re-aim and re-calibrate the vehicle detection sensor units within the MVDS manufacture's specification tolerances prior to final acceptance by the Engineer. The Contractor shall fully complete MVDS calibration worksheet(s) in the presence of the Engineer before submitting for approval by the Engineer. The Contractor shall be totally and completely responsible for the vehicle detection sensor maintenance and data quality until system testing acceptance.

The properly aimed and calibrated units shall collect traffic counts and average speed on a per lane basis with individual detection zones. The detection zones shall be viewable by the Contractor performing the work.

The firmware (hardware and software) used to calibrate the MVDS unit(s) shall be capable of allowing verification of correct setup and diagnostics. It shall include facilities for saving verification data and collected data as well as saving and retrieving sensor setup from a disk

file. Copies of this data shall be provided to the Engineer upon completion of the calibration procedure.

TESTING

The Contractor shall be required to perform the following tests after the re-aiming and re-calibrating of the MVDS units. The Contractor shall use the test plans within this special provision to conduct the following tests in the presence of the Engineer.

1. Site Test
2. System Test

Site Test

The purpose of the Site Test is to have the Contractor demonstrate to the Engineer that the MVDS unit(s) have been properly re-aimed and re-configured as per the manufacturer's requirements, utilizing quality workmanship. The re-aiming and re-calibrating shall result in the reviewing of accurate (per manufacturer's specifications) volume and speed data at the site before being connected to the Illinois Tollway switch and communications system.

For the Site Test to be accepted, the Contractor shall demonstrate to the Engineer that:

- The MVDS Calibration form and MVDS configuration spreadsheet (Available on the WBPM system) has been fully completed, signed by the Engineer and provided to the Illinois Tollway Traffic Operations Center (TOC) at the finish of the Site Test.
 - A minimum of 20 vehicles count per lane of traffic, per site (manual and via the MVDS) has been conducted, has accurately recorded the counts on the Volume Verification Sheet (attached to this specification), and the Volume Verification Sheet has been signed by the Engineer.
 - The counts from the MVDS shall be within 10% of the manual counts taken.
 - A one for one vehicle comparison has been conducted when calibrating the speed and has recorded the results on the Speed Verification Sheets (attached to this special provision).
 - The Contractor shall test a minimum of 20 vehicles per lane of traffic, per site. The observed average speed of the detector shall be within 10% of the average speed measured with a calibrated Lidar gun by a trained Lidar gun operator. If this requirement cannot be attained, then the Contractor shall adjust the unit and repeat the entire volume and speed tests.

System Test

The Contractor shall verify with the Engineer, via the WBPM system, if the System Test is required. The System Test shall demonstrate that the field devices can provide correct data at the TOC utilizing the Traffic Information Management System (TIMS) software.

For the System Test to be accepted, the Contractor shall:

- Notify the Engineer in writing (via the WBPM system) within 5 business days that all applicable MVDS sites are ready for System Testing.
- Demonstrate successful communication connectivity from TIMS to each re-calibrated MVDS unit.
- Demonstrate accurate data transmission from each MVDS site to TIMS.
- Receive written approval (via email) from the Engineer verifying that the TOC supervisor is receiving accurate field data from the units upon re-aiming/re-calibration.

METHOD OF MEASUREMENT

This work will be measured in units of each, completed in place and accepted.

BASIS OF PAYMENT

This work will be paid for at the contract unit price per each for REAIMING MVDS UNITS.

| Pay Item Number | Designation | Unit of Measure |
|-----------------|---------------------|-----------------|
| JT130714 | REAIMING MVDS UNITS | EACH |

MVDS Sensor Calibration Sheet

Project Number and Name: _____

Route (Circle One): I-88 / I-90 / I-94 / I-294 / I-355 / IL-390

Mile Post: _____ Direction (Circle One): NB / SB / EB / WB / Median

Latitude: _____ Longitude: _____

Date / Time: _____

Contractor: _____

CM: _____

Manufacture: **Wavetronix**

Manufacture: **ISS**

Model: ss125 ss126

Model: X3 G4 Sx-300

Protocol: Smart Sensor X3 G4

| Zone Number | Lane Number | Lane Direction | Actual Count | Sensor Count | % Difference | Speed Observed | Actual Speed | % Difference |
|-------------|-------------|----------------|--------------|--------------|--------------|----------------|--------------|--------------|
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| Site Checklist | | | | | |
|--------------------------|--|-----------------------|--|-------------------------|--|
| Site Number Verification | | Lane Configuration | | Message Period @ 60 Sec | |
| Vehicle Classification | | Speed Set to KPH | | Lane 5 minute count | |
| Speed Calibration | | Returned to STAT Mode | | Saved to Sensor | |
| Saved to File | | | | | |
| | | | | | |
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| Comments |
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| |

Contractor: _____

Contractor signature: _____

CM: _____

CM signature: _____



X3/G4 Device Settings

Preferred Device Settings:
 Speed = KPH
 Interval = 60 sec
 Data mode = stat
 Message comp = set to protocol

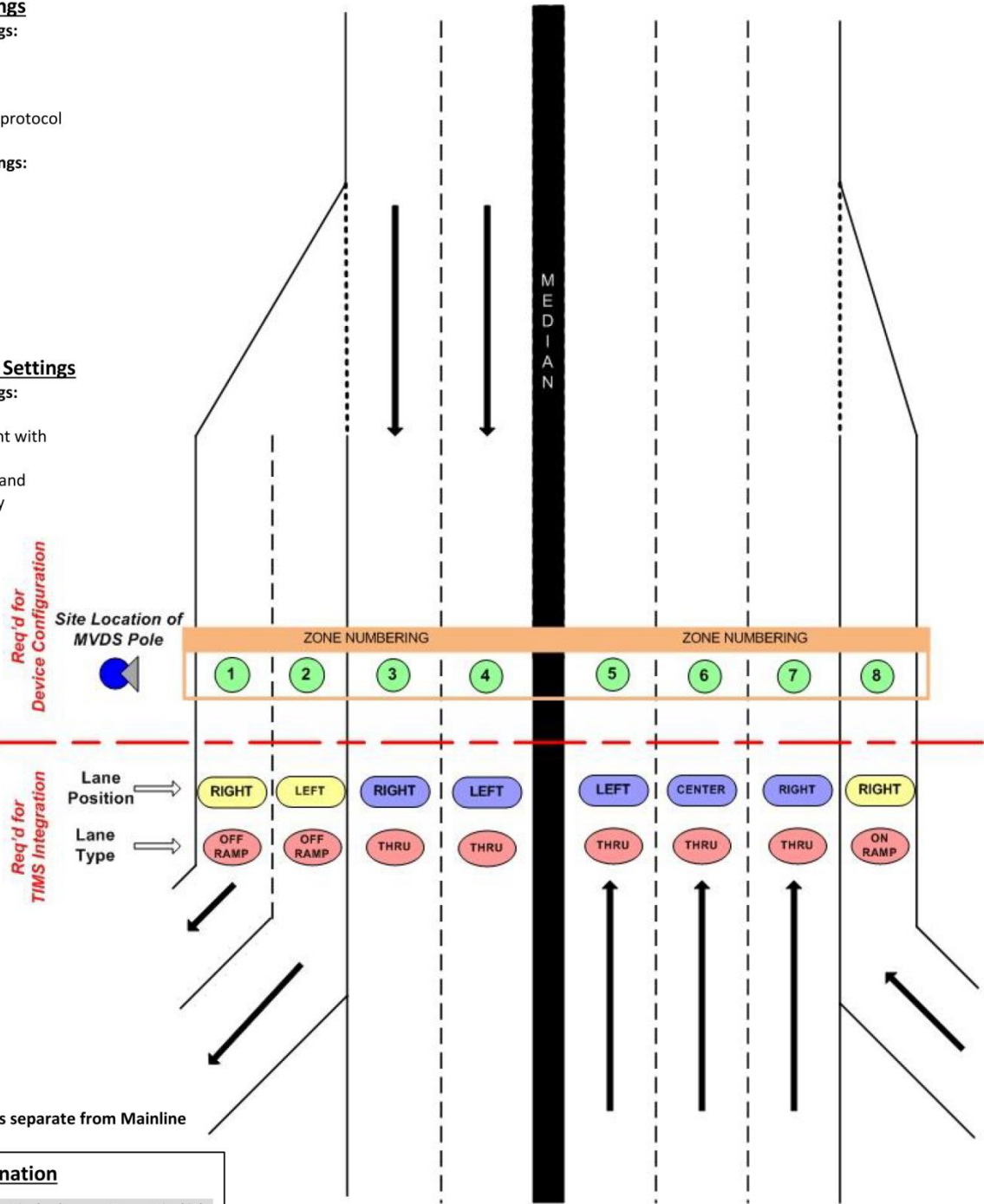
Preferred Modem Settings:

Data port = 12345
 Protocol = RS232
 Baud = 9600
 Data bits = 8
 Flow Control = none
 Parity = none
 Stop bits = 1

Wavetronix Device Settings

Preferred Device Settings:
 -Interval mode enabled
 -Serial port set consistent with modem
 -Format set to protocol and broadcasted if necessary
 -60 sec data interval

Zones: always number from pole to other end



Note:

Ramp lane positioning is separate from Mainline

| Classification Designation | | |
|----------------------------|-------------|-------------|
| Class/Bin | Length (m) | Length (ft) |
| 1 | up to 6.1m | up to 20' |
| 2 | 6.1 – 7.9m | 20 – 26' |
| 3 | 7.9 – 15.5m | 26 – 51' |
| 4 | > 15.5m | > 51' |

MVDS Site Acceptance Test Form



Project Number and Name: _____

Route (Circle One): I-88 / I-90 / I-94 / I-294 / I-355 / IL-390

Mile Post: _____ Direction (Circle One): NB / SB / EB / WB / Median

Date / Time: _____ MVDS Type: _____

INTRODUCTION

Site Acceptance Testing verifies that the installed MVDS(s) are fully operational at each device site, prior to connection to the field Cisco switch.

PROCEDURE

From the Contractor's laptop, access the MVDS. Verify that the MVDS is communicating with vendor supplied software.

Use manufactured software to start automatic setup.

Use manufactured supplied software to adjust settings as required to meet

Fill out the MVDS calibration sheet.

Save setting to MVDS.

Save file to storage device.

Submit calibration sheet(s) and save file to CM via the WBPM system.

Additional Comments: _____

Test Conducted By: _____ Date: _____

CM: _____ Date: _____

Organization: _____

FIBER OPTIC COMMUNICATIONS, ITS ASSEMBLY

DESCRIPTION

This work shall consist of furnishing, installing, and testing a Fiber Optic Communications, ITS Assembly per the contract plans and as directed by the Engineer and as part of a fully functional ITS site.

The work under this specification shall be in association with the installation of an ITS Pole Mounted Enclosure (CCTV or MVDS), ITS device pole, electrical service, grounding, and ITS device (CCTV or MVDS).

MATERIALS

The main components of the system are as described below. All other ancillary connection cables, brackets, and other items required for the installation of a fully functional Fiber Optic Communications, ITS Assembly are included in this work.

- Fiber patch panel
- Fiber optic cable
- Associated splice material/jumper cables/connectors/patch cords

The following are the specific materials for the major system component described above:

- The pre-terminated fiber optic patch panel shall be a Fiber Connections G620U012LAN-200-0 patch panel with six duplex LC connectors with a factory attached 12 fiber single-mode fiber optic cable (SMFOC). The pigtail length shall be measured in meters.
- The fiber optic cable shall:
 - Be armored, all-dielectric, dry-filled, loose-tube, dispersion-unshifted, singlemode fiber (SMF) with low water peak, gel free, and suitable for underground (i.e., in conduit) and aerial outside plant installation.
 - Meet or exceed the Telecommunications Industry Association (TIA) and Electronic Industries Alliance (EIA) TIA/EIA-492-CAAB specification, the U.S. Department of Agriculture Rural Utilities Service (RUS) 7 CFR 1755.900, Telcordia GR-20 standards, International Electrotechnical Commission (IEC) 60793-2-50 Type B1.3, and International Telecommunication Union ITU-T G.652.D requirements.
 - Be splice-compatible with the Illinois Tollway's existing SMF and require no electronic equipment for dispersion compensation between new and existing fiber.
 - Be continuous and be of the same material.
 - Be in buffer tubes and shall be usable at attenuation of:
 - 1,310 nm, ≤ 0.4 dB/km loss
 - 1,550 nm, ≤ 0.3 dB/km loss
 - The fiber shall be free of surface imperfections and inclusions.
 - Only commercial off the shelf materials, equipment and components shall be furnished.
 - All fiber optic core glass shall be from the same manufacturer.
- The fiber optic jumper cables and connectors shall be compliant with the TIA/EIA-568-A and TIA/EIA-604 standards, as applicable, and shall be tested according to the Telcordia/Bellcore GR-326-CORE standard. When tested according to the TIA and EIA's Fiber Optic Test Procedure (FOTP)-171 (TIA/EIA-455-171), the connectors shall test to

an average insertion loss of 0.4 decibel and a maximum loss of 0.75 decibel. The connectors shall be tested as detailed in FOTP-107 (TIA/EIA-455-107) to reflectance values of -50 decibels.

- The fiber optic jumpers shall be two 6.5 foot (2 meter) SMFO duplex LC-LC jumper cables manufactured by Corning, model number 040402R5Z20002M
- The Contractor shall install the armored, outdoor rated 12 strand SM fiber drop cable as indicated on the plans.

The Contractor shall submit to the Engineer a request for variance when changing equipment prescribed on the FIBER OPTIC COMMUNICATIONS, ITS ASSEMBLY CHECKLIST attached to this special provision. The variance shall be the formal request of an approval of an equal or better substitute for a specified part by providing justification and supporting manufacturer's specifications and other relevant documentation.

CONSTRUCTION REQUIREMENTS:

The Contractor shall closely coordinate with the Engineer. This includes, but is not limited to, the following:

Pre-Procurement Meeting and Documentation Approval

- The Contractor shall submit for approval to the Engineer, within 10 business days from Notice to Proceed (NTP), a detailed schedule showing dates for: product submittals and approvals; device configuration by the Illinois Tollway; construction/installation; calibration; testing; and warranty of the fiber optic cable, fiber optic patch panel, and fiber optic jumper cable. This detailed schedule shall be included in the project schedule, as required per Illinois Tollway Supplemental Specifications Article 108.02. Schedules for fiber optic cable to be deployed within the larger construction contracts shall be staggered based on resources to be employed.
 - If this installation is part of a larger ITS deployment or construction project, then the furnishing, installation, and testing of the fiber optic cable, fiber optic patch panel, and fiber optic jumper cables, shall be specifically noted in the overall project schedule.

The Contractor shall submit for approval to the Engineer, within 10 business days from NTP, a completed Contractor FIBER OPTIC COMMUNICATIONS, ITS ASSEMBLY CHECKLIST and associated submittals.

The Contractor shall make all submissions to the Engineer through the Illinois Tollway Web Based Program Management (WBPM) system.

The Contractor must obtain approval of the schedule, catalog cut sheets, cabinet wiring diagrams, and calculations from the Engineer prior to purchasing any equipment and subsequently performing the installation per the approved documents, contract plans, and specifications.

Pre-Installation Requirements

- Upon receipt of the fiber optic cable (excluding the jumper cables) within this specification, the Contractor shall:
 - Perform an end-to-end attenuation test of the fiber optic cable.
 - All fibers shall be tested to ensure that no discontinuities greater than 0.2

- decibel per 300 feet exist.
- The power meter/light source shall be a calibrated pair that is portable and battery operated.
 - The power meter/light source shall operate at selectable wavelengths of 1,310/1,550 nanometers.
 - The power meter shall have a decibel milliwatt measurement scale with a range of +3 to -45 decibel milliwatts for SMF operation and an accuracy of 0.5 decibel or better.
- The Contractor shall replace any pre-terminated fiber optic patch panel assemblies exceeding allowable attenuation.
- Label the pre-terminated fiber optic patch panel in accordance with the Illinois Tollway ITS Labeling Guide.

Fiber Optic Installation

- The Contractor shall install the 12 strand Single Mode Fiber optic cable where as noted on the plans and as per the manufactures installation procedures and recommendations, industry accepted installation standards, codes, practices; or as directed by the Engineer.
 - All associated fiber optic cable fusion splices, terminations, and connectors required to connect, but not limited to any existing Illinois Tollway fiber, existing or proposed fiber optic patch panels, fiber optic modems, small-form factor plug (SFPs), or any other terminals, along with all workmanship required to successfully pass the Site Test stated within this special provision.
 - The Contractor shall coordinate all work with the Illinois Tollway Fiber Optic Maintenance Provider on bringing the drop cable into the nearest splice handhole.
 - All splicing shall be done by Illinois Tollway's Fiber Management Company.

TESTING

The following tests are required after the installation of the fiber optic cable, fiber optic patch panel, and fiber optic jumper cable. The Contractor shall use the test plans within this special provision to conduct the following tests in the presence of the Engineer.

- First Unit Factory Visual Inspection (If Required)
- 3. Site Test
- 4. System Test
- 5. Final System Acceptance and Training

First Unit Factory Visual Inspection

(ONLY REQUIRED IF FIBER OPTIC COMMUNICATION, ITS ASSEMBLY IS DIFFERENT FROM THIS SPECIAL PROVISION)

The Contractor (or the Contractor's equipment fabricator) shall completely assemble one fiber optic cable, fiber optic patch panel, and fiber optic jumper cable unit which includes the fiber optic cable, fiber optic patch panel, and fiber optic jumper cable assembly, all equipment, modules, components and complete all internal wiring (including labeling), then provide 5 business days' notice that this unit is ready for inspection. The Contractor shall have one set of

contract plans and two sets of shop drawings on site to be redlined with any discrepancies noted. One set of redlines will be retained by the Illinois Tollway. The Contractor shall follow the ITS Labeling Guidelines Manual for all labeling of components. The manual can be found on the Illinois Tollway's main website. In lieu of the Factory Visual Inspection, the Contractor shall obtain from the manufacturer a product validation certification illustrating that the manufacturer has followed their quality processes and verifies that the unit meets the specifications for operations. This certificate must be submitted to the Engineer for review and approval for the Factory Visual Inspection acceptance.

Site Testing

The purpose of the Site Test is to have the Contractor demonstrate to the Engineer that all fiber optic cable, fiber optic patch panel, and fiber optic jumper cable components have been installed, connected, labeled, and configured correctly as per contract plans and as per the manufacturer's requirements, utilizing quality workmanship. This installation shall result in accurate data transmission of the contractor installed fiber before being connected to the Illinois Tollway switch and communications system.

The Site Test shall be performed in conjunction with all associated equipment installed at a common site, including but not limited to the following elements. A Site Test shall not be performed at the element or component level. Site Tests shall be performed for all relevant elements at a common site, meeting any Site Test requirements specified for each element.

- CLOSED CIRCUIT TELEVISION (CCTV) CAMERA, ITS ASSEMBLY
- MICROWAVE VEHICLE DETECTION SYSTEM (MVDS), ITS ASSEMBLY
- ITS POLE MOUNTED ENCLOSURE, ITS ASSEMBLY (CCTV or MVDS)
- FIBER OPTIC COMMUNICATIONS, ITS ASSEMBLY
- STATIC SIGN FLASHING BEACON ASSEMBLY INSTALLATION
- SOLAR POWERED GENERATOR ASSEMBLY
- CO-LOCATED SOLAR POWERED GENERATOR ASSEMBLY
- ITS ELEMENT SITE GROUNDING
- MONOPOLE CLOSED CIRCUIT TELEVISION (CCTV) CAMERA TOWER ASSEMBLY

For the Site Test to be accepted, the Contractor shall demonstrate to the Engineer that:

- The installation has been performed as per contract plans and as per the manufacturer's recommendations.
- All connections are tight and cannot be dislodged by incidental contact from the Engineer.
- All fiber optic cable, fiber optic patch panel, and fiber optic jumper cable equipment inside the enclosure shall be properly labeled as per the ITS Labeling Guide (located on the Illinois Tollway website).
- The Contractor has conducted and successfully passed in the presence of the Engineer an end-to-end, Optical Time Domain Reflectometer (OTDR), splice loss and connector loss tests, as described in this special provision

End-to-End Attenuation Testing

All fibers shall be tested to ensure that no discontinuities greater than 0.2 decibel per 300 feet (2.2 decibels per kilometer) exist. Testing shall be conducted and documented and performed bi-directionally at both 1,310/1,550 nanometers. The Contractor shall repair or replace cable sections exceeding allowable attenuation. The power meter/light source shall be a calibrated

pair that is portable and battery operated. The power meter/light source shall operate at selectable wavelengths of 1,310/1,550 nanometers. The power meter shall have a decibel milliwatt measurement scale with a range of +3 to -45 decibel milliwatts for SMF operation and an accuracy of 0.5 decibel or better.

OTDR Tracing

The OTDR test shall be performed if the Scope of Work includes splicing of one or more of the 12 fibers of the pre-terminated fiber optic patch panel. All fibers shall be tested from both cable end points with an OTDR at wavelengths of 1310 and 1550 nm. The fibers that are not terminated at the time of installation shall be tested using a bare fiber adapter. The results of the OTDR testing (i.e., traces for each fiber) and a loss table showing details for each splice or termination tested shall be submitted to the Engineer in an approved electronic format. All OTDR testing shall comply with the EIA/TIA-455-61 standard.

Splice Loss Testing

The Splice Loss test shall be performed if the Scope of Work includes splicing of one or more of the 12 fibers of the pre-terminated fiber optic patch panel. The splice loss for a SMF fusion splice shall not exceed a maximum bidirectional average of 0.1 decibel per splice. The Contractor shall repair or replace splices that exceed allowable attenuation at no additional cost to the Illinois Tollway.

System Test

The System Test shall be conducted by the Illinois Tollway. The System Test demonstrates that the fiber optic cable, fiber optic patch panel, and fiber optic jumper cable provides reliable transportation of the optical signal from attached equipment without any impediment.

If any component fails to pass its System Test, the unit shall be corrected or another unit substituted in its place and the test successfully repeated. If a component has been modified or replaced as a result of a test failure, a report shall be prepared and delivered to the Engineer and Illinois Tollway prior to the retesting of the unit.

For the System Test to begin, the Contractor shall notify the Engineer in writing (via the WBPM system), within 5-Days prior to the start of System Testing, stating that all project sites utilizing the newly installed fiber optic cable, fiber optic patch panel, and fiber optic jumper cable are ready for System Testing.

System Test Acceptance:

- Project pre-final walk-through has been successfully completed by the Illinois Tollway's ITS General Engineering Consultant (GEC).
- Contact the Illinois Tollway Traffic Operations Center (TOC) Manager, after the 5-Day request from above, to request that all aforementioned sites within the project are tested for:
 - Communications connectivity from the Traffic Information management System (TIMS) to each device site is established.
 - Accurate data transmission and full operational control from each site to TIMS.
- Receive written approval (via the WBPM system) from the Engineer and the TOC Manager verifying the communications connectivity and data transmission are within the Illinois Tollway requirements, and that the System Test has passed.

The Illinois Tollway ITS unit will complete the System Test within 2 weeks of notification from the Engineer requesting that all sites be tested.

Final System Acceptance

Final acceptance of the all work associated with this pay item will be made after:

- Successful completion of the project final walk-through by the Illinois Tollway's ITS GEC.
- Submission (via the WBPM system) to the Engineer of all Record Drawings, Warranty documents, user, operator, and maintenance manuals and electronic computer files (Microstation, PDF, Word and/or Excel) that include completed test reports, a sketch of each ITS element assembly, a listing of each device's location, and identification number.
- Notification of Final Acceptance will be sent in writing (via the WBPM system) by the Engineer.

WARRANTY

All fiber optic cable, fiber optic patch panel, and fiber optic jumper cable and associated components shall be warranted and guaranteed against defects and/or failure in design, materials, and workmanship within the warranty period. The Contractor shall submit the warranty terms as part of each material item's shop drawing submittal for approval.

The warranty shall provide that, in the event of a malfunction during the warranty period, the defective system component shall be replaced with a new component by the manufacturer or his/her representative.

Any system component that, in the opinion of the Engineer, fails three (3) times prior to the expiration of the warranty will be judged as an unsuitable system and shall require the entire system be replaced by the device manufacturer or representative with a new system of the same type at no additional cost to the Illinois Tollway. The unsuitable system shall be permanently removed from the project. A failure shall also be defined as the field device becoming unable to comply with all applicable standards at the time of original construction.

All manufacturer's equipment guarantees or warranties shall be included in the maintenance manuals for the subject equipment.

METHOD OF MEASUREMENT

This work will be measured in units of each, completed in place and accepted.

BASIS OF PAYMENT

This work will be paid for at the contract unit price per each for FIBER OPTIC COMMUNICATIONS, ITS ASSEMBLY.

The payment to the Contractor will adhere to the following schedule:

Ten percent (10%) of the contract unit price will be paid upon receipt of submission and

approval of all product submittal documentation, shop drawings, and calculations.

Sixty-five percent (65%) of the contract unit price will be paid at completion of the local field test acceptance by the Engineer at all locations. Written approval from the Engineer that all local field tests have been accepted is required before payment is released.

The final twenty-five percent (25%) of the contract unit price will be paid after Final System Acceptance at all locations. The final inspection of the entire system will be performed by the Engineer in the presence of a representative of the Contractor. Written approval from the Engineer that Final Acceptance has been granted is required before payment is released.

The ITS Pole Mounted Enclosure (CCTV or MVDS), ITS device pole, electrical service, grounding, and ITS device (CCTV or MVDS) will be paid separately.

| Pay Item Number | Designation | Unit of Measure |
|--------------------|--|--------------------|
| JT132830 | FIBER OPTIC COMMUNICATIONS, ITS ASSEMBLY | EACH |

FIBER OPTIC COMMUNICATIONS, ITS ASSEMBLY CHECKLIST

PAY ITEM # JTXXXXXX

Contract #

e-Builder Submittal Package #:

e-Builder Submittal Date:

Reviewed By (CM Staff Name):

Review Date:

SUBMITTAL STATUS

APPROVED

APPROVED AS NOTED

REJECTED

| LOCATION OF REFERENCE | DETAIL SHEET ITEM | ITEM DESCRIPTION | APPROVED MANUFACTURER | APPROVED MODEL No. | SUBMITTED AS SPECIFIED? | PROPOSED EQUIVALENT DETAILS | |
|--|-------------------|---|-----------------------|--------------------|-------------------------|-----------------------------|-----------|
| | | | | | | MANUFACTURER | MODEL No. |
| FIBER OPTIC CABLE/CONNECTOR MODULES/PATCH PANEL | | | | | | | |
| SPEC. PROV. | O | pre-terminated fiber optic patch panel | Fiber Connections | G6204012LAN-100-0 | | | |
| SPEC. PROV. | O | 12 STRAND ARMORED, OUTDOOR RATED, SM, FOC | | | | | |
| SPEC. PROV. | M | 2METER SMFO DUPLEX LC-LC JUMPERS (2) | CORNING | 040402R5Z2002M | | | |

MAINTAIN INTELLIGENT TRANSPORTATION SYSTEMS

Description. This work shall consist of furnishing all labor, equipment, and incidental materials for maintaining roadway ITS systems, including but not limited to data and power cabling, renewable power sources, and wireless devices for communication, as shown on the contract plans and as stated herein, until the proposed new systems are installed, energized, tested and accepted for operation by the Illinois Tollway.

This work does not include maintenance of portable changeable message signs (PCMS) installed by the Contractor and existing Illinois Tollway owned fiber backbone and related equipment that are maintained by the Illinois Tollway's fiber maintenance contractor.

The work shall include maintenance of existing Dynamic Message Signs (DMS) and controllers, CCTV, MVDS, CCTV/MVDS co-located units, Bluetooth detection units, Wireless Traffic Detection Systems including access points and repeaters, Roadway Weather Information Systems (RWIS), Weigh-In-Motion (WIM), and all associated enclosures/cabinets including equipment/devices inside the enclosures/cabinets. Also included are poles, pole foundations and other support equipment and equipment grounding.

Materials. All materials required for maintenance shall be furnished and delivered by the Contractor to the jobsite at no additional cost to the Illinois Tollway. All materials furnished by the Contractor for maintenance of the system shall meet the requirements of the Illinois Tollway special provisions for new work of the same or similar function. All materials furnished and installed by the Contractor during maintenance of the system shall become the property of the Illinois Tollway at the conclusion of the Contract. (During the Preconstruction Conference and prior to the Contractor accepting maintenance responsibility, any materials with long lead times shall be identified jointly between the Contractor and Engineer.

CONSTRUCTION REQUIREMENTS

Effective the date of the maintenance transfer, the Contractor shall be responsible for the proper operation and maintenance of all existing ITS Systems until contract completion. Operation and maintenance of existing ITS equipment that is relocated becomes the responsibility of the Contractor that relocates said equipment until the end of the contract.

Maintenance Transfer

Upon received the Notice to Proceed, the Contractor shall initiate an inspection and maintenance transfer request, as specified elsewhere herein. A subsequent inspection and maintenance transfer to the Illinois Tollway is required at the conclusion of the Contract. All issues identified by the Tollway during inspection must be repaired by the Contractor prior to the Tollway accepting the maintenance transfer.

MAINTENANCE OF EXISTING ITS SYSTEMS

Existing ITS systems include all permanent or temporary ITS system or part of a permanent or temporary ITS system in service prior to the contract that may be affected by the work of the contract as shown on the plans. It remains the Contractor's responsibility to visit the site and ascertain the extent of effort required for compliance with these specifications and failure to do so will not be justification for extra payment or reduced responsibilities.

MAINTENANCE OF PROPOSED ITS SYSTEMS

EXTENT OF MAINTENANCE

The Contractor shall maintain all existing ITS equipment, enclosures (including all equipment/devices within the enclosure), structural supports, grounding for all equipment, ITS disconnect switch, and all circuits/fiber connected to the enclosures, as well as all equipment within the enclosures affected by the contract. This may include enclosures and circuits/fiber and equipment e.g. Switches that extend outside the nominal contract limits identified in the contract documents, but are essential to operation of the ITS equipment within the contract limits. There is no "Partial Maintenance" of Illinois Tollway ITS system/equipment. An anti-static electric safety device will be utilized when doing maintenance of ITS Enclosures and for DMS cabinets.

MAINTENANCE RESPONSIBILITY

The Contractor shall be fully responsible for maintenance of all existing and proposed ITS systems under this contract. Maintenance shall include, but not be limited to, any equipment failures or malfunctions as well as equipment damage either by the motoring public, Contractor operations, or other means.

The Contractor's responsibility shall include the maintenance of ITS equipment units (including enclosures), cable/fiber runs and equipment inside enclosures. In the case of a pole knockdown or equipment damage caused by normal vehicular traffic, the Contractor shall promptly clear the equipment and circuit/fiber discontinuity and restore the system to service.

The Engineer will identify non-functioning ITS equipment and systems and notify the Contractor. Deficiencies will be corrected within the time frame given in the following chart. Uncorrected deficiencies may be designated by the Engineer as necessitating emergency repairs as described elsewhere herein.

The following chart lists the maximum response, service restoration, and permanent repair time the Contractor will be allowed to perform corrective action on specific ITS system equipment.

| INCIDENT OR PROBLEM | SERVICE RESPONSE TIME | SERVICE RESTORATION TIME |
|---|-----------------------|--------------------------|
| Control cabinet out | 24 hours | 72 hours |
| Motorist caused knockdown, damaged or leaning ITS pole (10) degrees or more | 1 hour to clear | 72 hours |
| Circuit out — Needs to reset breaker | 24 hours | N/A |
| Circuit out — Cable trouble | 24 hours | 72 hours |
| Switch out — Needs to reset Switch | 24 hours | N/A |
| Fiber Out — Cable trouble | 24 hours | 72 hours |

Service Response Time — amount of time from the initial notification to the Contractor until a repair technician physically arrives at the location.

Service Restoration Time — amount of time from the initial notification to the Contractor until the time the system is fully operational again (In cases of motorist caused damage the undamaged portions of the system are operational).

LIQUIDATED DAMAGES

Non-Compliance. The Contractor will be subject to liquidated damages of \$1,000.00 per incident, per day, to be deducted from next pay estimate due Contractor, for each occurrence when Engineer determines that Contractor or his Subcontractor is not in full compliance within **MAINTENANCE RESPONSIBILITY** timetable chart.

Failure to Respond. The Contractor is required to respond in accordance with the requirements of Maintenance Responsibility. Failure by Contractor to so respond shall be grounds for liquidated damages of \$1,000.00 for each and every occurrence, to be deducted from next pay estimate due within **MAINTENANCE RESPONSIBILITY** timetable chart.

Damage caused by the Contractor's operations shall be repaired at no additional cost to the contract.

Spare Parts

The Contractor shall maintain an inventory of spare parts for ITS maintenance. The list below shall be followed:

| | |
|---------------|--|
| CCTV assembly | 10% of the quantity within contract limits, minimum of 1 |
| ITS Cabinet | 1 |
| ITS Pole | 1 |

OPERATION OF ITS SYSTEMS

The ITS Systems shall be in proper working and operational condition 24 hours per day, seven days per week. Failure to repair any ITS device under the Contractor's maintenance within the response time stated above will be subject to Liquidated Damages.

MAINTENANCE TRANSFER AND PRECONSTRUCTION INSPECTION

Before performing any excavation, removal, or installation work (electrical or otherwise) at the site, the Contractor shall request a maintenance transfer and preconstruction site inspection, to be held in the presence of the Engineer and a representative of the party or parties responsible for maintenance of any ITS systems which may be affected by the work. The request for the maintenance transfer and preconstruction inspection shall be made no less than seven (7) calendar days prior to the desired inspection date. The maintenance transfer and preconstruction inspection shall:

- Complete the transfer checklist.
- Establish the approximate location and existing operating condition of ITS systems which may be affected by the work.
- Establish the condition of ITS systems which may be affected by the work.

The Contractor shall conduct an inventory of all existing ITS system equipment within the project limits, which may be affected by the work, making note of any parts which are found broken or missing, defective or malfunctioning. The inventory and test data shall be reviewed with and approved by the Engineer and a record of the inventory shall be submitted to the Engineer for the record. Without such a record, all systems transferred to the Contractor for maintenance during construction shall be returned at the end of construction in complete, fully operating condition.

TEMPORARY WIRING/F.O.C.

Temporary wiring/F.O.C suspended between poles, if any, shall be installed a minimum of 20' above finished grade. Temporary wiring/F.O.C. shall not be wrapped around the pole, connected through the pole handhole, or routed under the base of the pole. All pole handhole covers must always be securely installed for the duration of the contract.

Temporary wiring shall be limited to one aerial power cable and one SM fiber optic cable attached to an existing light pole with prior approval of the Illinois Tollway.

MARKING OF EXISTING CABLE SYSTEMS

The parties having jurisdiction and/or maintenance responsibilities over any existing ITS systems within the project limits shall, at the Contractor's request, mark and/or stake, once per location, all underground cable routes owned or maintained by the respective party. A project may involve multiple "locations" where separate ITS electrical/communication systems are involved.

The markings shall be taken to have a horizontal tolerance of at 18 inches to either side of the marking. The request for the cable locations and marking shall be made 48 hours in advance of the request for the maintenance transfer and preconstruction inspection to allow the locates to

be completed before the preconstruction site inspection date.

The Contractor shall exercise extreme caution where existing underground utilities and cable runs are identified. The markings of existing systems are made strictly for assistance to the Contractor and this does not relieve the Contractor of responsibility for the repair or replacement of any cable run damaged in the course of his work, as specified elsewhere herein.

Method of Measurement. This work will not be measured for payment.

Basis of Payment. This work will be paid for at the contract lump sum price for MAINTAIN INTELLIGENT TRANSPORTATION SYSTEMS.

The repair and any parts of the ITS device listed above will be paid for according to the Illinois Tollway Special Provision for CONTRACT ALLOWANCE FOR MAINTAIN INTELLIGENT TRANSPORTATION SYSTEM REPAIR.

| Pay Item Number | Designation | Unit of Measure |
|-----------------|---|-----------------|
| JT134000 | MAINTAIN INTELLIGENT TRANSPORTATION SYSTEMS | L SUM |

RELOCATE INTELLIGENT TRANSPORTATION SYSTEM ASSEMBLY

DESCRIPTION

This work shall consist of relocating an ITS Pole assembly to a location designated on the plans, or as directed by the engineer, including any necessary transportation and storage of the ITS assembly required to comply with the overall needs of the adjacent construction activities. The ITS Pole assembly shall be defined as any ITS device, equipment cabinet (complete), solar panels (not solar generator), hardware, and support pole identified for relocation, which shall be considered a complete assembly for each location identified on the contract plans or as directed by the Engineer. This shall include removing the existing helix foundation.

MATERIALS

The Contractor shall replace all cables, connectors, ground rods, and hardware as required to reinstall the existing assembly at the proposed location, for a fully functional installation.

The Concrete Service Pad shall be constructed as illustrated on the plan details.

Within 10 business days from the Notice to Proceed (NTP), the Contractor shall submit for approval to the Engineer a completed "RELOCATE INTELLIGENT TRANSPORTATION SYSTEM ASSEMBLY" Contractor Submittal Checklist, attached to this special provision, and associated submittals. The Contractor shall submit to the Engineer a request for variance when changing equipment prescribed on the "RELOCATE INTELLIGENT TRANSPORTATION SYSTEM ASSEMBLY" Contractor Submittal Checklist. The variance shall be the formal request of an approval of an equal or better substitute for a specified part by providing justification and supporting manufacturer's specifications and other relevant documentation.

CONSTRUCTION REQUIREMENTS

A minimum of 5 business days prior to removal of the existing equipment, the Contractor shall inspect the existing ITS Pole assembly in the presence of the Engineer to identify any existing deficiencies or damage. The inspection shall be documented on an Asset Transfer Packet to be developed by the Illinois Tollway ITS Unit, obtained from the Engineer, for the equipment to be relocated. At the Illinois Tollway's discretion, any deficiencies or damage found may be repaired by others, or as directed by the Engineer. The Asset Transfer Packet shall be submitted to the Engineer through the Illinois Tollway Web Based Program Management (WBPM) system no less than 48-hours prior to removal of the existing equipment or concurrently with submission of the Outage Request Form (form ITS-01 located on the WBPM system), whichever occurs first. The Contractor shall submit a relocation plan outlining the procedures for removal, transportation, storage (as required), and reinstallation to the Engineer (via the WBPM system) for approval, prior to inspecting the existing ITS assembly.

The Contractor shall assume custody of the ITS Pole assembly the moment any Contractor equipment or personnel touch the ITS Pole assembly to begin the relocation process. Custody of the ITS Pole assembly shall transfer back to the Illinois Tollway upon final acceptance as further specified herein. While in custody of the Contractor, any damage to existing equipment, hardware, or supports caused during the removal, transportation, storage, or reinstallation of the ITS Pole assembly shall be replaced in kind by the Contractor or as directed by the Engineer, at no additional cost to the Illinois Tollway.

Existing ground rod(s) shall be abandoned in place. New grounding shall be installed in accordance with the requirements of the special provision "ITS ELEMENT SITE GROUNDING".

The Contractor shall install the ITS Pole assembly on a new helix foundation, in accordance with the special provision "ITS ELEMENT POLE FOUNDATION STEEL HELIX", or relocate existing foundation as directed by the Engineer.

The Contractor shall install a flat steel mesh panel between the anchor base and the pole to prevent the entry of rodents into the pole. Additionally, the Contractor shall fill the hollow space inside the pole between the hand hole and the pole base using a 2" layer of steel wool followed by a hydrophobic, low-density high-strength two-part polyurethane composite backfill, commercially available as Q-SET™ 250 manufactured by CHEMQUE. Any cables passing through the pole base shall be armored and shall be approved by the Engineer.

Pre-Installation Requirements

TESTING

The Contractor shall be required to perform the following tests after the installation of the relocated ITS assembly. The Contractor shall use the test plans within this special provision to conduct the following tests in the presence of the Engineer, in accordance with the test requirements identified herein.

6. Site Test
7. System Test
8. Final System Acceptance

Site Test

The purpose of the Site Test is to have the Contractor demonstrate to the Engineer that all relocated components have been installed, connected, labeled, and configured correctly as per contract plans and as per the manufacturer's requirements, utilizing quality workmanship. ITS assemblies that include MVDS shall produce accurate volume and speed data at the site before being connected to the Illinois Tollway switch and communications system.

For the Site Test to be accepted, the Contractor shall demonstrate to the Engineer that:

- All connections are tight and cannot be dislodged by incidental contact from the Engineer.
- All equipment inside the enclosure shall be properly labeled as per the Illinois Tollway ITS Labeling Guide (located on the Illinois Tollway website).
- For sites with CCTV, all camera functions, including pan, tilt, zoom, autofocus, iris control, and presets shall be properly working.
 - The video feed received at the communication switch shall be clean and without distortion, lag, pixilation, or streaking.
 - The camera installation shall be set plumb to exhibit pan operations level to the horizon and zooming concentric to the center field of view.
- For sites with detection, calibration and re-aiming of relocated MVDS equipment shall be in accordance with the special provision "RE-AIMING MICROWAVE VEHICLE DETECTION SYSTEM (MVDS) UNITS".

System Test

The System Test demonstrates that the field devices can be operated at the Traffic Operations Center (TOC) utilizing the Traffic Information Management System (TIMS) software.

For the System Test to begin, the Contractor shall:

- Notify the Engineer in writing (via the WBPM system), within 5-Days prior to the start of System Testing, stating that all the project aforementioned sites are ready for integration into the Illinois Tollway's Traffic Information Management System (TIMS) software.
- Request the Engineer contact the Traffic Operations Manager to request that subject relocation sites are integrated and tested for (as applicable):
 - Communications connectivity from TIMS to subject ITS assembly.
 - For sites with CCTV, video transmission from subject ITS assembly site to TIMS.
 - For sites with CCTV, full video control from TIMS to subject ITS Pole assembly.
 - For sites with detection, accurate data transmission from subject ITS Pole assembly site to TIMS.

The Traffic Operations Manager will provide written approval (via email) when the communications connectivity and data transmission are fully functional. If found unacceptable, the Contractor shall remedy the deficient requirements and request the Engineer reinstate the System Test with the Illinois Tollway.

The Illinois Tollway may take up to 2 weeks to complete the System Test from the date of notification from the Engineer that a subject relocation site be tested.

Final System Acceptance

A representative of the Contractor shall witness the Engineer's final inspection of the relocated ITS Pole assembly. Final acceptance of all work associated with this pay item will be made after:

- Successful completion of the project final walk-through by the Illinois Tollway's ITS GEC.
- Submission (via the WBPM system) of all Record Drawings including an electronic computer file (Microstation and PDF) including a sketch of each ITS element assembly listing each device's location, identification number, wireless channel information and GPS coordinates to the Engineer.
- Written approval for the submission items identified herein has been received (via the WBPM system) from the Engineer.
- Written notification of Final Acceptance has been received in writing (via e-Builder) from the Engineer.

METHOD OF MEASUREMENT

This work will be measured in units of each, completed in place and accepted.

BASIS OF PAYMENT

This work will be paid for at the contract unit price per each for RELOCATE INTELLIGENT TRANSPORTATION SYSTEM ASSEMBLY.

The payment to the Contractor will adhere to the following schedule:

Seventy-five percent (75%) of the contract unit price will be paid by the Engineer at completion of the Site Test of the relocation. Written (via the WBPM system) approval from the Engineer of acceptance of the Site Test is required before payment is released.

The final twenty-five percent (25%) of the contract unit price will be paid after Final System

Acceptance at all locations. The final inspection of the entire system will be performed by the Engineer in the presence of a representative of the Contractor. Written (via the WBPM system) approval from the Engineer that Final Acceptance has been granted is required before payment is released.

Communication and power cables passing through the pole base shall be paid for separately.

ITS element site grounding will be paid for separately.

The helix foundation at the proposed location site will be paid for separately.

For sites with MVDS, re-aiming of MVDS shall be paid for separately.

| Pay Item Number | Designation | Unit of Measure |
|-----------------|---|-----------------|
| JT134005 | RELOCATE INTELLIGENT TRANSPORTATION SYSTEM ASSEMBLY | EACH |

RELOCATE INTELLIGENT TRANSPORTATION SYSTEM ASSEMBLY

PAY ITEM # JT134005
 Contract #
 e-Builder Submittal Package #:
 e-Builder Submittal Date:
 Reviewed By (CM Staff Name):
 Review Date:

SUBMITTAL STATUS
 APPROVED
 APPROVED AS NOTED
 REJECTED

| LOCATION OF REFERENCE | DETAIL SHEET ITEM | ITEM DESCRIPTION | APPROVED MANUFACTURER | APPROVED MODEL No. | SUBMITTED AS SPECIFIED? | PROPOSED EQUIVALENT DETAILS | | NOTES |
|--|-------------------|---|-----------------------|--------------------|-------------------------|-----------------------------|-----------|-------|
| | | | | | | MANUFACTURER | MODEL No. | |
| CONCRETE SERVICE PAD | | | | | | | | |
| SPEC. PROV. | | CONCRETE SERVICE PAD 4' x 4' | | | | | | |
| RODENT PROTECTION | | | | | | | | |
| SPEC. PROV. | | HYDROPHOBIC, LOW DENSITY, HIGH STRENGTH, TWO PART POLYURETHANE COMPOSITE BACKFILL | CHEMQUE | Q-SET 250 | | | | |
| GROUNDING SYSTEM (SEE ITS ELEMENT SITE GROUNDING SPECIAL PROVISION) | | | | | | | | |
| REFER TO "ITS ELEMENT SITE GROUNDING" CHECKLIST | | | | | | | | |

ITS ELEMENT SITE GROUNDING (Illinois Tollway)

Effective: January 20, 2014

Revised: March 1, 2018

DESCRIPTION

This work shall consist of furnishing and installing an ITS element site grounding system in place as shown in the Plans and in accordance with the Special Provisions. This work shall also include the performance of Three-Point, Fall-of-Potential grounding electrode earth resistance test which shall be performed for the Contractor by an independent professional testing service that is equipped and qualified to perform the test and certify the test results. The Three-Point, Fall-of-Potential grounding electrode earth resistance test shall be performed on both new work and on existing installations involved with the work.

CODES AND STANDARDS

This special provision was developed in accordance with the applicable chapters of the Motorola Standards and Guidelines for Communications Sites (R56).

Also incorporated are the applicable elements of the following standards:

1. ANSI/TIA-222, Section 10.0 – Structural Standard for Steel Antenna Towers and Antenna Supporting Structures, Protective Grounding
2. Illinois Tollway Supplemental Specifications, Section 806 – Grounding
3. NFPA 70 – National Electric Code (NEC)
4. NFPA 780 – Standard for the Installation of Lightning Protection Systems
5. UL 96A – Standard for Installation Requirements for Lightning Protection Systems

Where there are conflicts found between the above standards, the more stringent standard shall govern. Government and local codes shall take precedence over the requirements of this special provision.

SOIL ANALYSIS

The Contractor shall perform a soil analysis to determine the acidity (pH) and the porosity (aeration) of the soil. The analysis shall also test for the presence of organic acids in the soil commonly associated with poorly drained or poorly aerated soils. Test reports for each ITS Element site shall be provided. In acidic soils with a pH of 5 or lower and in soils where organic acids are found to be present, the ground rod shall be encased as specified elsewhere herein.

GENERAL GROUNDING MATERIAL REQUIREMENTS

Within 10 business days from Notice to Proceed, the Contractor shall submit via the Illinois Tollway's Web Based Program Management (WBPM) system a completed ITS ELEMENT SITE GROUNDING CHECKLIST (ILLINOIS TOLLWAY), (attached to this special provision), and associated submittals for review and approval by the Engineer. The Contractor shall submit to the Engineer a request for variance when changing equipment prescribed on the ITS ELEMENT SITE GROUNDING CHECKLIST (ILLINOIS TOLLWAY). The variance shall be the formal request of an approval of an equal or better substitute for a specified part by providing justification and supporting manufacturer's specifications and other relevant documentation.

- a) All grounding materials shall be listed for the intended application.
- b) Ground rods shall be per Section 806 of the Illinois Tollway supplemental specifications.
- c) Aluminum or copper-clad aluminum grounding conductors **SHALL NOT** be used.
- d) All grounding electrode conductors shall be 1/C, bare, stranded, soft drawn, tinned-copper unless otherwise specified herein. Grounding electrode conductors shall be per ASTM B 8 for stranded conductors and ASTM B 33 for tinned conductors.
- e) All grounding hardware, except ground busses and conductors, must be stainless steel or galvanized rigid steel. (See installation requirements pertaining to dissimilar metals.)
- f) Groundings bushings shall be malleable iron, threaded, with insulated liner and solderless lug.
- g) Unless otherwise noted, bus bars must be solid annealed copper and be equipped with insulating mounting supports. Bus bars must be pre-drilled with holes suitably sized for terminating up to No. 2/0 AWG grounding conductors with two-hole lugs.
- h) Copper or copper-clad ground rods shall not be used in soils where organic acids are present unless protective measures are taken, such as encasing the ground rods in a grounding enhancement material.
- i) Grounding Enhancement Material (GEM) shall absorb water from surrounding soil and have hydrogen and water retention properties. The suggested grounding electrode encasement (backfill) material shall be a mixture of 75% gypsum, 20% bentonite clay and 5% sodium sulfate.

GENERAL GROUNDING INSTALLATION REQUIREMENTS

- a) An ITS Element site shall include but is not limited to a Dynamic Message Signs (DMS) (any type), a DMS Control Cabinet, electrical work for a DMS (any type), an overhead sign structure, a Closed Circuit Television (CCTV) camera (pole mounted, tower mounted, or otherwise), Microwave Vehicle Detector System (MVDS), Sensys System, Roadway Weather Information System (RWIS), Weigh In Motion (WIM) system, ITS Pole Mounted Enclosure, and Solar Powered Generator Assembly.
- b) The ITS Element site grounding electrode system shall be provided at all ITS Element site locations as indicated in the Plans.
- c) A bonding jumper between the neutral and grounding bus bars shall be installed at the electrical service entrance panel or enclosure **ONLY** unless a separately derived system is identified as defined by the National Electric Code (NEC). For example, if a transformer is utilized (unless it is an autotransformer) there exists no direct electrical connection between the primary and secondary sides. In this case, a bonding jumper between the neutral and grounding bus bars on the secondary side would be required.
- d) All metallic members either attached to the ITS Element supporting structure and those which comprise the supporting structure shall be bonded together by means of copper

bonding jumpers as specified herein to create a continuous low impedance path to the ITS Element site grounding electrode system.

- e) All metallic housings with energized components or metallic structures which may become energized under fault conditions shall be bonded to the ITS Element site grounding electrode system.
- f) All grounded metal objects within 25 feet of a component of the ITS Element site must be tied into the ITS Element site grounding electrode system using approved grounding electrode conductors, bonding conductors and connection methods as described herein and/or shown in the Plans, or as directed by the Engineer.
- g) All equipment bonds must be made to bare metal surfaces as specified herein.
- h) All ground rods shall include a ground test well (access well) to allow inspection of connections to the ground rod with exception of any ground rods which are installed beneath roadway shoulder pavement.
- i) Exothermic welded joints on galvanized material shall be coated as specified herein to prevent corrosion.
- j) Copper/Aluminum joints shall be avoided wherever possible. In cases where this cannot be avoided, the connections shall be as specified herein.
- k) Bare copper shall not come in contact with galvanized steel. However, a connection of copper and stainless steel, and a connection of tinned copper and galvanized steel are acceptable.
- l) There shall be no coils of power cables internal to any enclosure containing electronic equipment.
- m) Contractor shall provide all necessary materials and labor even if not shown specifically on the Plans or specified herein to provide an ITS Element site grounding system in accordance with NEC and Motorola R56 requirements.

ITS ELEMENT SITE COMPONENTS

- a) Grounding/Bonding Conductors
 - 1. To prevent arcing, all grounding/bonding conductors shall be as short, straight, and with as few kinks as possible. A minimum bending radius of 8 inches shall be maintained. "U" shaped bonding jumpers may be utilized for the bonding of doors and gates only.
 - 2. A UL listed, lightning protection T-splice is an acceptable means of installing grounding/bonding conductors with 90 degree angles provided it can withstand a 200 pound pull test. The T-splice must be listed for use with a 1/C No. 2/0 AWG conductor.

3. All bare copper conductors must be tinned. All copper used for lightning protection or equipment bonding must have 95% conductivity when annealed. See Article 1066.02(a) of the Standard Specifications for additional requirements.
4. Care shall be exercised during the installation of tinned conductors to ensure surfaces are not damaged. Any tinned conductors damaged during installation shall be replaced at no additional cost to the Illinois Tollway.
5. Any above grade grounding/bonding conductor which is not in conduit shall be supported by a UL listed connector a minimum of every 3 feet.
6. If grounding/bonding conductors are routed in a continuous run of metallic conduit, the conduit system shall be provided with properly installed grounding bushings. Both ends of a metallic conduit containing a grounding conductor must be bonded with a listed grounding bushing.

b) Equipment Grounding Conductor

1. In all cases, equipment grounding conductors originating at the electrical service entrance shall be provided. This equipment grounding conductor shall be bonded to the service reference ground system. The equipment grounding conductor shall be a 1/C copper sized as shown on the plans but at a minimum shall meet the requirements of the NEC Table 250.122.D.
2. Power conductors routed between structures must include an equipment grounding conductor as shown on the plans. This equipment grounding conductor shall be bonded to the site ground by means of direct copper connection to either a grounding bus bar or to the grounding electrode conductor.
3. If conductors are routed in a continuous run of metallic conduit, an equipment grounding conductor shall be provided and the conduit system shall be provided with properly installed grounding bushings. Both ends of a metallic conduit containing a grounding conductor must be bonded with a listed grounding bushing.

c) Bonding Jumper

1. All bonding jumpers shall be 1/C No. 2/0 AWG tinned copper minimum or as required by the NEC Article 250 and as specified herein.
2. At the electrical service entrance, a bonding jumper shall be provided between the neutral and grounding bus bar.
3. At any separately derived system as defined by the NEC, a bonding jumper shall be provided between the neutral and grounding bus bars of the separately derived system. The grounding bus bar of the separately derived system shall also be connected to the overall system ground by direct copper conductor connection.
4. A bonding jumper shall be provided for all metallic enclosures containing electrical conductors or components including but not limited to service entrance panels, disconnect switches, and junction boxes. Any metallic lids and/or doors of said

enclosures shall also be bonded by means of a bonding jumper between the main enclosure and the lid and/or door. This bonding jumper shall not impede the function of opening the door or removing the lid for service.

5. When an ITS element is mounted to a metallic structure , all metallic members either attached to the structure and those which comprise the structure shall be bonded together as shown on the plans to create a continuous low impedance path to the ITS element site grounding electrode system. All conductors for the bonding of metallic members either attached to the structure and/or those which comprise the structure shall be a stranded tinned-copper bonding jumper, minimum No. 2/0 AWG in size

d) Grounding Electrode Conductors

1. All grounding electrode conductors terminating on a ground rod shall be a 1/C, stranded, soft drawn, tinned-copper, minimum No. 2/0 AWG in size, or as specified in the Plans.
2. Grounding electrode conductors shall be installed without any splices.
3. All grounding electrode conductors must be individually run to a ground bus bar or ground rod. The only exception to this “no-daisy chaining” rule is when joining two ground rods together in order to obtain 5 ohms or less.
4. Grounding electrode conductors shall not be run through concrete structure foundations.

e) Ground Well

1. Ground well shall be Neenah Foundry model number R7506-E 10” or approved equal.
2. Each ground well shall have concrete surrounding the access well and shall be of Class SI with a rating of 4000 Pounds per square inch.
3. The stone shall be CA-6.

f) Grounding/Bonding Connections

1. All connectors shall be rated for both the intended use and the surface upon which it to be installed.
2. Grounding clamps and bushings, wherein specified, must be galvanized steel or a high copper content alloy. For applications involving Dynamic Message Signs (DMS), aluminum bonding plates attached with four screws shall be used in the grounding of the DMS aluminum chassis.
3. Insulation piercing connections shall not be used in the installation of conductor lugs. Only connection devices which require the complete removal of the conductor jacket and which provide a complete connection between the inside of the lug and the outer circumference of the grounding wire shall be permissible.

4. A UL listed, irreversible, pressure-typed crimp connection shall be used to connect a ground rod connected grounding conductor to an internal grounding bus bar. All other internal connections to a bus bar by conductors larger than No. 6 AWG must be made by two-hole lugs.
5. No more than one connection shall be made at each bus bar position unless the connector is listed for multiple conductors.
6. All external and underground connections shall be by exothermic welding.
7. Exothermically welded connections to metal surfaces must be completed with a weld area roughly twice the diameter of the conductor. The area of the connection must first be sanded or filled to expose the bare metal prior to the exothermic weld being performed.
8. Exothermically welded connections to galvanized material shall be coated with a zinc-enriched paint to prevent corrosion.
9. Where copper/aluminum connections cannot be avoided, the connections shall be exothermically welded using an aluminum/copper listed bimetallic transition connector and a listed conductive anti-oxidant compound on all metallic connections.
10. For all mechanical connections, a listed conductive anti-oxidant compound shall be applied between the two metals.

g) ITS Element Site Master Grounding Bus Bar (MGB):

1. Each ITS Element shall have a Master Grounding Bus Bar (MGB) made of solid annealed copper installed in a specific location as shown in the Plans. For example, a pole mounted CCTV camera shall have the MGB attached to the pole below the enclosure. For applications involving DMS, the MGB shall be approximately 12 inches long, 4 inches tall, and ¼ inches thick, and shall be mounted in a NEMA 4X enclosure on the galvanized steel panel as shown on the Plans. The bus bar mounts shall provide electrical isolation from the steel panel.
2. The MGB hole pattern shall permit connecting two-hole lugs for up to No. 2/0 AWG grounding conductors.
3. The MGB shall be provided with a bare tinned-copper 1/C No. 2/0 AWG conductor which shall be connected via an exothermic weld to an ITS Element site ground triad/halo electrode system ground rod located below the MGB in a grounding well.

h) ITS Element Site Grounding Electrode System:

1. In the case when a DMS or any other ITS element is installed on an overhead sign structure (cantilever or span type), the overhead sign structure shall be provided with a site grounding electrode system to provide a single ground reference. This grounding electrode system shall consist of ground rods installed in ground wells and oriented around the concrete foundation(s) of the overhead sign structure as shown

on the Plans (grounding halo). The ground rods within the grounding halo(s) shall be connected to each other by a stranded continuous 1/C No. 2/0 AWG bare tinned-copper conductor. The grounding halo(s) shall also be bonded to the MGB as specified elsewhere herein.

2. Where a span type overhead sign structure is specified including concrete foundations, grounding halos shall be provided oriented around both concrete foundations as shown on the Plans. Where the distance between the two grounding halos is less than 200 feet, the grounding halos shall be bonded together at no less than two separate points on each by a stranded 1/C No. 2/0 AWG bare tinned-copper conductor installed a minimum of 30 inches below grade or at the frost line, whichever is deeper.
 3. All ground rods shall be installed such that the top of the ground rod is accessible inside the ground well. All ground rods installed beneath a paved roadway shoulder (void of a ground access well) shall be installed such that the top of the ground rod is a minimum of 30 inches below grade or at the frost line, whichever is deeper.
 4. Whenever possible, ground rods shall be installed a nominal distance of 1.1 times the length of a rod and a minimum of 36 inches from all foundations or other underground structures. In no case shall a ground rod be installed through a foundation or beneath travelled roadway pavement.
 5. Whenever possible, the spacing between adjacent ground rods shall be 2 times the length of the ground rod and a minimum of 6 feet in any direction.
 6. When the ITS Element site grounding electrode system as shown on the plans does not result in a resistance less than or equal to 5 ohms, the Contractor shall install additional ground rods and stranded continuous 1/C No. 2/0 AWG bare tinned-copper conductors in an expanding star-burst pattern until the resistance is brought down to acceptable levels. Typically the additional ground rods would be located further out from the MGB than the original equipment ground rods. However, it is permissible to install additional rods between the equipment and MGB as long as the required separation distances are maintained. Any additional ground rods and conductors as required bringing the resistance down to 5 ohms or less shall be included in this work.
 7. No more than three grounding electrode conductors shall be connected to a single ground rod.
- i) Handholes:
1. All handholes shall be provided with a ground rod extending up into the handhole cavity. The resistance to ground of this ground rod shall be 5 ohms or less.
 2. Any handhole located adjacent to the ITS Element shall be equipped with a 12-inch x 4-inch x ¼-inch solid annealed copper grounding bus bar.
 3. In all cases, power conductors routed between structures include an equipment grounding conductor as shown on the Plans. This equipment grounding conductor shall be bonded to the handhole ground rod or to the handhole grounding bus bar.

4. All metallic components of the handhole including but not limited to the frame, lid and any metallic conduits entering the cavity shall be bonded together and to the ground rod utilizing a 1/C braided tinned-copper bonding jumper, minimum No. 2/0 AWG in size.
5. A grounding bushing shall be used if the entire conduit run is metallic.
6. Neutral conductor(s) shall not be bonded to the handhole grounding bus bar or ground rod; neutral conductor(s) shall pass through the handhole non-spliced.
7. Cable with no metallic components (for example, a direct-burial, non-armored, fiber optic cable) need not be connected to the ground bar however, the metallic conduit sheath which it entered the handhole shall be connected to the ground bar.
8. Any handholes located within 200 feet of the ITS Element site grounding electrode system shall also be bonded to the ITS Element site electrode system by a stranded continuous 1/C No. 2/0 AWG bare tinned-copper conductor installed a minimum of 30 inches below grade or at the frost line, whichever is deeper.
9. All grounding/bonding connections within the handhole shall be by exothermic welds.

j) ITS Element Enclosure or Control Cabinet

1. The Contractor shall ensure that every ITS element Control Cabinet is grounded as described herein and on the Plans.
2. For ITS applications involving dynamic message signs, both the DMS control cabinet and the DMS structure shall be provided with a site grounding electrode system. These grounding electrode systems shall consist of ground rods oriented in a triad/halo next to the concrete foundations of the DMS controller cabinet and the DMS structure as shown on the plans. The ground rods within the grounding triad/halo shall be connected to each other by a stranded continuous 1/C No. 2/0 AWG bare tinned-copper conductor.
3. Grounding/bonding of the equipment inside the DMS enclosure shall be similar to the grounding of the DMS Control Cabinet as applicable to the equipment installed. The equipment grounding conductor originating from the electrical service entrance of the DMS system shall be routed to within this enclosure. This conductor shall be bonded to an internal insulated grounding bus bar similar to that of the DMS Controller Cabinet specified elsewhere herein. This equipment grounding conductor shall also be bonded to the MGB specified elsewhere herein. This conductor routed between the MGB and the DMS Enclosure grounding bus bar shall be a stranded continuous 1/C No. 2/0 AWG bare tinned-copper conductor installed on the structure to the MGB.
4. The DMS enclosure shall be equipped with at least one internal grounding lug that is installed by the manufacturer. The Contractor shall connect any internal grounding lug(s) to the grounding bus bar.

5. Any non-welded conductive part of the DMS enclosure shall also be bonded together utilizing 1/C braided bare tinned-copper bonding jumpers, minimum No. 2/0 AWG in size. Portions of the enclosure which are welded together do not require a bonding jumper. U-bolt connections or metal to metal contact do not offer a sufficiently conductive path and so must be equipped with bonding jumper. Connections through a painted DMS enclosure surface shall not offer a sufficient conductive path and shall be equipped with a bonding plate for connection to the bonding jumper. See General Grounding Installation Requirements section for discussion on bonding the dissimilar metals of the steel DMS truss and the aluminum DMS enclosure.
6. Where the distance between the DMS controller cabinet and the DMS site grounding electrode system is less than 200 feet, the DMS controller site grounding electrode system shall be bonded to the DMS site grounding electrode system at no less than two separate points on each by a stranded continuous 1/C No. 2/0 AWG bare tinned-copper conductor installed a minimum of 30 inches below grade or at the frost line, whichever is deeper.
7. All ITS equipment grounds inside the ITS element cabinet shall be connected to a copper bus bar which shall then be connected to the ITS element site grounding electrode system by means of a stranded bare tinned-copper 1/C No. 2/0 AWG conductor routed to each ground rod comprising ITS element site grounding electrode system.
8. The copper bus bar shall be mounted such that it is insulated from all metallic items, including the cabinet chassis itself, except by equipment grounding jumpers.

k) Testing

The Contractor shall use the test plans within this special provision to conduct the following tests per ITS Element grounding site in the presence of the Engineer, in accordance with the test requirements identified and found on the ITS Site Grounding Acceptance Test Form included herein.

1. All testing shall be conducted in the presence of the Engineer after a minimum 48 hour notification period. All test results, including those where the design criteria was not achieved, shall be documented. All retests shall be witnessed by the Engineer and documented by the Contractor (via the WBPM system).
2. As stated above, the installed grounding system at ITS Element sites shall be tested by the Contractor to confirm that there is a maximum 5 ohms resistance to ground within the grounding system. Proper grounding of AC power disconnect shall be verified by the use of a clamp-on ohmmeter. Testing of resistance to ground from the chassis of electronic equipment is not recommended due to the potential to damage of the electronics; however, the Contractor shall be required to test resistance to ground from each bus bar after all chassis grounds have been disconnected and taped to avoid accidental contact during testing.
3. Three-Point Fall-of-Potential. The site grounding electrode systems shall be tested using the three-point fall-of-potential method as detailed in ANSI/IEEE STD 81, BS 7430, NFPA 7800-2004, and MIL-HDBK-419A. Test results must be documented and submitted to the Engineer via the WBPM system.

METHOD OF MEASUREMENT

This work will be measured for payment in units of each ITS element site for all ITS Element Grounding as required herein and shown on the plans. Each ITS Element type listed below shall be considered a unit of 1 each per type of site. Adjacent sites shall be measured separately. Co-located devices on a single pole mounted site shall be considered a single site.

- ITS Element Pole Mounted assembly
- Solar Powered Generator assembly

Grounding for Dynamic Message Sign and Controller Cabinet will not be measured for payment.

BASIS OF PAYMENT

This work will be paid for at the contract unit price per each for ITS ELEMENT SITE GROUNDING, of the assembly or system specified. Grounding for Dynamic Message Sign and Controller Cabinet shall be included in DMS ELECTRICAL WORK of the Type specified.

The payment to the Contractor will adhere to the following schedule:

Ten percent (10%) of the contract unit price will be paid upon receipt of submission and approval of all system documentation (product submittals and checklist, shop drawings).

Eighty percent (80%) of the contract unit price will be paid upon completion of the installation of the ITS ELEMENT SITE GROUNDING.

Ten percent (10%) of the contract unit price will be paid upon receipt of submission and approval of final documentation (as-builts and testing).

The installation and testing of the ITS Pole Mounted Enclosure (CCTV or MVDS), ITS device pole, foundation, electrical service, grounding, MVDS ITS Assembly, and communications shall be paid separately.

| Pay Item Number | Designation | Unit of Measure |
|-----------------|---|-----------------|
| JT134037 | ITS ELEMENT SITE GROUNDING – POLE MOUNTED ASSEMBLY | EACH |
| JT134039 | ITS ELEMENT SITE GROUNDING – SOLAR POWERED GENERATOR ASSEMBLY | EACH |

WEBCAM

Description

This work shall consist of furnishing, installing, calibrating, testing and maintaining a webcam system and related required components. A wood pole of the height specified on the plans for mounting the webcam system shall be paid for separately. The archived images from the webcam system will be used to create time lapse photography through the duration of the contract.

The contractor shall furnish a webcam system manufactured by Earthcam and shall coordinate the procurement, installation testing and calibration of the system with the following representative from Earthcam (System Vendor).

Joe Streko

Email: jstreko@earthcam.com

Phone: 201-488-1111 x1334

Locations shown in the plans are approximate and are shown for the purpose of depicting where the webcam system and associated equipment must function. The Contractor shall coordinate with the Engineer to determine the final location, in consultation with the Tollway for optimum site coverage.

The Contractor shall be required to provide ongoing maintenance of the webcam and hosting and maintaining the established website, archiving services, and the 4G modem data service, in coordination with the webcam System Vendor through the duration on the contract.

On completion of the contract, the Contractor shall coordinate with the Engineer to determine how maintenance responsibility shall be transferred to another contract performing work in the project area after the completion of the contract.

Materials

The webcam system shall meet and exceed the following system component specifications. The system components furnished shall be compatible with the central system software and control center of the System Vendor:

Gigapixel Camera: The camera shall at a minimum meet the following specifications:

- i. Thermostatically controlled IP66/IP67 rated environmentally sealed black powder coated enclosure with stainless steel hardware
- ii. User controlled window wiper
- iii. Industrial grade solid state embedded Linux System
- iv. Pan/Tilt/Zoom base designed to provide consistent imaging in all environments.
- v. Pan/Tilt: Pan Range 360° continuous Pan, Tilt: +45° to -90° non-continuous pan mode.
Motor Type: Stepper
- vi. Auto-generated 360° Megapixel Panoramas up to 1 Gigapixel (1000 megapixels)
- vii. 24 Megapixels (6000 x 4000 pixels), Digital SLR camera with a 15.6 mm x 23.6 mm DXFormat CMOS Image Sensor

- viii. Lens: F/3.5-F/5.6, 18-300mm, 17X Optical Zoom
- ix. Live streaming video preview window with daily 1080i broadcast quality clip

Communications

The communication to the camera shall be over 4G cellular wireless network.

The Contractor shall be responsible for the 4G cellular modem and related monthly service fees for the 4G cellular communication service, in coordination with the webcam System Vendor through the duration of the contract. In addition, the 4G cellular modem shall meet the following requirements at a minimum.

- i. Communications: 10Base-T/100Base-TX Ethernet, IP Addressing: Dynamic or Static
- ii. 32GB On-Board Data Backup to provide a minimum of thirty days of on-board image retention

Power

The webcam system shall be powered through a solar 12 VDC system. Solar panels, batteries, inverters, weatherproof enclosure and any other required material shall be provided by the Contractor, in coordination with the webcam System Vendor. In addition, the Contractor shall be responsible for maintenance of the solar power system throughout the duration of the contract.

Mounting Structure

The webcam system shall be mounted on a wood pole, paid for separately, of the height specified on the plans. Any additional requirements per the System Vendor shall be coordinated by the Contractor. The Contractor shall supply all equipment required for safe and secure access to the camera location for technicians performing installation and maintenance services, including building access, bucket truck and/or lift. The Contractor shall coordinate with the System Vendor and obtain professional installation services, to determine optimal camera placement.

Web Interface

The webcam system shall be accessible via an internet based software as a Service (SaaS) solution. This online interface shall be managed and supported by the System Vendor and the Contractor shall be responsible for payment of all hosting, archiving and broadcasting service fees, including creating time-lapse video throughout the duration of the of the contract. The service shall allow the viewing of live video and HD digital still images captured and stored of the project via a secure password protected website. In addition, the web interface shall meet the following requirements:

The Internet Based Online Interface shall include the following features:

- i. The System Vendor shall provide a live link to the video stream from the webcam. The Contractor is required to coordinate with the Engineer to determine the suitable integration of the live stream into the Tollway Elgin O'Hare Western Access project webpage.
- ii. Multiview Screen for viewing and accessing multiple cameras.

- iii. Real-time live video viewing
- iv. User-controllable Robotic Pan, Tilt and Zoom
- v. Instant live snapshot capability in addition to preset scheduled archives.
- vi. Account access security feature shall include four levels of password protection, IP address block/permission and SSL protection of user login password.

Other System Requirements

In addition, the webcam system shall meet the following general requirements:

- i. The webcam system shall capture and upload images every 15 minutes, 24 hours per day.
- ii. Software and system upgrades shall be made whenever available by the System Vendor at no additional cost to the Tollway.
- iii. Images generated will be maintained on the servers owned and operated by the System Vendor, throughout the life of the project and for no less than 60 days after completion.
- iv. The System Vendor shall provide custom public website separate from the online interface. The website shall be coordinated with the Engineer to match the look and colors of the project's website, and be delivered as embed code or standalone web page.
- v. The System Vendor shall provide time-lapse movie(s) at the end of the project. Time-lapses shall be professionally edited by a video editor using image stabilization software.

Maintenance

The Contractor shall be responsible to provide all service and maintenance, including cleaning, of the camera system throughout the life of the project including making appropriate arrangements for camera to remain in operation up to and through finalization of all structural, landscaping and "completed state" condition necessary for beginning-to-end time lapse record.

Method of Measurement. This work will be measured for payment in place in units of each.

Basis of Payment. This work will be paid for at the contract unit price per each for WEBCAM which price shall be payment in full for the work described herein including all labor and equipment and any other material required for successful installation and testing of the webcam system as stated herein. The cost of the furnishing and installing of a wood pole of the height specified in the plans shall be paid for separately.

| Pay Item Number | Designation | Unit of Measure |
|-----------------|-------------|-----------------|
| JT135042 | WEBCAM | EACH |

CONTRACT ALLOWANCES (Illinois Tollway)

Effective: March 16, 2007

Revised: April 1, 2016

Description of Contingent Items. This work shall consist of various items of Work which may be required to be done by the Contractor, the scope of which cannot be determined at the time of submittal of the Proposal. This item will provide a line item against which payment may be made for:

- JT154001 Pavement patching and traffic control in lanes being used by traffic in a construction zone. Article 701.04 (e) of the Illinois Tollway Supplemental Specifications.
- JT154002 Disposal of previously unidentified hazardous waste. Article 107.19 (a) of the Illinois Tollway Supplemental Specifications.
- JT154003 Additional Elastomeric Bearing Pads when required for testing. Article 521.09 of the Standard Specifications.
- JT154004 Sawcutting and removal of edge deterioration repair prior to pavement widening. Illinois Tollway Standard Drawing A1
- JT154005 Emergency Pavement and Shoulder Maintenance Repairs, including delaminated and/or rutted pavement overlays within the contract limits, and along the designated detour routes.
- JT154008 Maintenance of traffic due to unforeseen circumstances, including additional signage, as deemed necessary by the Engineer.
- JT154009 Temporary signal installation and Maintenance.

GENERAL REQUIREMENTS

Work shall be done under this item as directed by the Engineer.

Method of Measurement. This work will not be measured for payment.

Basis of Payment. Payment for this work will be made as specified in Article 109.04 of the Illinois Tollway Supplemental Specifications using a force account basis. Payment for this work will not exceed the costs incurred by the Contractor and approved by the Engineer.

| Pay Item Number | Designation | Unit of Measure |
|-----------------|--|-----------------|
| JT154002 | DISPOSAL OF UNIDENTIFIED HAZARDOUS WASTE | UNIT |

CONTRACT ALLOWANCE FOR MAINTAIN INTELLIGENT TRANSPORTATION SYSTEMS REPAIR

Description. This Special Provision establishes a budgetary allowance for work to repair and any parts of the ITS devices, as described in the Special Provision MAINTENANCE OF INTELLIGENT TRANSPORTATION SYSTEMS, to be performed by the Contractor, the scope of which cannot be determined at the time of submittal of the Proposal.

MAINTAIN INTELLIGENT TRANSPORTATION SYSTEMS REPAIR will be paid for on a force account basis, Payment for Extra Work as described in the Illinois Tollway Supplemental Specifications, including mobilization to account for the preparatory work and operations necessary for the movement of personnel, equipment, supplies, and incidentals to the project site.

Payment will only be made for that work completed which is directed by the Engineer in writing.

Method of Measurement. This work will not be measured for payment.

Basis of Payment. Payment for this work will be made as specified in Article 109.04 of the Illinois Tollway Supplemental Specifications using a force account basis. Payment for this work will not exceed the costs incurred by the Contractor and approved by the Engineer.

| Pay Item Number | Designation | Unit of Measure |
|-----------------|---|-----------------|
| JT154062 | CONTRACT ALLOWANCE FOR MAINTAIN INTELLIGENT TRANSPORTATION SYSTEMS REPAIR | UNIT |

ALLOWANCE FOR ADDITIONAL ELECTRICAL AND COMMUNICATION WORK

DESCRIPTION OF CONTINGENT ITEMS

This Special Provision establishes a budgetary allowance for additional electrical, fiber optic cable, and communications (ITS, IT, etc.) work, including work at existing toll plazas. The work to be completed under this item will be as directed by the Engineer. This item will provide a line item against which payment will be made since the scope cannot be determined at the time of submittal of the Proposal.

Payment will only be made for that work completed which is directed by the Engineer in writing.

METHOD of MEASUREMENT

This work will not be measured for payment.

BASIS of PAYMENT

Payment for this work will be made as specified in Tollway Supplemental Specifications Article 109.04 using a force account basis. Payment for this work will not exceed the costs incurred by the Contractor and approved by the Engineer.

| Pay Item Number | Designation | Unit of Measure |
|-----------------|---|-----------------|
| JT154112 | ALLOWANCE FOR ADDITIONAL ELECTRICAL AND COMMUNICATIONS WORK | UNIT |

ALLOWANCE FOR STEEL COSTS ADJUSTMENT (Illinois Tollway)

Effective: April 1, 2009

Description. This Special Provision establishes a budgetary allowance for the steel costs adjustment.

This allowance may be used to reimburse the Contractor for steel costs in accordance with the special provision Steel Cost Adjustment.

Method of Measurement. This work will not be measured for payment

Basis of Payment. Should the Contractor qualify for such an adjustment, payment will be made under Pay Item Number JT154150.

| Pay Item Number | Designation | Unit of Measure |
|-----------------|--------------------------------------|-----------------|
| JT154150 | ALLOWANCE FOR STEEL COSTS ADJUSTMENT | UNIT |

STEEL COST ADJUSTMENT (Illinois Tollway) (RETURN FORM WITH BID)

Effective: April 1, 2009

Revised: April 23, 2015

Description. Steel cost adjustments will be made to provide additional compensation to the Contractor, or a credit to the Illinois Tollway, for fluctuations in steel prices when optioned by the Contractor. The bidder shall indicate on the attached form whether or not this special provision will be part of the contract and submit the completed form with his/her bid. Failure to submit the form or failure to indicate contract number, company name, and sign and date the form shall make this contract exempt of steel cost adjustments for all items of steel. Failure to indicate "Yes" for any item of work will make that item of steel exempt from steel cost adjustment.

Types of Steel Products. An adjustment will be made for fluctuations in the cost of steel used in the manufacture of the following items:

- Metal Piling (excluding temporary sheet piling)
- Structural Steel
- Reinforcing Steel

Other steel materials such as dowel bars, tie bars, mesh reinforcement, guardrail, steel traffic signal and light poles, towers and mast arms, metal railings (excluding wire fence), and frames and grates will be subject to a steel cost adjustment when the pay items they are used in have a contract value of \$10,000 or greater.

The adjustments shall apply to the above items when they are part of the original proposed construction, or added as extra work and paid for by agreed unit prices. The adjustments shall not apply when the item is added as extra work and paid for at a lump sum price or by force account.

Documentation. Sufficient documentation shall be furnished to the Engineer to verify the following:

- (a) The dates and quantity of steel, in lb, shipped from the mill to the fabricator.
- (b) The quantity of steel, in lb, incorporated into the various items of work covered by this special provision. The Illinois Tollway reserves the right to verify submitted quantities.

The following is a listing of all applicable pay item numbers:

| ITEM NO. | DESCRIPTION |
|----------|----------------------------------|
| 50800205 | REINFORCEMENT BARS, EPOXY COATED |
| 51201400 | FURNISHING STEEL PILES HP10X42 |
| 51201900 | FURNISHING STEEL PILES HP14X89 |
| 51203400 | TEST PILE STEEL HP10X42 |
| 51203900 | TEST PILE STEEL HP14X89 |
| J1420040 | BRIDGE APPROACH SLAB |

Method of Adjustment. Steel cost adjustments will be computed as follows:

$$SCA = Q \times D$$

Where: SCA = steel cost adjustment, in dollars
Q = quantity of steel incorporated into the work, in lb
D = price factor, in dollars per lb

$$D = MPI_M - MPI_L$$

Where: MPI_M = The Materials Cost Index for steel as published by the Illinois Department of Transportation for the month the steel is shipped from the mill. The indices will be converted from dollars per 100 lb to dollars per lb.

MPI_L = The Materials Cost Index for steel as published by the Illinois Department of Transportation for the month prior to the letting for work paid for at the contract price; or for the month the agreed unit price letter is submitted by the Contractor for extra work paid for by agreed unit price. The indices will be converted from dollars per 100 lb to dollars per lb.

The unit weights of steel that will be used to calculate the steel cost adjustment for the various items are shown in the attached table.

No steel cost adjustment will be made for any products manufactured from steel having a mill shipping date prior to the letting date.

If the Contractor fails to provide the required documentation, the method of adjustment will be calculated as described above; however, the MPI_M will be based on the date the steel arrives at the job site. In this case, an adjustment will only be made when there is a decrease in steel costs.

Basis of Payment. Steel cost adjustments may be positive or negative but will only be made when there is a difference between the MPI_L and MPI_M in excess of five percent, as calculated by:

$$\text{Percent Difference} = \{(MPI_L - MPI_M) \div MPI_L\} \times 100$$

Steel cost adjustments will be calculated by the Engineer and will be paid or deducted when all other contract requirements for the items of work are satisfied. Adjustments will only be made for fluctuations in the cost of the steel as described herein. No adjustment will be made for changes in the cost of manufacturing, fabrication, shipping, storage, etc.

The adjustments shall not apply during contract time subject to liquidated damages for completion of the entire contract.

Attachment

| Item | Unit Mass (Weight) |
|---|-----------------------|
| Metal Piling (excluding temporary sheet piling) | |
| Furnishing Metal Pile Shells 12 in., (0.179 in. wall thickness) | 23 lb/ft |
| Furnishing Metal Pile Shells 12 in., (0.250 in. wall thickness) | 32 lb/ft |
| Furnishing Metal Pile Shells 14 in., (0.250 in. wall thickness) | 37 lb/ft |
| Other piling | See plans |
| Structural Steel | See plans for weights |
| Reinforcing Steel | See plans for weights |
| Dowel Bars and Tie Bars | 6 lb each |
| Mesh Reinforcement | 63 lb/100 sq ft |
| Guardrail | |
| Steel Plate Beam Guardrail, Type A w/steel posts | 20 lb/ft |
| Steel Plate Beam Guardrail, Type B w/steel posts | 30 lb/ft |
| Steel Plate Beam Guardrail, Types A and B w/wood posts | 8 lb/ft |
| Steel Plate Beam Guardrail, Type 2 | 305 lb each |
| Steel Plate Beam Guardrail, Type 6 | 1260 lb each |
| Traffic Barrier Terminal, Type 1 Special (Tangent) | 730 lb each |
| Traffic Barrier Terminal, Type 1 Special (Flared) | 410 lb each |
| Steel Traffic Signal and Light Poles, Towers and Mast Arms | |
| Traffic Signal Post | 11 lb/ft |
| Light Pole, Tenon Mount and Twin Mount, 30 - 40 ft | 14 lb/ft |
| Light Pole, Tenon Mount and Twin Mount, 45 - 55 ft | 21 lb/ft |
| Light Pole w/Mast Arm, 30 - 50 ft | 13 lb/ft |
| Light Pole w/Mast Arm, 55 - 60 ft | 19 lb/ft |
| Light Tower w/Luminaire Mount, 80 - 110 ft | 31 lb/ft |
| Light Tower w/Luminaire Mount, 120 - 140 ft | 65 lb/ft |
| Light Tower w/Luminaire Mount, 150 - 160 ft | 80 lb/ft |
| Metal Railings (excluding wire fence) | |
| Steel Railing, Type SM | 64 lb/ft |
| Steel Railing, Type S-1 | 39 lb/ft |
| Steel Railing, Type T-1 | 53 lb/ft |
| Steel Bridge Rail | 52 lb/ft |
| Frames and Grates | |
| Frame | 250 lb |
| Lids and Grates | 150 lb |

Return With Bid

ILLINOIS TOLLWAY

**OPTION FOR
STEEL COST ADJUSTMENT**

The bidder shall submit this completed form with his/her bid. Failure to submit the form or properly complete contract number, company name, and sign and date the form shall make this contract exempt of steel cost adjustments for all items of steel. Failure to indicate "Yes" for any item of work will make that item of steel exempt from steel cost adjustment. After award, this form, when submitted shall become part of the contract.

Contract No.: _____

Company Name: _____

Contractor's Option:

Is your company opting to include this special provision as part of the contract plans for the following items of work?

- | | | |
|--|-----|--------------------------|
| Metal Piling | Yes | <input type="checkbox"/> |
| Structural Steel | Yes | <input type="checkbox"/> |
| Reinforcing Steel | Yes | <input type="checkbox"/> |
| Dowel Bars, Tie Bars and Mesh Reinforcement | Yes | <input type="checkbox"/> |
| Guardrail | Yes | <input type="checkbox"/> |
| Steel Traffic Signal and Light Poles, Towers and Mast Arms | Yes | <input type="checkbox"/> |
| Metal Railings (excluding wire fence) | Yes | <input type="checkbox"/> |
| Frames and Grates | Yes | <input type="checkbox"/> |

Signature: _____ **Date:** _____

ALLOWANCE FOR FUEL COSTS ADJUSTMENT (Illinois Tollway)

Effective: April 1, 2009

Description. This Special Provision establishes a budgetary allowance for the fuel costs adjustment.

This allowance may be used to reimburse the Contractor for fuel costs in accordance with the special provision Fuel Cost Adjustment.

Method of Measurement. This work will not be measured for payment.

Basis of Payment. Should the Contractor qualify for such an adjustment, payment will be made under Pay Item Number JT154160.

| Pay Item Number | Designation | Unit of Measure |
|--------------------|-------------------------------------|--------------------|
| JT154160 | ALLOWANCE FOR FUEL COSTS ADJUSTMENT | UNIT |

**FUEL COST ADJUSTMENT (Illinois Tollway)
(RETURN FORM WITH BID)**

Effective: April 1, 2009

Revised: April 23, 2015

Description. Fuel cost adjustments will be made to provide additional compensation to the Contractor, or a credit to the Illinois Tollway, for fluctuations in fuel prices when optioned by the Contractor. The bidder shall indicate on the attached form whether or not this special provision will be part of the contract and submit the completed form with his/her bid. Failure to submit the form or failure to indicate contract number, company name and sign and date the form shall make this contract exempt of fuel cost adjustments for all categories of work. Failure to indicate "Yes" for any category of work will make that category of work exempt from fuel cost adjustment.

General. The fuel cost adjustment shall apply to contract pay items as grouped by category. The adjustment shall only apply to those categories of work checked "Yes", and only when the cumulative plan quantities for a category exceed the required threshold. Adjustments to work items in a category, either up or down, and extra work paid for by agreed unit price will be subject to fuel cost adjustment only when the category representing the added work was subject to the fuel cost adjustment. Extra work paid for at a lump sum price or by force account will not be subject to fuel cost adjustment. Category descriptions and thresholds for application and the fuel usage factors which are applicable to each are as follows:

(a) Categories of Work.

- (1) Category A: Earthwork. Contract pay items performed under Sections 202, 204, and 206 of the Standard Specifications including any modified standard or nonstandard items where the character of the work to be performed is considered earthwork. The cumulative total of all applicable item plan quantities shall exceed 25,000 cu yd. Included in the fuel usage factor is a weighted average 0.10 gal/cu yd factor for trucking.
- (2) Category B: Subbases and Aggregate Base Courses. Contract pay items constructed under Sections 311, 312 and 351 of the Standard Specifications including any modified standard or nonstandard items where the character of the work to be performed is considered construction of a subbase or aggregate, stabilized or modified base course. The cumulative total of all applicable item plan quantities shall exceed 5000 tons. Included in the fuel usage factor is a 0.60 gal/ton factor for trucking.
- (3) Category C: Hot-Mix Asphalt (HMA) Bases, Pavements and Shoulders. Contract pay items constructed under Sections 355, 406, 407 and 482 of the Standard Specifications including any modified standard or nonstandard items where the character of the work to be performed is considered HMA bases, pavements and shoulders. The cumulative total of all applicable item plan quantities shall exceed 5000 tons. Included in the fuel usage factor is 0.60 gal/ton factor for trucking.
- (4) Category D: Portland Cement Concrete (PCC) Bases, Pavements and Shoulders. Contract pay items constructed under Sections 353, 420, 421 and 483 of the Standard Specifications including any modified standard or nonstandard items where

the character of the work to be performed is considered PCC base, pavement or shoulder. The cumulative total of all applicable item plan quantities shall exceed 7500 sq yd. Included in the fuel usage factor is 1.20 gal/cu yd factor for trucking.

- (5) Category E: Structures. Structure items having a cumulative bid price that exceeds \$250,000 for pay items constructed under Sections 502, 503, 504, 505, 512, 516 and 540 of the Standard Specifications including any modified standard or nonstandard items where the character of the work to be performed is considered structure work when similar to that performed under these sections and not included in categories A through D.

(b) Fuel Usage Factors.

| English Units Category | Factor | Units |
|--|--------|--------------|
| A - Earthwork | 0.34 | gal / cu yd |
| B – Subbase and Aggregate Base courses | 0.62 | gal / ton |
| C – HMA Bases, Pavements and Shoulders | 1.05 | gal / ton |
| D – PCC Bases, Pavements and Shoulders | 2.53 | gal / cu yd |
| E – Structures | 8.00 | gal / \$1000 |

(c) Quantity Conversion Factors.

| Category | Conversion | Factor |
|----------|----------------|--------------------------------|
| B | sq yd to ton | 0.057 ton / sq yd / in depth |
| C | sq yd to ton | 0.056 ton / sq yd / in depth |
| D | sq yd to cu yd | 0.028 cu yd / sq yd / in depth |

Method of Adjustment. Fuel cost adjustments will be computed as follows.

$$CA = (FPI_P - FPI_L) \times FUF \times Q$$

Where: CA = Cost Adjustment, \$
 FPI_P = Fuel Price Index, as published by the Illinois Department of Transportation for the month the work is performed, \$/gal
 FPI_L = Fuel Price Index, as published by the Illinois Department of Transportation for the month prior to the letting for work paid for at the contract price; or for the month the agreed unit price letter is submitted by the Contractor for extra work paid for by agreed unit price, \$/gal
 FUF = Fuel Usage Factor in the pay item(s) being adjusted
 Q = Authorized construction Quantity, tons or cu yd

The entire FUF indicated in paragraph (b) will be used regardless of use of trucking to perform the work.

The following is a listing of all applicable pay item numbers by Category:

Category E: Structures

| | |
|----------|--|
| 50200100 | STRUCTURE EXCAVATION |
| 50200450 | REMOVAL AND DISPOSAL OF UNSUITABLE MATERIAL FOR STRUCTURES |
| 50300225 | CONCRETE STRUCTURES |
| 50300255 | CONCRETE SUPERSTRUCTURE |
| 50401340 | FURNISHING AND ERECTING PRECAST PRESTRESSED CONCRETE BEAMS, IL63 |
| 51201400 | FURNISHING STEEL PILES HP10X42 |
| 51201900 | FURNISHING STEEL PILES HP14X89 |
| 51202305 | DRIVING PILES |
| 51203400 | TEST PILE STEEL HP10X42 |
| 51203900 | TEST PILE STEEL HP14X89 |
| 51204650 | PILE SHOES |
| Jl503010 | HIGH PERFORMANCE CONCRETE SUPERSTRUCTURE |
| JT512300 | PILE CASING, CORRUGATED METAL PIPE, 24" |

Basis of Payment. Fuel cost adjustments may be positive or negative but will only be made when there is a difference between the FPI_L and FPI_P in excess of five percent, as calculated by:

$$\text{Percent Difference} = \{(FPI_L - FPI_P) \div FPI_L\} \times 100$$

Fuel cost adjustments will be calculated for each calendar month in which applicable work is performed; and will be paid or deducted when all other contract requirements for the items of work are satisfied. The adjustments shall not apply during contract time subject to liquidated damages for completion of the entire contract.

Return With Bid

ILLINOIS TOLLWAY

OPTION FOR FUEL COST ADJUSTMENT

The bidder shall submit this completed form with his/her bid. Failure to submit the form or properly complete contract number, company name, and sign and date the form shall make this contract exempt of fuel cost adjustments in all categories. Failure to indicate "Yes" for any category of work at the time of bid will make that category of work exempt from fuel cost adjustment. After award, this form, when submitted shall become part of the contract.

Contract No.: _____

Company Name: _____

Contractor's Option:

Is your company opting to include this special provision as part of the contract plans for the following categories of work?

- | | | |
|--|-----|--------------------------|
| Category A Earthwork. | Yes | <input type="checkbox"/> |
| Category B Subbases and Aggregate Base Courses | Yes | <input type="checkbox"/> |
| Category C HMA Bases, Pavements and Shoulders | Yes | <input type="checkbox"/> |
| Category D PCC Bases, Pavements and Shoulders | Yes | <input type="checkbox"/> |
| Category E Structures | Yes | <input type="checkbox"/> |

Signature: _____ **Date:** _____

ALLOWANCE FOR HAUL ROAD MAINTENANCE

Description.

This Special Provision establishes a budgetary allowance for haul road maintenance which may include work maintaining the haul roads, pipeline and water main protection systems, erosion control systems, super silt fence and gates for the duration of the contract which may be required to be performed by the Contractor.

The work to be completed under this item will be as directed by the Engineer. This item will provide a line item against which payment will be made since the scope cannot be determined at the time of submittal of the Proposal. Payment will only be made for that work completed which is directed by the Engineer in writing.

Method of Measurement.

This work will not be measured for payment.

Basis of Payment.

Payment for this work will be made as specified in Illinois Tollway Supplemental Specifications Article 109.04 using a force account basis. Payment for this work will not exceed the costs incurred by the Contractor and approved by the Engineer.

| Pay Item Number | Designation | Unit of Measure |
|--------------------|-------------------------------------|-----------------|
| JT154168 | ALLOWANCE FOR HAUL ROAD MAINTENANCE | UNIT |

CONTRACTOR'S QUALITY PROGRAM (Illinois Tollway)

Effective: May 1, 2007

Revised: April 1, 2016

Description. This work shall consist of the Contractor establishing, implementing, and maintaining an effective Quality Program in accordance with the Illinois Tollway Contractor's Quality Program Manual.

Method of Measurement. This work will not be measured for payment.

Basis of payment. This work will be paid for at the contract lump sum price for CONTRACTOR'S QUALITY PROGRAM (CQP), which payment shall constitute full compensation for all labor, bonds, insurance, taxes, materials, equipment, sublet work, and incidentals required to develop, maintain, perform and as necessary modify an acceptable CQP, with the exception of the work described below.

The work for CONTRACTOR'S QUALITY PROGRAM (CQP) that involves quality control activities at a fabrication and/or material production facility is not to be paid under this pay item. This includes but is not limited to activities at fabrication and/or production facilities for steel, precast concrete, Portland Cement Concrete, and hot-mix asphalt. Field (that is, job-site) quality control activities for materials fabricated and/or produced off-site including but not limited to Portland Cement Concrete and Hot -Mix or Warm -Mix Asphalt are to be included for payment under this pay item. For Portland Cement Concrete, field activities include job-site testing such as air content, slump, and temperature. For Hot-Mix Asphalt, field activities include nuclear density testing, coring, and the subsequent density testing of cores. Not included as a field activity for hot-mix asphalt is any work involved with test strips, which is paid for under a separate pay item.

Payment will be made based on the percent complete of the original Contract amount.

| Pay Item Number | Designation | Unit of Measure |
|-----------------|------------------------------|-----------------|
| JT155001 | CONTRACTOR'S QUALITY PROGRAM | L SUM |

WORKFORCE HIRING INCENTIVE (Illinois Tollway)

Effective: December 22, 2015

Description: In addition to the Contractor's equal employment opportunity efforts undertaken as elsewhere required by this Contract, the Contractor is encouraged to participate in this Special Provision with incentives to provide access to employment opportunities to graduates of the Illinois Department of Transportation Construction Apprenticeship Readiness Training, Referral and Intermodal Placement Program (TCART) in order to add meaningful and diverse participation in the building of transportation projects. The Incentive will encourage the employment of historically unemployed or underemployed individuals.

It is the Illinois Tollway's intent to provide an incentive to the Contractor to hire Eligible Employees as described herein on the project site when feasible. To benefit from the incentives to encourage TCART graduate hiring under this Special Provision, the Contractor will be responsible for demonstrating the steps that it has taken in pursuance thereof, prior to a determination as to whether the Contractor is in compliance and entitled to the incentive. This Special Provision is not intended, and shall not be used to discriminate against any applicant for employment. Further, this provision is voluntary and no Contractor shall be disqualified as an unresponsive bidder or have a contract be terminated for failing to participate in this Special Provision for incentives or on the basis of what extent the Contractor may choose to participate.

The Contractor will be responsible for demonstrating hours worked by an Eligible Employee in a form prescribed by the Illinois Tollway prior to a determination as to whether the Contractor is in compliance and entitled to the Special Provision \$15 an hour incentive. Such compliance is to be determined in the Illinois Tollway's sole discretion.

An Eligible Employee for purposes of this Special Provision is defined as a person who is a graduate of TCART, as evidenced by written proof of graduation provided to the Illinois Tollway by the Contractor, who passes the Contractor's screening process to become an employee to work in the construction crafts for the Contractor.

Participation pursuant to Illinois Tollway's criteria by the Contractor in this Special Provision entitles the Contractor to be reimbursed at \$15 per hour worked by an Eligible Employee on this contract subject to a maximum overall allowance as specified herein. As approved by the Illinois Tollway, reimbursement for a monetary incentive will be allowed for Eligible Employees as specified herein; a contractor will be reimbursed for a \$15 per hour Workforce Hiring Incentive. This single reimbursement will be made even though the Contractor may receive additional non-monetary incentives from other sources, such as the Illinois Tollway's Earned Credit Program (ECP) provided such other source does not specifically prohibit the Contractor from receiving other reimbursement. For purposes of this Special Provision, the Contractor is not relieved of requirements under the Illinois Prevailing Wage Act or other applicable laws and regulations.

The Illinois Tollway, upon request, may provide the Contractor with a list of eligible TCART graduates to assist the Contractor in locating Eligible Employees. The Illinois Tollway, by providing such listings, makes no guarantees as to the suitability of candidates.

General Requirements: The maximum overall allowance for hours worked by Eligible Employees for which the incentive is available is \$15,000. During the course of performance of the Contract, the Contractor may request that the Illinois Tollway provide additional funds to increase the maximum allowance for the incentive and the Illinois Tollway may do so under its sole discretion. In the event the Contractor subcontracts a portion of the contract work, Contractor shall determine how many, if any, of the Eligible Employees are to be employed by the subcontractor. The Contractor shall also ensure that this Special Provision is made applicable to such subcontract if the Eligible Employees are to be employed by a subcontractor and that the incentive payment is passed on to each participating subcontractor.

Upon commencing construction, the Contractor shall submit to the Illinois Tollway for approval a report in the form attached to this Special Provision detailing the hours for which the Contractor is seeking the reimbursement incentive for Eligible Employees. The report shall be submitted to the Illinois Tollway with the pay estimate on which reimbursement for the Workforce Hiring Initiative is requested. It is the intention of this Special Provision that reimbursement is to be provided for Eligible Employees working in the construction crafts rather than clerk-typists or secretarial-type positions. The Contractor will provide for the maintenance of records and furnish reports documenting hours worked by each Eligible Employee under this Special Provision, and such records are subject to verification through audit. Contractor agrees to truthfully and accurately report any hours claimed for the Incentive under penalty of perjury.

Method of Measurement: This work will be measured for payment in units of hour.

Basis of Payment: This incentive will be paid for at the contract unit price of \$15 per hour for WORKFORCE HIRING INCENTIVE. The unit price and total price have been included in the schedule of prices as an allowance.

| Pay Item Number | Designation | Unit of Measure |
|--------------------|----------------------------|--------------------|
| JT155110 | WORKFORCE HIRING INCENTIVE | HOUR |

SINGLE MODE FIBER OPTIC CABLE REMOVAL, SALVAGE

DESCRIPTION

This work shall consist of removing of single-mode fiber optic cable in conduit, of the number of fibers specified as shown in the plans and as directed by the Engineer. The Contractor shall remove, test, salvage and deliver the existing fiber optic cable on reel(s) to the Illinois Tollway's Fiber Optic Maintenance Manager.

All disconnections of the existing single mode fiber optic cable splices will be completed By Others (The Illinois Tollway's Fiber Maintenance Manager). The Contractor shall notify the Engineer in writing at least two (2) weeks prior to when the disconnection work is requested to be performed. The Engineer will contact the Illinois Tollway's Fiber Optic Maintenance Manager to schedule the disconnection work.

All ancillary work required to complete the cable removal shall be included in this work.

HANDLING, PACKAGING AND QUALITY ASSURANCE

Handling:

Cable End Sealing: The fiber optic cable ends shall be capped or sealed to prevent the entry of moisture.

Protective Wrap: The fiber optic cable shall be stored with a protective wrap or other approved mechanical reel protection device over the outer turns of the fiber optic cable on each reel. The wrap shall be weather resistant and protect the cable reel from environmental hazards.

The cable shall then be OTDR tested on the reel by the Contractor to verify that no strands were damaged during removal and the measured attenuation matches the cable data sheet. Upon completion of the cable removal, the Contractor shall test all fibers for continuity, events above 0.1 dB, and total attenuation of the cable.

CONTRACTOR QUALIFICATIONS

The fiber optic cable removal shall be supervised by trained and experienced personnel. The Contractor shall provide documentation on qualifications and experience of the personnel. The Engineer will determine if the Contractor is qualified to perform the work.

CONSTRUCTION REQUIREMENTS

Removal in Raceways.

Pulling: Prior to removal, the Contractor shall provide a cable-pulling plan. The plan shall include the following information:

1. Identify where cable will enter the median barrier wall and the direction of each pull.
2. Identify locations where the cable is pulled out of an existing junction box embedded in median barrier wall, coiled in a figure eight, and pulled back into the Junction box.

3. The plan shall address the physical protection of the cable during removal and during periods of downtime and storage.

The cable-pulling plan shall be provided to the Engineer and shall be approved prior to the start of removal. The Engineer's approval shall be for the operation on the Tollway and does not include an endorsement of the proposed procedures. The Contractor is responsible for the technical adequacy of the proposed procedures.

During cable pulling operations, the Contractor shall ensure that the minimum bending of the cable is maintained during the unreeling and pulling operations. Unless specified otherwise by the fiber optic cable manufacturer, the outside bend radius of the cable during installation shall be no less than 20 times the outside diameter of the fiber optic cable. Entry guide chutes shall be used to guide the cable into the existing junction box conduit ports. Lubricating compound shall be used to minimize friction. Corner rollers (wheels), if used, shall not have radii less than the minimum installation-bending radius of the cable. A series array of smaller wheels can be used for accomplishing the bend if the cable manufacturers specifically approve the array.

If figure-eight techniques are used during cable removal, the cable shall be handled manually and stored on the ground. The cable shall be placed on tarps to prevent damage from gravel, rocks, or other abrasive surfaces. Tarps should also be used in muddy conditions to keep the cable clean. Enough area to accommodate the cable length to be stored and sufficient personnel to maintain the required minimum-bending diameter as well as avoid kinking or otherwise damaging the cable shall be provided. If the cable has been figure-eighted in preparation for a forward feed, the figure-eight must be flipped over to access the outside cable end. Sufficient personnel shall be provided to avoid kinking the cable as the figure-eight is flipped over. When removing the cable from the figure-eight, use care to avoid kinking the cable and violating the minimum-bending diameter.

Power assisted or figure-eight eliminator equipment, which is used to eliminate manual figure-eight procedures, shall not be used unless specifically allowed by the cable manufacturer in writing.

The pulling tension shall be continuously measured and shall not be allowed to exceed the maximum tension specified by the manufacturer of the cable. A dynamometer or in-line tension meter shall be used to monitor tension in the pull-line near the winch. This device must be visible to the winch operator or used to control the winch. The pulling system shall have an audible alarm that sounds whenever a pre-selected tension level is reached. Tension levels shall be recorded continuously and shall be given to the engineer as well as included in the record drawing package.

The cable shall be pulled from and into the conduit as a single component, absorbing the pulling force in all tension elements. The central strength member and Aramid yarn shall be attached directly to the pulling eye during cable pulling. "Basket grip" type attachments, which only attach to the cable's outer jacket, shall not be permitted. A breakaway swivel, rated at 95% of the cable manufacturer's approved maximum tensile loading, shall be used on all pulls. When simultaneously pulling fiber optic cable with other cables, separate grooved rollers shall be used for each cable.

The following shall be the criteria for the acceptance of the cable:

The test results shall show that the dB/km loss does not exceed +3% of the factory test or 1% of the cable's published production loss. However, no event shall exceed 0.10 dB. If any event is detected above 0.10 dB, the Contractor shall replace or repair the fiber including that event point.

The total loss of the cable (dB), less events, shall not exceed the manufacturer's production specifications as follows: 0.4 dB/km at 1310 nm and 0.3 dB/km at 1550 nm.

If the total loss exceeds these specifications, the Contractor shall replace or repair the cable run at no additional cost to the Illinois Tollway, both labor and materials.

METHOD OF MEASUREMENT

Removal of existing fiber optic cable will be measured for payment in feet in place.

BASIS OF PAYMENT

This work will be paid for at the contract unit price per foot for SINGLE MODE FIBER OPTIC CABLE REMOVAL, SALVAGE.

| Pay Item Number | Designation | Unit of Measure |
|-----------------|--|-----------------|
| JT160225 | SINGLE MODE FIBER OPTIC CABLE REMOVAL, SALVAGE | FOOT |

FIBER OPTIC CABLE, SINGLE MODE

DESCRIPTION

This work shall consist of furnishing Illinois Tollway approved Single Mode fiber cable as directed in the project plans, including installing and testing the fiber optic cable as well as other ancillary components as required to complete the fiber optic cable installation as shown in the plans and as directed by the Engineer. All ancillary components shall be included in the cost of the fiber optic cable and will not be paid for separately.

All splicing will be completed by the Illinois Tollway's Fiber Optic Maintenance Manager. The Contractor shall notify the Engineer in writing at least two (2) weeks prior to when the splicing work is requested to be performed. The Engineer will contact the Illinois Tollway's Fiber Optic Maintenance Manager to schedule the splicing work.

MATERIALS

Fiber Optic Cable

The provided fiber optic cable shall:

- Be non-armored, all-dielectric, dry-filled, loose-tube, dispersion-unshifted, single-mode fiber (SMF) with low water peak, gel free, and suitable for underground (i.e., in conduit) and aerial outside plant installation or ISP rated fiber as project required.
- Ribbon fiber must be approved by the Illinois Tollway
- Meet or exceed the following standards:
 - Telecommunications Industry Association (TIA) and Electronic Industries Alliance (EIA) TIA/EIA-492-CAAB,
 - U.S. Department of Agriculture Rural Utilities Service (RUS) 7 CFR 1755.900,
 - Telcordia GR-20,
 - International Electrotechnical Commission (IEC) 60793-2-50 Type B1.3,
 - American National Standards Institute/ ANSI/ICEA S-87-640-1999
 - International Telecommunication Union ITU-T G.652.D requirements.
- Be constructed with buffer tubes and shall not exceed a maximum attenuation for SMF of 0.4 decibels per kilometer (dB/km) at a wavelength of 1,310 nanometers (nm) and an attenuation of 0.3 dB/km at a wavelength of 1,550 nm and MMF at a wavelength of 850 and 1,300 nanometers (nm).
- Be splice-compatible with the Illinois Tollway's existing SMF.
- Require no electronic equipment for dispersion compensation between new and existing fiber.
- Be continuous and of the same material.
- Be free of surface imperfections and inclusions.
- Be only furnished with commercial off the shelf materials, equipment, and components.
- All fiber optic core glass be from the same manufacturer and do not adhere to each other.

In addition, fiber optic cables shall meet or exceed the following requirements:

| |
|---|
| Geometry |
| Cladding Diameter: 125 μ m, \pm 0.7 μ m |
| Core-to-Cladding Concentricity: \leq 0.5 μ m |
| Cladding Noncircularity: \leq 0.7% |
| Mode Field Diameter: 1,550 nm; 10.4 μ m, \pm 0.5 μ m |
| Coating Diameter: 245 μ m, \pm 5 μ m |
| Colored Fiber Nominal Diameter: 250 \pm 15 μ m |
| Optical |
| Cabled Fiber Attenuation: 1,310 nm, \leq 0.4 dB/km; 1,550 nm, \leq 0.3 dB/km |
| Point Discontinuity: 1,310 nm, \leq 0.05 dB/km; 1,550 nm, \leq 0.05 dB/km |
| Cable Cutoff Wavelength (λ_{cct}): \leq 1,260 nm. |
| Total Dispersion: 1,625 nm \leq 23.0 ps/(nm \cdot km) |
| Macrobend Attenuation: Turns -100; Outer diameter (OD) of the mandrel - 60 mm, \pm 2 mm; \leq 0.05 dB at 1,550 nm |
| Cabled Polarization Mode Dispersion: \leq 0.5 ps/ \sqrt km |

Cable Construction

Buffer Tubes: The fiber optic cable shall include loose buffer tubes that isolate internal optical fibers from outside forces and provide protection from physical damage as well as water ingress and migration. Buffer tubes shall provide freedom of movement for internal optical fibers and allow for expansion and contraction of the cable without damage to internal optical fiber. Fiber shall not adhere to the inside of the tube. Buffer tubes shall permit intentional scoring and breakout without damage to the fiber. Each fiber optic cable buffer tube shall contain 12 fibers per tube unless otherwise shown in the Plans. The buffer tubes shall be resistant to external forces and shall meet the buffer tube cold bend and shrink back requirements of 7 CFR 1755.900.

Color Code: The marking and color-coding of the fibers and buffer tubes shall conform to the EIA/TIA-598-B standard. Colors shall be permanent and stable during temperature cycling, and not subject to fading or smearing onto each other or into the water-blocking material or cause the fibers to stick together. Fibers shall be colored with UV curable inks that remain clearly distinguishable as the intended color.

Strength Member: The fiber optic cable shall contain a dielectric glass reinforced plastic (GRP) central strength member and dielectric outside strength member to prevent buckling of the cable and provide tensile strength. The fiber optic cable shall withstand a dynamic pulling tension of 600 lbs. without damage to any components of the fiber optic cable. The central member shall be over coated with a thermoplastic when required to achieve dimensional sizing to accommodate buffer tubes/fillers.

Water Blocking Compound: The fiber optic cable shall contain a dry water-blocking material to prevent the ingress of water within the outer cable jacket. The water-blocking materials shall be non-nutritive, dielectric, and homogeneous, and free from dirt and foreign matter. This yarn will preclude the need for other water-blocking material; the buffer-tube shall be gel-free. The optical fibers shall not require cleaning before placement into a splice tray or fan-out kit.

Dry water-blocking material for fiber optic cables shall be used for underground installations. Dry water-blocking compound shall be applied longitudinally around the outside of the central buffer tubes. All cables shall be constructed with water blocking material that complies with the

requirements of the EIA/TIA-455-81 B standard and is subjected to water penetration tests as defined in the EIA/TIA-455-82B standard.

Ripcord: The cable shall contain at least one ripcord under the sheath. The ripcord shall permit the removal of the sheath by hand or with pliers.

Filler: Fillers or rods may be included in the cable core to lend symmetry to the cable cross section if required. Fillers shall be placed so that they do not interrupt the consecutive positioning of the buffer tubes. In dual layer cables, any fillers shall be placed in the inner layer. Fillers shall be nominally 0.1 inch in outer diameter.

Outer Jacket: The fiber optic cable shall be jacketed with medium density polyethylene (MOPE) that is free of blisters, cracks, holes, and other deformities. The nominal jacket thickness shall be a minimum of 0.03 inches. Jacketing material shall be applied directly over the tensile strength members (as required) and water swellable tape. The outer jacket shall provide UV protection and shall not promote the growth of fungus.

The cable shall meet all specified requirements under the following conditions:

- Shipping/storage temperature: -58° F to +158° F (-50° C to +70° C)
- Installation temperature: -22° F to +158° F (-30° C to +70° C)
- Operating temperature: -40° F to +158° F (-40° C to +70° C)
- Relative humidity from 0% to 95%, non-condensing

The jacket shall be with the agency name (Illinois Tollway), cable manufacturer's name, fiber type, fiber count, date of manufacture, and the sequential cable lengths marked in feet. Ensure that the actual length of the cable is within 1% of the length indicated by the marking. Legible marking with contrasting color to that of the cable jacket shall be provided.

General Cable Performance Requirements

The fiber optic cable manufacturer shall provide documentation and certify that the fiber optic cable complies with the following EIA-455-xxx Fiber Optic Test Procedures (FOTP) (Note that, as represented below, FOTS-x is specified in EIA-455-x, e.g., FOTP-3 is specified in EIA-455-3):

- When tested in accordance with FOTP-3, *"Procedure to Measure Temperature Cycling Effects on Optical Fibers, Optical Cable, and Other Passive Fiber Optic Components,"* the change in attenuation at extreme operational temperatures (-40°F and +158°F) shall not exceed 0.15 dB/km at 1550 nm for single-mode fiber.
- When tested in accordance with FOTP-82, *"Fluid Penetration Test for Fluid-Blocked Fiber Optic Cable,"* a one-meter length of unaged cable shall withstand a one-meter static head or equivalent continuous pressure of water for one hour without leakage through the open cable end.
- When tested in accordance with FOTP-81, *"Compound Flow (Drip) Test for Filled Fiber Optic Cable,"* the cable shall exhibit no flow (drip or leak) of filling and/or flooding material at 158°F.

- When tested in accordance with FOTP-41, "*Compressive Loading Resistance of Fiber Optic Cables*," the cable shall withstand a minimum compressive load of 125 lbf/in (220 N/cm) applied uniformly over the length of the sample. The 125 lbf/in (220 N/cm) load shall be applied at a rate of 0.1 in (2.5 mm) per minute. The load shall be maintained for a period of 1 minute. The load shall then be decreased to 63 lbf/in (110 N/cm). Alternatively, it is acceptable to remove the 125 lbf/in (220 N/cm) load entirely and apply the 63 lbf/in (110 N/cm) load within five minutes at a rate of 0.1 in (2.5 mm) per minute. The 63 lbf/in (110 N/cm) load shall be maintained for a period of 10 minutes. Attenuation measurements shall be performed before release of the 63 lbf/in (110 N/cm) load. The change in attenuation shall not exceed 0.15 dB at 1550 nm for single-mode fiber.
- When tested in accordance with FOTP-104, "*Fiber Optic Cable Cyclic Flexing Test*," the cable shall withstand 25 mechanical flexing cycles around a sheave diameter not greater than 20 times the cable diameter. The change in attenuation shall not exceed 0.15 dB at 1550 nm for single-mode fiber.
- When tested in accordance with FOTP-25, "*Repeated Impact Testing of Fiber Optic Cables and Cable Assemblies*," except that the number of cycles shall be two at three locations along a one-meter cable length and the impact energy shall be at least 4.4 Nm (in accordance with ICEA S-87-640)", the change in attenuation shall not exceed 0.15 dB at 1550 nm for single-mode fiber.
- When tested in accordance with FOTP-33, "*Fiber Optic Cable Tensile Loading and Bending Test*," using a maximum mandrel and sheave diameter of 560 mm, the cable shall withstand a rated tensile load of 600 lbf (2670N) and residual load of 30% of the rated installation load. The axial fiber strain shall \leq 60% of the fiber proof level after completion of 60-minute conditioning and while the cable is under the rated installation load. The axial fiber strain shall be \leq 20% of the fiber proof level after completion of 10 minute conditioning and while the cable is under the residual load. The change in attenuation at residual load and after load removal shall not exceed 0.15 dB at 1550 nm for single mode fiber.
- When tested in accordance with FOTP-85, "*Fiber Optic Cable Twist Test*," a length of cable no greater than 2 meters shall withstand 10 cycles of mechanical twisting. The change in attenuation shall not exceed 0.15 dB at 1550 nm for single-mode fiber.
- When tested in accordance with FOTP-37, "*Low or High Temperature Bend Test for Fiber Optic Cable*," the cable shall withstand four full turns around a mandrel of s 20 times the cable diameter after conditioning for four hours at test temperatures of -30°C and +60°C. Neither the inner or outer surfaces of the jacket shall exhibit visible cracks, splits, tears, or other openings. The change in attenuation shall not exceed 0.30 dB at 1550 nm for single mode fiber.

CABLE TERMINATIONS

No fiber splicing or terminations shall be done by the Contractor. All splicing work shall be performed by the Illinois Tollway's Fiber Optic Maintenance Manager. The Contractor shall coordinate with the Engineer for the splicing work to be done after the new fiber optic cable has been installed in the new conduit, tested and accepted.

HANDLING, PACKAGING AND QUALITY ASSURANCE

All cabled optical fibers shall be 100% attenuation tested. The attenuation of each fiber shall be provided with each cable reel. The cable manufacturer shall be TL 9000 registered.

Handling

Cable End Sealing: The fiber optic cable ends shall be capped or sealed to prevent the entry of moisture during shipping, handling, storage, and installation. One end of the fiber optic cable shall be equipped with flexible pulling eyes.

Protective Wrap: The fiber optic cable shall be shipped and stored with a protective wrap or other approved mechanical reel protection device over the outer turns of the fiber optic cable on each reel. The wrap shall be weather resistant and protect the cable reel from environmental hazards. The cable reel shall remain wrapped until cable is to be installed.

Packaging, Shipping & Receiving: The packaging and delivery of fiber optic cable reels shall comply with the following minimum requirements:

1. Cable is shipped on reels of marked continuous length.
2. Each cable is shipped on a separate, strongly constructed reel designed to prevent damage to the cable during shipment and installation.
3. Each reel has a minimum of 6 feet on each end of the cable available for testing.
4. All fiber optic cable reels must be inspected upon arrival to insure NO visible signs of damage to the fiber and the fiber is continuous and free from damage.
5. No point discontinuities greater than 0.1 dB per reel.
6. The Contractor is responsible for all fiber accepted until the fiber is installed and tested and accepted by the Illinois Tollway

In addition, the manufacturer shall provide on each reel a weather resistant reel tag attached identifying the reel and cable. The reel tag shall include the following information:

- Cable Number
- Gross Weight
- Shipped Cable Length in Meters/Feet
- Job Order Number
- Product Number
- Customer Order Number
- Date Cable was Tested
- Manufacturer Order Number
- Cable Length Markings
 - Top (inside end of cable)
 - Bottom (outside end of cable)

The reel (one flange) marking shall include:

- Manufacturer
- Country of origin
- An arrow indicating proper direction of roll when handling
- Fork lift-handling illustration
- Handling Warnings.

On delivery, each cable shall be accompanied by a cable data sheet which shall include the following information:

- Manufacturer Cable Number
- Manufacturer Product Number
- Manufacturer Factory Order Number
- Customer Name
- Customer Cable Number
- Customer Purchase Order Number
- Mark for Information
- Ordered Length
- Maximum Billable Length
- Actual Shipped Length
- Measured Attenuation of Each Fiber as required by the EIA/TIA-455-61 standard
- Factory test results performed prior to shipping.

The cable shall then be OTDR tested on the reel by the contractor so verify that no strands were damaged during shipment and the measured attenuation matches the cable data sheet.

The cable shall be capable of withstanding a minimum-bending radius of 20 times its outer diameter during installation and 10 times its outer diameter during operation without changing the characteristics of the optical fibers.

CONSTRUCTION REQUIREMENTS

Experience Requirements.

Personnel involved in the installation, splicing and testing of the fiber optic cables shall meet the following requirements:

- A minimum of three (3) years-experience in the installation of fiber optic cables, including fusion splicing, terminating and testing single mode fibers.
- Install two systems where fiber optic cables are outdoors in conduit and where the systems have been in continuous satisfactory operation for at least two years. The Contractor shall submit as proof, photographs or other supporting documents, and the names, addresses and telephone numbers of the operating personnel who can be contacted regarding the installed fiber optic systems.
- One fiber optic cable system (which may be one of the two in the preceding paragraph), which the Contractor can arrange for demonstration to the Illinois Tollway representatives and the Engineer, if required.

Installers shall be familiar with the cable manufacturer's recommended procedures for installing the cable. The Contractor shall submit documented procedures to the Engineer for approval and to be used during inspection.

Installation in Conduit / Raceways

Pulling: Prior to installation, the Contractor shall provide a cable-pulling plan. The plan shall include the following information:

- Blowing conduit first with compressed air removes water and sediment and ensure the conduit is clear of major obstructions.
- Identify where each cable will enter the underground system and the direction of each pull.
- When pulling fiber cable, the manufacturer's maximum rated pull tension must not be exceeded. Lubricant will be used for all pulls to lessen the friction from the conduit and damage to the fiber cable. If the maximum tension rating is reached the Contractor will dig that location exposing the conduit, opening the conduit making a temporary pull point coiling the fiber in a figure eight, then completing the pull to the next hand hole. The Contractor will then reseal the conduit with a split coupling sleeve/connector.
- Identify locations where the cable is pulled out of a handhole, coiled in a figure eight, and pulled back into the hand hole.
- The plan shall address the physical protection of the cable during installation and during periods of downtime.
- Identify the location of fiber slack storage locations. A minimum of 50 feet of fiber must be left neatly coiled in each handhole and a minimum of 100 feet of fiber neatly coiled in each splice point handhole or man hole
- Identify the locations of splices.
- Identify distances between fiber access points and crossings.
- Cable safety is the responsibility of the Contractor. Cones, tape and warning signs will be placed around all ground openings, handholes, and exposed fiber.

The cable-pulling plan shall be provided to the Engineer and shall be approved, prior to the start of installation. The Engineer's approval shall be for the operation on the tollway and does not include an endorsement of the proposed procedures. The Contractor is responsible for the technical adequacy of the proposed procedures.

During cable pulling operations, the Contractor shall ensure that the minimum bending of the cable is maintained during the unreeling and pulling operations. Unless specified otherwise by the fiber optic cable manufacturer, the outside bend radius of the cable during installation shall be no less than 20 times the outside diameter of the fiber optic cable. Entry guide chutes shall be used to guide the cable into the handhole conduit ports. Lubricating compound shall be used to minimize friction. Corner rollers (wheels), if used, shall not have radii less than the minimum installation-bending radius of the cable. A series array of smaller wheels can be used for accomplishing the bend if the cable manufacturers specifically approve the array.

If figure-eight techniques are used during cable installation, the cable shall be handled manually and stored on the ground. The cable shall be placed on tarps to prevent damage from gravel, rocks, or other abrasive surfaces. Tarps should also be used in muddy conditions to keep the cable clean. Enough area to accommodate the cable length to be stored and sufficient personnel to maintain the required minimum-bending diameter as well as avoid kinking or otherwise damaging the cable shall be provided. If the cable has been made into a figure-eight in preparation for a forward feed, the figure-eight must be flipped over to access the outside cable end. Sufficient personnel shall be provided to avoid kinking the cable as the figure-eight is flipped over. When removing the cable from the figure-eight, use care to avoid kinking the cable and violating the minimum-bending diameter.

Power assisted or figure-eight eliminator equipment, which is used to eliminate manual figure-eight procedures, shall not be used unless specifically allowed by the cable manufacturer in writing.

The pulling tension shall be continuously measured and shall not be allowed to exceed the maximum tension specified by the manufacturer of the cable. A dynamometer or in-line tensiometer shall be used to monitor tension in the pull-line near the winch. This device must be visible to the winch operator or used to control the winch. The pulling system shall have an audible alarm that sounds whenever a pre-selected tension level is reached. Tension levels shall be recorded continuously and shall be given to the Engineer as well as included in the record drawing package.

The use of a breakaway link (swivel) shall be used to ensure that the maximum tension of the cable is not exceeded. Breakaway links that react to tension at the pulling eye shall not be used in lieu of tension measuring devices. All pulling equipment and hardware which will contact the cable during installation must maintain the cable's minimum bend radius. Equipment including sheaves, capstans, bending shoes, and quadrant blocks shall be designed for use with fiber optic cable.

The cable shall be pulled into the conduit as a single component, absorbing the pulling force in all tension elements. The central strength member and Aramid yarn shall be attached directly to the pulling eye during cable pulling. "Basket grip" type attachments, which only attach to the cable's outer jacket, shall not be permitted. A breakaway swivel, rated at 95% of the cable manufacturer's approved maximum tensile loading, shall be used on all pulls. When simultaneously pulling fiber optic cable with other cables, separate grooved rollers shall be used for each cable.

Blowing: To minimize the exposure of the backbone cable and to facilitate the longer lengths of fiber optic cable, the Contractor shall use a "blown cable" (pneumatically assisted) technique to place the fiber optic cable. Either the high airspeed blowing (HASB) method or the piston method shall be used. When using the HASB method, the volume of air passing through the conduit shall not exceed 600 cubic feet per minute or the conduit manufacturer's recommended air volume, whichever is more restrictive.

When using the piston method, the volume of air passing through the conduit shall not exceed 300 cubic feet per minute or the conduit manufacturer's recommended air volume, whichever is more restrictive. A Compressed air cooler shall be used when ambient air temperatures reach 90°F or more.

Tracer Wire: A tracer wire shall be installed with the fiber optic cable run. The tracer wire shall be a direct burial next to the fiber conduit not to exceed 3" rated number 10 AWG (minimum) solid, steel core soft drawn high strength tracer wire. The wire shall have a minimum 380-pound average tensile break strength. The wire shall have a 30-mil high density orange polyethylene (HOPE) jacket complying with ASTM-D-1248, and a 30-volt rating. The tracer wire shall be installed as per Illinois Tollway standards and supplemental standard specifications.

Connection devices used shall be as approved by the tracer wire manufacturer, except wire nuts of any type are not acceptable and shall not be used.

Construction Documentation Requirements

Installation Practices for Outdoor Fiber Optic Cable Systems: The Contractor shall examine the proposed cable plant design. At least one month prior to starting installation of the fiber optic cable plant, the Contractor shall prepare and submit electronically to the Engineer for review and approval, the Contractor's "Installation Practices for Outdoor Fiber Optic Cable Systems" manual. This manual shall address the Contractor's proposed practices covering all aspects of the fiber optic cable plant. This submittal shall include all proposed procedures, list of installation equipment, and splicing and test equipment. Test and quality control procedures shall be detailed as well as procedures for corrective action.

Operation and Maintenance Documentation: After the fiber optic cable plant has been installed, an electronic copy of the complete set of Operation and Maintenance Documentation shall be provided. The documentation shall, as a minimum, include the following:

- Complete and accurate as-built diagrams showing the entire fiber optic cable plant including locations of all splices.
- Final copies of all approved test procedures
- Complete performance data of the cable plant showing the losses at each splice location and each terminal connector.
- Complete parts list including names of vendors.

Testing Requirements: The Contractor shall provide the date, time and location of any tests required by this specification to the Engineer at least 10 working (14 calendar) days before performing the test. Included with the notification shall be a record drawing of the installed fiber optic cable system. The drawings shall indicate actual installed routing of the cable, the locations of splices, and locations of cable slack with slack quantities identified. The Contractor shall submit detailed test procedures for approval by the Engineer. All fibers in the cable shall be tested bi-directionally at both 1310 nm and 1550 nm with both an Optical Time Domain Reflectometer (OTDR) and a power meter with an optical source. For testing, intermediate breakout fibers may be concatenated and tested end-to-end. Any discrepancies between the measured results and these specifications will be resolved to the satisfaction of the Engineer.

All unterminated fibers in the cable shall be tested with a temporary fusion spliced pigtail fiber.

Mechanical splice or bare fiber adapters shall not be accepted.

Upon completion of the cable installation, the Contractor shall test all fibers for continuity, events above 0.1 dB, and total attenuation of the cable. The test procedure shall be as follows:

- A Certified Technician utilizing an Optical Time Domain Reflectometer (OTDR) and Optical Source/Power Meter shall conduct the installation test. The test equipment used shall have been calibrated within the year. Documentation shall be provided. The Technician is directed to conduct the test using the standard operating procedures defined by the manufacturer of the test equipment. All fibers installed shall be tested in both directions.
- A fiber ring or fiber box, commonly known as a launch kit, shall be used to connect the OTDR to the fiber optic cable under test at both the launch and receive ends. The tests shall be conducted at 1310 and 1550 nm for all SMF fibers bi-directionally.

- At the completion of the test, the Contractor shall provide copies of the documentation of the test results to the Engineer. All test results shall be provided on or the day following the test date. The Contractor shall tabulate the test results in a spreadsheet format and submit to the Engineer and Illinois Tollway for final review and approval. Screenshots of the test results shall **not** be accepted. A minimum of 5 working (7 calendar) days shall be allowed for the Illinois Tollway to review the test results.

Three (3) copies of the test documentation shall be submitted electronically, and shall include the following:

Cable & Fiber Identification:

- Cable ID
- Cable Location – beginning and end-point
- Fiber ID, including tube and fiber color
- Wavelength
- Date and Time
- Operator Name
- Setup Parameters
- Pulse width (OTDR)
- Refractory index (OTDR)
- Range (OTDR)
- Scale (OTDR)
- Setup Option chosen to pass OTDR “deadzone”

Test Results shall include:

- OTDR Test results - Including the raw test results file and the results in a .pdf format.
- Total Fiber Trace
- Measured Length (Cable Marking)
- Total Length (OTDR)
- Optical Source/Power Meter Total Attenuation (dB/km)
- Splice Loss/Gain
- Events > 0.10 dB
- OTDR Fiber Trace Viewer Software details

Sample Power Meter Tabulation:

| Power Meter Measurements (dB) | | | | | | | | | |
|-------------------------------|---|-----------|-------------------|---------|---------|---------|---------|-----------------------|---------|
| Location | | Fiber No. | Cable Length (km) | A to B | | B to A | | Bidirectional Average | |
| A | B | | | 1310 nm | 1550 nm | 1310 nm | 1550 nm | 1310 nm | 1550 nm |
| | | 1 | | | | | | | |
| | | | | | | | | | |
| | | 2 | | | | | | | |
| Maximum Loss | | | | | | | | | |
| Minimum Loss | | | | | | | | | |

A copy of the test equipment manufacturer's software to read the test files, OTDR and power, shall be provided to the Illinois Tollway. These results shall also be provided in tabular form, see sample below:

| Sample OTDR Summary | | | | |
|---------------------|------------------|------------------|---------------------|---------------------|
| Cable Designation: | <i>TCF-IK-03</i> | OTDR Location: | <i>Pump Sta. 67</i> | Date: <i>111/00</i> |
| Fiber Number | Event Type | Event Location | Event Loss (dB) | |
| | | | 1310 nm | 1550 nm |
| <i>1</i> | <i>Splice</i> | <i>23500 Ft.</i> | <i>.082</i> | <i>.078</i> |
| <i>1</i> | <i>Splice</i> | <i>29000 Ft.</i> | <i>.075</i> | <i>.063</i> |
| <i>2</i> | <i>Splice</i> | <i>29000 Ft.</i> | <i>.091</i> | <i>.082</i> |
| <i>3</i> | <i>Splice</i> | <i>26000 Ft.</i> | <i>.072</i> | <i>.061</i> |
| <i>3</i> | <i>Bend</i> | <i>27000 Ft.</i> | <i>.010</i> | <i>.009</i> |

The following shall be the criteria for the acceptance of the cable:

The test results shall show that the dB/km loss does not exceed +3% of the factory test or 1% of the cable's published production loss. However, no event shall exceed 0.10 dB. If any event is detected above 0.10 dB, the Contractor shall replace or repair the fiber including that event point.

The total loss of the cable (dB), less events, shall not exceed the manufacturer's production specifications as follows: 0.4 dB/km at 1310 nm and 0.3 dB/km at 1550 nm.

If the total loss exceeds these specifications, the Contractor shall replace or repair the cable run at no additional cost to the Illinois Tollway, both labor and materials.

Splicing Requirements: No splicing shall be done by the Contractor. The Contractor shall coordinate with the Engineer to have the final splicing work performed by the Illinois Tollway Fiber Optic Management Vendor, as noted elsewhere in this specification document.

Slack Storage of Fiber Optic Cables: Included as a part of this item, slack fiber shall be supplied as necessary to allow splicing the fiber optic cables in a controlled environment, such as a splicing van or tent. After splicing has been completed, the slack fiber shall be stored in junction boxes in accordance with the fiber optic cable manufacturer's guidelines. Fiber optic cable slack shall be 50 feet for each cable at each splice location. Fiber optic cable slack shall be 50 feet for each cable at access points where splicing is not involved. If the inner duct is cut, the ends of the inner duct should extend beyond the first vertical rack so they can be secured at that point. This slack shall be measured for payment.

Fiber optic cable shall be tagged inside junction boxes as per the "Illinois Tollway ITS Labeling Guidelines" manual, dated March, 2018. The manual is available on the Illinois Tollway website.

METHOD OF MEASUREMENT

Fiber optic cable will be measured for payment in feet in place installed and tested. Fiber optic cable will be measured horizontally and vertically between the changes in direction, including

slack cable. The entire lengths of cables installed in buildings will be measured for payment. Fusion splices will not be measured for payment.

BASIS OF PAYMENT

This work will be paid for at the contract unit price per lineal foot for FIBER OPTIC CABLE, SINGLE MODE, NON-ARMORED of the type, size, and number of fibers specified, installed, tested and accepted by the Illinois Tollway. Payment will not be made until the cable is installed, spliced, tested and accepted by the Illinois Tollway in compliance with these special provisions.

| Pay Item Number | Designation | Unit of Measure |
|-----------------|--|-----------------|
| JT160360 | FIBER OPTIC CABLE, SINGLE MODE, NON-ARMORED, 36 FIBERS | FOOT |

EMBANKMENT UNDER STRUCTURES (Illinois Tollway)

Effective: April 16, 2014

Revised: April 1, 2016

Description

The work shall consist of furnishing, testing, placing and compacting Embankment under Structures as indicated on the contract Plans.

The work shall be in accordance with Sections 202, 204, and 205 of the Standard Specifications except as modified herein.

Material

The Contractor must submit material source information as required in the Illinois Tollway special provision "Embankment". The Engineer shall approve the material source submittal prior to use.

The Contractor will provide laboratory tests and reports to demonstrate the material meets the following requirements. Test reports shall be submitted for approval a minimum of 14 days prior to placement of material. The Engineer may collect independent soil samples and perform confirmatory tests prior to approval.

- a) The laboratory Standard Dry Density shall be a minimum of 98 lb/cu ft (1570 kg/cu m) when determined according to AASHTO T 99 (Method C).
- b) The organic content shall be less than ten percent determined according to AASHTO T 194 (Wet Combustion).
- c) The grain size distribution shall have at least 35 percent passing the number 75 um (#200) sieve as tested per AASHTO T 27/T 11.
- d) The plasticity index (PI) shall be 12 or greater as tested per AASHTO T 90.
- e) The liquid limit (LL) shall be 50 or less as tested per AASHTO T 89.
- f) The material will satisfy the strength requirements shown on the plans (undrained shear strength (S_u) or drained friction angle).
 - 1) If cohesive material is proposed, S_u will be demonstrated by unconfined compressive strength tests (AASHTO T208) or unconsolidated-undrained (UU) triaxial compression tests (AASHTO T296), each with three specimens sheared at confining pressures specified or approved by the Engineer prior to testing.
 - 2) If granular material (per Section 1004 of the Standard Specifications) is proposed, the drained friction angle will be demonstrated by direct shear tests (AASHTO T236) or other method as approved by the Engineer.
 - 3) Test specimens will be prepared within 2 percent of the optimum moisture content, and compacted to between 95 and 98 percent of the modified laboratory dry density, as determined by AASHTO T 180.

- g) For the test methods listed in Items a through f above, a minimum of one test will be performed for every 2000 CY of EMBANKMENT UNDER STRUCTURES with a minimum of three tests for each material source, or as required by the Engineer or Illinois Tollway Materials Engineer.
- h) Reclaimed asphalt, broken concrete, or other demolition materials shall not be used.

Construction Requirements

Placing Material. When embankments are to be constructed on hillsides or existing slopes that are steeper than 1V:3H, steps shall be keyed into the existing slope by stepping and benching as shown in the plans or as directed by the engineer.

Compaction. Soils classification for moisture content control will be determined by the Soils Inspector using visual field examination techniques and the IDH Textural Classification Chart. When tested for density in place each lift shall have a maximum moisture content as follows:

- a) A maximum of 110 percent of the optimum moisture for all forms of clay soils.
- b) A maximum of 105 percent of the optimum moisture for all forms of clay loam soils.

All lifts shall be compacted to not less than 95 percent of the modified laboratory density, per AASHTO T180 Method C with a coarse particle correction according to AASTHO T224.

Stability. The requirement for embankment stability in Article 205.04 will be measured with a Dynamic Cone Penetrometer (DCP) according to the test method in the IDOT Geotechnical Manual. A minimum of one DCP test will be performed per 200 SY of each compacted lift. The DCP penetration rate must be consistent with the S_u requirements shown on the plans, based on the following correlations. Required DCP values can be interpolated between the S_u values listed below:

| <u>Min. Required S_u (ksf)</u> | <u>Max. Movement per Blow (inch)</u> |
|---|--------------------------------------|
| 1.28 or less | 1.5 |
| 1.60 | 1.3 |
| 1.94 | 1.1 |
| 2.24 | 1.0 |
| 2.56 | 0.9 |
| 2.88 | 0.8 |

Method of Measurement. When the project is constructed essentially to the lines, grades, or dimensions shown on the plans, and the Contractor and Engineer have agreed in writing that the plan quantities are accurate, no further measurement will be required and payment will be made for the quantities shown in the contract, except that if errors are discovered after work has started, appropriate adjustments will be made.

When the plans have been altered or when disagreement exists between the Contractor and the Engineer as to the accuracy of the plan quantities, either party shall, before any work is started which could affect the measurement, have the right to request in writing and thereby cause the quantities involved to be measured.

If measured, this work will be measured in cubic yards in place computed by the method of end areas.

Basis of Payment. This work will be paid for at the contract unit price per cubic yard for EMBANKMENT UNDER STRUCTURES.

| Pay Item Number | Designation | Unit of Measure |
|--------------------|-----------------------------|--------------------|
| JT205010 | EMBANKMENT UNDER STRUCTURES | CU YD |

SUBGRADE AGGREGATE (Illinois Tollway)

Effective: October 29, 2012

Revised: April 6, 2018

Description. This work shall consist of furnishing, transporting, placing, compacting and finishing an aggregate subgrade of porous granular embankment material of the specified thickness for the SUBGRADE AGGREGATE item minus the 3 inch lift of capping aggregate, and capped with a 3 inch lift of a dense graded aggregate constructed on the finished subgrade in accordance with this special provision and to the lines, dimensions, and cross sections shown on the Plans, and as required by the Engineer.

Materials. The materials used for SUBGRADE AGGREGATE shall consist of the following:

The coarse aggregate for porous granular embankment shall be crushed stone, crushed blast furnace slag, crushed gravel, or crushed concrete*. Crushed reclaimed asphalt pavement (RAP)** may be used up to 50% of the final product if it is mechanically blended with crushed stone, crushed blast furnace slag, crushed gravel, or crushed concrete. Virgin steel slag aggregates and other expansive materials as determined through testing by the Illinois Tollway will not be permitted. The coarse aggregate for porous granular embankment below the 3 inches of capping aggregate shall consist of sound durable particles reasonably free of objectionable deleterious material.

When the coarse aggregate for porous granular embankment thickness is nine inches or greater, the coarse aggregate gradation shall be as follows:

| <u>Sieve Size</u> | <u>Percent Passing</u> |
|-------------------|------------------------|
| 8 inches | 100 |
| 6 inches | 97±3 |
| 4 inches | 90±10 |
| 2 inches | 45±25 |
| #4 | 20±20 |
| #200 | 5±5 |

When the coarse aggregate for porous granular embankment thickness is less than nine inches, the coarse aggregate gradation shall be as follows:

| <u>Sieve Size</u> | <u>Percent Passing</u> |
|-------------------|------------------------|
| 5 inches | 100 |
| 4 inches | 85±15 |
| 2 inches | 45±15 |
| #4 | 25±15 |
| #200 | 4±4 |

* Production of crushed concrete shall be through stationary crushers that comply with the current IDOT Bureau of Materials and Physical Research Policy Memorandum,

“Recycling Portland Cement Concrete Into Aggregate”, or with a mobile crusher that complies with the Illinois Tollway’s current Construction Bulletin 12-02 for “The Production of Certified Aggregate From Reclaimed Pavements and Structures Using Mobile Crushers”. The Engineer shall approve the concrete removal method or stockpiled reclaimed material prior to crushing. With stationary crushers stockpile pads shall be provided at the crushing location to assure that acceptable material is not contaminated prior to use. Existing subbase aggregates shall not be intermixed with the recycled concrete either when picking up the broken concrete, feeding the concrete into the crusher, or when stockpiling the recycled aggregate.

- ** The crushed RAP particles shall be separated and mechanically blended with the crushed concrete so that the RAP does not exceed 50% of the final product. The top size of the RAP in the final product shall be less than 4 inches.

The coarse aggregate for the 3 inch lift of capping aggregate shall consist of sound durable particles reasonably free of objectionable deleterious material with a gradation of CA-6 for processed material from an approved source with the Contractor having the option to use screened Reclaimed Asphalt Pavement (RAP) from an approved source. The RAP shall meet the requirements of the Illinois Tollway special provision for Reclaimed Asphalt Pavement and have 100% passing the 1.5 inch sieve and be well graded down through fines. The resulting gradation shall vary by no more than 25% Cumulative Retained when screened across the 1 ½”, 1”, ¾”, 5/8”, ½”, 3/8”, ¼” #4, #16, #30, #50, and #200 sieves. Gradations may be performed dry, without the need for washing per ASTM C 136.

The source of subgrade aggregate materials shall be optional to the Contractor unless otherwise noted on the Plans.

CONSTRUCTION REQUIREMENTS

The SUBGRADE AGGREGATE shall be placed in two lifts. The top lift shall consist of a 3 inch variable nominal thickness top lift of capping. The thickness of the capping aggregate under bituminous shoulders will vary as a result of shoulder pavement thicknesses and shoulder surface or shoulder subgrade slope requirements as shown on the Plans. If used as the capping aggregate, the RAP shall be separated and stockpiled before use. The bottom lift shall consist of the porous granular embankment material, with minimum thickness being the total thickness for the specified SUBGRADE AGGREGATE item minus the 3 inch lift of capping aggregate. A vibratory roller meeting the requirements of Article 1101.01(g) of the Standard Specifications shall be used to roll each lift of material to obtain the desired keying or interlock and necessary compaction. The Engineer will verify that adequate keying has been obtained. The capping aggregate shall be tested and controlled for compaction using the percent growth curve method as defined below.

The Contractor shall perform a growth curve at the beginning of placement. If the aggregate or base condition changes, the Engineer reserves the right to request an additional growth curve and supporting tests at no additional cost to the Illinois Tollway.

Compaction of the growth curve shall commence immediately after the course is placed. The growth curve, consisting of a plot of lbs./cu ft. vs. number of passes with the project vibratory roller, shall be developed. This curve shall be established by use of a nuclear gauge. Tests shall be taken after each pass until the highest lbs./cu ft. is obtained. A new growth curve is

required if the breakdown roller used on the growth curve is replaced with a new roller during production.

The target density 95%-102% shall apply only to the specific gauge used. If additional gauges are to be used to determine density specification compliance, the Contractor shall establish a unique minimum allowable target density from the growth curve location for each gauge. The Illinois Tollway will establish a target density for its Quality Assurance nuclear gauge from the growth curve location.

All lifts shall be compacted to an average density of not less than 95 percent nor greater than 102 percent of the target density obtained on the growth curve. The average density shall be based on tests representing one day's production.

Quality Control density tests shall be performed at randomly selected locations within ¼ mile intervals. In no case shall more than one half day's production be completed without density testing being performed.

If the Contractor is not controlling the compaction process and is making no effort to take corrective action, the operation shall stop as directed by the Engineer.”

When a recommended remedial treatment for unstable subgrades is included in the contract that includes the allowance to use Porous Granular Embankment as a backfill aggregate, the lower lift of SUBGRADE AGGREGATE may be placed simultaneously with the material for Porous Granular Embankment, Subgrade when the total thickness to be placed is 2 feet or less.

Method of Measurement. This work will be measured for payment in cubic yards.

Basis of Payment. This work will be paid at the contract unit price per cubic yard for SUBGRADE AGGREGATE of the thickness specified.

| Pay Item Number | Designation | Unit of Measure |
|-----------------|------------------------|-----------------|
| JT211A08 | SUBGRADE AGGREGATE, 9” | CU YD |

SEEDING, CLASS 2E SALT TOLERANT ROADSIDE MIX (SPECIAL) (Illinois Tollway)
Effective: October 3, 2016

Description. The work shall consist of preparing the seed bed, transporting, furnishing and placing the seed and other materials required in seeding operations on shoulders, slopes, and other locations, as shown on the plans, or as directed by the Engineer. This work shall be performed in accordance with Section 250 of the Standard Specifications except as herein modified.

Add the following to Article 250.06 (a) (5) Bare Earth Seeding:

“Contractor shall make a minimum of 2 passes in opposite directions when mechanically seeding to ensure even coverage.

Broadcast seeding will be allowed as approved by the Engineer and/or on slopes steeper than 1:3 (V: H) or in inaccessible areas. When broadcast seeders are used, the individual seeds comprising the seeding mixture shall be sown separately or in similar size groupings unless otherwise approved by the Engineer.

Immediately after seed is sown, Erosion Control Blanket shall be installed in accordance with Section 251 of the Standard Specifications.”

Add the following to Table 1 of Article 250.07 Seed Mixtures:

“Class-Type = Seeding, Class 2E Salt Tolerant Roadside Mix (Special)

SEEDING, CLASS 2E SALT TOLERANT ROADSIDE MIX (SPECIAL)

| <u>Botanical Name</u> | <u>Common Name</u> | <u>Ib/acre</u> |
|---|------------------------------------|-----------------------|
| <i>Festuca arundinacea 'Falcon IV'</i> | <i>Falcon IV Tall Fescue</i> | 40.0 |
| <i>Festuca arundinacea 'Inferno'</i> | <i>Inferno Tall FescueE</i> | 20.0 |
| <i>Festuca arundinacea 'Titan Ltd.'</i> | <i>Titan Ltd. Tall FescueE</i> | 20.0 |
| <i>Festuca rubra 'Aruba'</i> | <i>Aruba Creeping Red Fescue</i> | 20.0 |
| <i>Festuca rubra 'Audobon'</i> | <i>Audobon Creeping Red Fescue</i> | 30.0 |
| <i>Festuca tricophylla 'Reliant 4'</i> | <i>Reliant 4 Haed Fescue</i> | 40.0 |
| <i>Lolium perenne 'Goalkeeper 2'</i> | <i>Goalkeeper 2 Perennial Rye</i> | 50.0 |
| <i>Puccinellia distans 'Fults' or 'Salty'</i> | <i>Fults Distans Alkaligrass</i> | 60.0 |
| | <i>Total</i> | 280.0 |

Seeding time shall be between April 1st and June 15th or August 1st and November 1st.

If substitutions are requested for any Tall Fescue (*Festuca spp.*) varieties or Perennial Ryegrass (*Lolium perenne*) varieties due to lack of availability at time of procurement, the Contractor shall submit validation that the alternate seed varieties are within the same species, hardy selections for the site conditions, and have greater than 90% viable endophytic levels, for approval by the Engineer.”

Method of Measurement. This work will be measured for payment in acres.

Basis of Payment. This work will be paid for at the contract unit price per acre for SEEDING, CLASS 2E SALT TOLERANT ROADSIDE MIX (SPECIAL)

| PAY ITEM NUMBER | DESIGNATION | UNIT OF MEASURE |
|----------------------------|---|----------------------------|
| JT250432 | SEEDING, CLASS 2E SALT TOLERANT ROADSIDE MIX (SPECIAL) | ACRE |

SEEDING, CLASS 4F NATIVE GRASS LOW PROFILE MIX (SPECIAL) (Illinois Tollway)
Effective: October 3, 2016

Description. The work shall consist of preparing the seed bed, transporting, furnishing and placing the seed and other materials required in seeding operations on slopes and other areas, as shown on the plans, or as directed by the Engineer. This work shall be performed in accordance with Section 250 of the Standard Specifications except as herein modified.

Add the following to Article 250.06 (a) (6) Bare Earth Seeding:

“Seeding, Class 4F Native Grass Low Profile Mix (Special) shall be sown with a rangeland type grass drill.

Seeding, Class 4F Native Grass Low Profile Mix (Special) shall include >90% Pure Live Seed (PLS).

Seeding, Class 4F Native Grass Low Profile Mix (Special) shall be combined with compatible endomycorrhizal inoculants such as AM 120 Mycorrhizal Inoculum (or comparable). The inoculants shall contain a diverse mixture of glomales fungal species (Glomus spp.) in pelletized form. Application rate shall be 40 lbs per acre.

Contractor shall make a minimum of 2 passes in opposite directions when drill seeding to ensure even coverage.

Immediately after seed is sown, Erosion Control Blanket shall be installed in accordance with Section 251 of the Standard Specifications.”

Add the following to Table 1 of Article 250.07 Seed Mixtures:

“Class-Type = Seeding, Class 4F Native Grass Low Profile Mix (Special)

SEEDING, CLASS 4F NATIVE GRASS-FORB MIX (SPECIAL)

| <i>Botanical Name</i> | <i>Common Name</i> | <i>lbs/acre</i> |
|--------------------------------------|------------------------------|------------------------|
| <i>Agropyron trachycaulum</i> | SLENDER WHEAT GRASS | 5.0 |
| <i>Bouteloua curtipendula</i> | SIDE-OATS GRAMA | 10.0 |
| <i>Elymus Canadensis</i> | CANADA WILD RYE | 2.0 |
| <i>Koeleria macrantha</i> | JUNE GRASS | 1.0 |
| <i>Schizachyrium scoparium</i> | LITTLE BLUESTEM | 15.0 |
| <i>Chasmanthium latifolium</i> | NORTHERN SEA OATS | 2.0 |
| <i>Lolium perenne 'Goalkeeper 2'</i> | GOALKEEPER 2 PERENNIAL RYE | 15.0 |
| | <i>Grass Subtotal</i> | 50.0 |
| <i>Lolium multiflorum</i> | ANNUAL RYEGRASS (cover crop) | 40.0 |
| | <i>Cover Subtotal</i> | 40.0 |
| | <i>Total</i> | 90.0 |

Seeding times shall be between May 1st to June 15th and September 15th to November 1st.”

Method of Measurement. This work will be measured for payment in acres.

Basis of Payment. This work will be paid for at the contract unit price per acre for SEEDING, CLASS 4F NATIVE GRASS LOW PROFILE MIX (SPECIAL).

| PAY ITEM NUMBER | DESIGNATION | UNIT OF MEASURE |
|----------------------------|---|----------------------------|
| JT250442 | SEEDING, CLASS 4F NATIVE GRASS LOW PROFILE MIX (SPECIAL) | ACRE |

GRANULAR SUBBASE SPECIAL

Description. This work shall consist of furnishing, transporting, placing, compacting and finishing granular subbase aggregate materials on the finished soil subgrade as shown on the plans and be performed as in accordance with Section 311 of the Standard Specifications, except as modified herein, or as directed by the Engineer.

Materials. Replace Article 1004.04 of the Standard Specifications with the following:

The aggregate for Granular Subbase, Special shall have a gradation of CA-6 for processed material from an approved source with the Contractor having the option to use Reclaimed Asphalt Pavement (RAP) from an approved source. The RAP shall meet the requirements of the Tollway special provision for Reclaimed Asphalt Pavement and have 100% passing the 1.5 inch sieve and well graded down through fines.

The source of subbase granular aggregate materials shall be optional to the Contractor unless otherwise noted on the Plans.

CONSTRUCTION REQUIREMENTS

Subgrade preparation, subbase placement and compaction, and finishing shall be in accordance with Articles 311.04 through 311.07 of the Standard Specifications except as follows:

Placement and compaction of Granular Subbase, Special shall be only in accordance with Article 311.05(a) of the Standard Specifications.

Method of Measurement. This work will not be measured for payment

Basis of Payment. This work will not be paid for separately but shall be included in the unit price for BRIDGE APPROACH SLAB.

PILE CASING, CORRUGATED METAL PIPE, 24"

Description. This work shall consist of furnishing and placement of sand filled corrugated steel pipe sleeves over driven steel H-piles and metal shell piles.

Materials. The steel pipe shall have a minimum inner diameter of 24". The use of a larger diameter pipe shall be coordinated and approved by the MSE wall supplier. The pipe shall be made of galvanized steel and have a minimum thickness of 10 gauge. The sand shall be clean. Both the pipe and sand shall meet the requirements as set forth in the following articles of the Standard Specifications.

| | Article |
|-------------------------------------|---------|
| a. Corrugated Structural Plate Pipe | 1006.01 |
| b. Sand | 1003.04 |

Construction Requirements. Placement of the corrugated steel pipes and sand shall conform to the following requirements.

- a. The sand filled corrugated steel pipes shall be placed around all steel H-piles and metal shell piles located in abutments and associated wing walls as detailed on the plans.
- b. The corrugated steel pipe shall be placed such that the steel H-pile or metal shell pile is centered within the pipe to a tolerance of 1".
- c. The corrugated steel pipe shall extend thru the select fill. The top of the pipe shall be located at the bottom of the concrete abutment cap, and the bottom of the pipe shall be located at least 1'-0" below the bottom of the select backfill.
- d. Prior to placing the sand the corrugated steel pipe shall contain only the steel H-pile or metal shell pile. The inside of the pipe shall be free of all debris, standing water, and MSE wall select fill.
- e. Prior to placing the sand any standing water shall be pumped out. The placement of sand shall not be used as a means to displace standing water. The drilling of holes into the pipes to drain water shall not be permitted.
- f. The sand shall be placed to the height as specified on the contract plans. The sand shall be evenly poured into the pipe in a controlled manner and not compacted. The steel H-pile or metal shell pile shall remain centered within tolerance after placement of the sand.
- g. Any corrugated steel pipe or sand filled corrugated steel pipe that requires removal and resetting shall be at the contractor's expense. Steel pipes or sand filled steel pipes shall be removed and reset if the following conditions are encountered:
 1. The corrugated steel pipe is no longer centered around the steel H-pile or metal shell pile within tolerance after sand placement.
 2. Prior to sand placement the pipe is filled with excessive debris or fill material that is not sand. Cutting and patching the pipe for the purpose of removing materials is not permitted.

- 3. Pipes are damaged, punctured, dented or crushed during placement of select fill or other construction operations.
- h. Any external bracing that may be employed by the Contractor to stabilize the pipes shall not be measured for payment and shall be removed prior to the placement of the MSE wall's select fill.

Method of Measurement. The corrugated steel pipe, sand and incidentals will be measured for payment per foot.

Basis of Payment. This work will be paid for at the contract unit price per foot for PILE CASING, CORRUGATED METAL PIPE, 24”.

| Pay Item Number | Designation | Unit of Measure |
|--------------------|---|--------------------|
| JT512300 | PILE CASING, CORRUGATED METAL PIPE, 24” | FOOT |

CONCRETE PIER PROTECTION BARRIER

Description. This work shall consist of constructing concrete median barrier in accordance with applicable portions of Illinois Tollway Standard Drawing C13-01, Section 637 of the Standard Specifications, and as shown on the Plans.

The Contractor shall construct concrete median barrier between the piers of the Ramps X3 and X4 Bridge Structures over Jane Addams Memorial Tollway (I-90). The concrete median barrier shall be constructed with the configuration shown in Section E-E of the Roadway Detail Sheets in the Plans.

Construction Requirements. Work shall follow the applicable portions of Section 637 of the Standard Specifications for Road and Bridge Construction.

Method of Measurement.

CONCRETE PIER PROTECTION BARRIER will be measured for payment in feet in place along the centerline of the concrete median barrier.

PROTECTIVE COAT will be measured for payment in place and the area computed in square yards.

Basis of Payment. This work shall be paid for at the contract unit price per foot for CONCRETE PIER PROTECTION BARRIER which price will constitute full compensation for the satisfactory completion of the work specified herein.

Protective coat will be paid for according to Article 420.20.

| Pay Item Number | Designation | Unit of Measure |
|-----------------|----------------------------------|-----------------|
| JT637026 | CONCRETE PIER PROTECTION BARRIER | FOOT |

SUPPLEMENTAL TRAFFIC CONTROL DEVICES (Illinois Tollway)

Effective: April 27, 2007

Revised: April 1, 2016

Description. This work shall consist of furnishing, installing, maintaining, relocating and removing additional traffic control devices at locations not anticipated during the preparation of the Contract Documents but for which a specific need arises during construction.

GENERAL REQUIREMENTS

Requirements for all devices furnished under this specification shall be governed by the Specifications and procedures of Section 701 of the Illinois Tollway Supplemental Specifications, Work Zone Traffic Control and Protection. The Contractor shall obtain the prior written authorization of the Engineer for the furnishing and placing of any Supplemental Traffic Control Devices.

Supplemental Barricades. SUPPLEMENTAL BARRICADES shall be placed at the locations and for the duration directed in writing by the Engineer.

Barricades used, together with their placement, maintenance, necessary realignment, and removal shall be in accordance with the applicable provisions of Section 701 of the Illinois Tollway Supplemental Specifications.

SUPPLEMENTAL BARRICADES shall be equipped with warning lights as required in accordance with the provisions of Section 701 of the Illinois Tollway Supplemental Specifications at no additional cost to the Illinois Tollway.

Supplemental Signing. SUPPLEMENTAL SIGNING shall be placed at the locations and for the duration directed in writing by the Engineer.

The signs shall be ground-mounted or skid-mounted at the height and distance from traffic as directed by the Engineer, and shall be securely attached to supports of sufficient strength and/or sufficiently weighted to assure that the signs will remain in place without hazard to vehicular traffic regardless of weather or traffic conditions. Signs shall comply with those in the Temporary Traffic Control Section of the current edition of the Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD).

The Contractor shall promptly relocate supplemental signing when and where necessary for stage changes or modification of lane closures without additional cost to the Illinois Tollway.

SUPPLEMENTAL SIGNING shall be equipped with warning lights when so directed and shall be maintained in accordance with the applicable provisions of Illinois Tollway Supplemental Specifications Section 701 at no additional cost to the Illinois Tollway.

Supplemental Flashing Arrow Boards. SUPPLEMENTAL FLASHING ARROW BOARDS shall be placed at the locations and for the duration directed in writing by the Engineer.

Arrow boards used together with their placement, maintenance, necessary realignment, and removal shall be in accordance with the applicable provisions of Illinois Tollway Supplemental Specifications Section 701.

Method of Measurement. SUPPLEMENTAL BARRICADES will be measured for payment per each per day for barricades ordered and placed, which measurement shall include all warning lights required to be attached thereto.

SUPPLEMENTAL SIGNING will be measured for payment in square feet edge to edge (horizontally and vertically) of the aggregate actual sign face surface area of all supplemental signs ordered and erected in place.

SUPPLEMENTAL FLASHING ARROW BOARD will be measured for payment per each per day, each per week and each per month for arrow boards ordered, placed, and functioning properly. No measurement will be made for any arrow board that fails to function for any day or fraction thereof.

Measurement will be in accordance with the following example.

| <u>PERIOD OF USE</u> | <u>MEASURED AS</u> |
|---------------------------|---|
| 1 to 6 consecutive days | number of days |
| 7 to 13 consecutive days | 1 week + No. days in excess of 7 |
| 14 to 20 consecutive days | 2 weeks + No. of days in excess of 14 |
| 21 to 27 consecutive days | 3 weeks + No. of days in excess of 21 |
| 28 to 34 consecutive days | 1 month + No. of days in excess of 28 |
| 35 to 41 consecutive days | 1 month + 1 week + No. of days in excess of 35 |
| 42 to 48 consecutive days | 1 month + 2 weeks + No. of days in excess of 42 |

Basis of Payment. Payment for SUPPLEMENTAL BARRICADE will be made at the Contract unit price per each per day, for each barricade.

Payment for SUPPLEMENTAL SIGNING will be made at the Contract unit price per square foot for the aggregate total of all supplemental signs.

Payments for SUPPLEMENTAL FLASHING ARROW BOARD will be made at the Contract unit price per each per day, each per week and each per month for each arrow board.

| Pay Item Number | Designation | Unit of Measure |
|--------------------|--|--------------------|
| JT701030 | SUPPLEMENTAL BARRICADE | EACH/DAY |
| JT701031 | SUPPLEMENTAL SIGNING | SQ. FT |
| JT701032 | SUPPLEMENTAL FLASHING ARROW BOARD (PER DAY) | EACH/DAY |
| JT701033 | SUPPLEMENTAL FLASHING ARROW BOARD (PER WEEK) | EACH/WEEK |
| JT701034 | SUPPLEMENTAL FLASHING ARROW BOARD (PER MONTH) | EACH/MONTH |

SUPPLEMENTAL MAINTENANCE OF TRAFFIC (Illinois Tollway)

Effective: May 14, 2007

Revised: April 1, 2016

Description. This work shall consist of providing the requirements of Section 701 of the Illinois Tollway Supplemental Specifications in the event that the Contractor receives an extension of time for the completion of the Contract and the Engineer has requested that maintenance of traffic be provided.

GENERAL REQUIREMENTS

The Contractor shall provide all necessary daily maintenance, realignment and surveillance of the maintenance of traffic devices installed by him/her in accordance with the requirements of Section 701 of the Illinois Tollway Supplemental Specifications.

Method of Measurement. This work will be measured on a per day basis for each calendar day after the Date for Completion, regardless of the number of lane closures to be maintained, installed or removed.

Basis of Payment. This work will be paid at the Contract unit price per day.

| Pay Item Number | Designation | Unit of Measure |
|-----------------|-------------------------------------|-----------------|
| JT701035 | SUPPLEMENTAL MAINTENANCE OF TRAFFIC | DAY |

TEMPORARY INFORMATION SIGNING (Illinois Tollway)

Effective: December 11, 2012

Revised: April 1, 2016

Description. This work shall consist of furnishing, fabricating, installing, maintaining, and relocating signs for various stages of construction and eventually removing temporary informational signs - ground mount and/or overhead mount.

Ground mount signs shall include ground mount signs, skid mount signs and overlay sign panels which cover portions of existing ground mount signs.

Overhead mount signs shall include truss mount signs, bridge mount signs and overlay sign panels which cover portions of existing overhead signs.

Materials. Materials shall be according to the following Articles of Section 1000 – Materials, of the Standard Specifications:

| <u>Item</u> | <u>Section/Article</u> |
|-----------------------------------|------------------------|
| a.) Sign Base (Notes 1 & 2) | 1090 |
| b.) Sign Face (Note 3) | 1091 |
| c.) Sign Legends..... | 1092 |
| d.) Sign Supports | 1093 |
| e.) Overlay Panels (Note 4)..... | 1090.02 |

Note 1. The Contractor may use 5/8 inch thick plywood.

Note 2. Type A sheeting may be used on the plywood base.

Note 3. All sign faces shall be Type A except all orange signs shall meet the requirements of Article 1106.01 of the Standard Specification.

Note 4. The overlay panels shall be 0.08 inch thick.

GENERAL CONSTRUCTION REQUIREMENTS

Installation. The sign sizes and legend sizes shall be verified by the Contractor prior to fabrication.

Signs which are placed along the roadway and/or within the construction zone shall be installed according to the requirements of the following Articles and Publications:

- Article 701.03(d) of the Illinois Tollway Supplemental Specifications
- Article 720.04 of the Standard Specifications.

Ground mount signs shall be 7 feet above the near edge of the pavement and shall be a minimum of 2 feet beyond the edge of the paved shoulder. A minimum of 2 posts shall be used.

Overhead mount signs to be installed to vertical clearance requirements in conformance with Article 5.4.1 of the Illinois Tollway's Structure Design Manual.

Post mounted signs that are unshielded shall be a breakaway design. The design and installation of sign supports should conform to the latest edition of AASHTO's *Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals*. Signs

on temporary supports shall meet the requirements of NCHRP Report 350 or Manual for Assessing Safety Hardware (MASH) to Test Level TL-3.

The attachment of temporary signs to existing sign structures or sign panels shall be approved by the Engineer. Any damage to the existing signs due to the Contractor's operations shall require the repair or replacement of the signs, as determined by the Engineer, at no additional cost to the Illinois Tollway.

Signs which are placed on overhead bridge structures shall be fastened to the handrail with stainless steel bands. These signs shall rest on the concrete parapet where possible. The Contractor shall furnish mounting details for approval by the Engineer.

Method of Measurement. This work shall be measured for payment in square feet edge to edge (horizontally and vertically).

All hardware, posts or skids, supports, bases for ground mounted signs, connections, which are required for mounting these signs will be included as part of this pay item.

Basis of Payment. This work shall be paid for at the contract unit price per square feet for: TEMPORARY INFORMATION SIGNING-GROUND MOUNT, 24 SQ FT IN AREA OR LESS; TEMPORARY INFORMATION SIGNING-GROUND MOUNT, GREATER THAN 24 SQ FT IN AREA; TEMPORARY INFORMATION SIGNING-OVERHEAD MOUNT, 24 SQ FT IN AREA OR LESS; or TEMPORARY INFORMATION SIGNING-OVERHEAD MOUNT, GREATER THAN 24 SQ FT IN AREA.

| Pay Item Number | Designation | Unit of Measure |
|-----------------|--|-----------------|
| JT701050 | TEMPORARY INFORMATION SIGNING-GROUND MOUNT, 24 SQ FT IN AREA OR LESS | SQ FT |

SIGN INSTALLATION (Illinois Tollway)

Effective: April 2, 2007

Revised: April 1, 2016

DESCRIPTION

This work shall consist of loading signs fabricated by the Illinois Tollway at the Tollway's Sign Shop in Naperville, Illinois, transporting them to the job site and mounting them on overhead structures, bridge mount or ground mount supports, wood posts, telescoping steel posts and/or overhead canopy structures at toll plazas as shown in the Plans and herein specified.

The three types of sign installations are defined by surface area in accordance with the following descriptions:

| | |
|--------|---|
| TYPE 1 | 9 square feet or less |
| TYPE 2 | Greater than 9 square feet and less than 24 square feet |
| TYPE 3 | 24 square feet or greater |

MATERIALS

Post clip bolts and sign panel stitch bolts shall be stainless steel conforming to ASTM A193, Class I Type 304, Grade 33. Aluminum flat washers shall conform to ASTM B209, Alloy 2024-T4 and shall be used under each nut to prevent gouging of the clip. Elastic stop nuts, shall be stainless steel conforming to ASTM A194 (AASHTO M292), Grade B8. Aluminum hardware for sign mounting panels shall conform to ASTM B211, Alloy 2024-T4.

CONSTRUCTION METHODS

New signs included with this provision will be fabricated in the Illinois Tollway's sign shop in Naperville, Illinois. The Contractor shall obtain and load the signs on his hauling units at the sign shop and transport them to the various erection sites.

The Contractor shall assemble sign sections in the field as needed, erect and attach the signs to the supports. The Contractor shall supply hardware for attaching the signs to the supports. Extreme care shall be used in tightening elastic stop nuts to avoid excessive torque and cracking. Any nuts so damaged during installation shall be replaced.

The Contractor shall exercise due care in handling the signs during all phases of this operation. Any sign that is damaged due to the Contractor's handling or operations shall be repaired by the Contractor to the satisfaction of the Illinois Tollway, at no additional cost to the Illinois Tollway, and without cause for the Contractor claiming delay.

Any sign that is lost or damaged beyond use shall be replaced by the Contractor at no additional cost to the Illinois Tollway and without cause for the Contractor claiming delay.

METHOD of MEASUREMENT

This work will be measured for payment in square feet of the actual total surface area of sign faces, including the edge molding, of all signs erected and accepted.

BASIS of PAYMENT

This work will be paid at the contract unit price per square foot for SIGN INSTALLATION, of the type specified.

| Pay Item Number | Designation | Unit of Measure |
|--------------------|---------------------------|--------------------|
| JT720110 | SIGN INSTALLATION, TYPE 2 | SQ FT |
| JT720120 | SIGN INSTALLATION, TYPE 3 | SQ FT |

MULTI-POLYMER PAVEMENT MARKINGS (Illinois Tollway)

Effective: October 20, 2008

Revised: April 1, 2016

Description. This work shall consist of the furnishing and application of a durable, long life multi-polymer pavement marking system. The binder portion of the system is to be applied to the road surface at 20 mils \pm 1 mil in thickness on concrete/asphalt pavements and 25 mils \pm 1 mil on open grade pavement (or according to Engineers and manufacturers recommendation); and into which reflective media is applied by means of pressurized applicator in accordance with the requirements stated in this specification.

Materials. All materials used to formulate a system for hot-spray applications of permanent multi-polymer pavement markings shall conform to the requirements specified herein.

A. Multi-Polymer Resins

a) Physical Properties of the Mixed Compound:

The multi-polymer pavement marking material shall consist of a 100 percent solid two part system formulated and designed to provide a simple volumetric mixing ratio of two components (must be two volume(s) of Component A and one volume(s) of Component B). No volatile solvents or fillers will be allowed. The multi-polymer resin shall be as follows:

- **Multi-Polymer Content (Component A).** The multi-polymer content of the multi-polymer resin shall be tested according to ASTM D 1652 and calculated as the weight per multi-polymer equivalent (WPE) for both white and yellow. The multi-polymer content shall be determined on a pigment free basis and shall meet the target value provided by the manufacturer's certification and approved by the Illinois Tollway Materials Group. A tolerance of plus or minus 50 of WPE will be applied to the target value to establish the acceptance range.
- **Amine Value (Component B).** The amine value of the curing agent shall be determined according to ERF-25-68. The total amine value shall be less than 530.

The system shall be formulated as a Long Life Pavement Marking System capable of providing an average of 6 years performance. The Long Life Pavement Marking System shall be free of TMPTA (trimethylolpropane-triacrylate), free of toxic heavy metal (lead, chromium, cadmium, and other toxic heavy metals as defined by the U.S. EPA), and free of other such multi functional monomers.

Material composition of the mixed compound shall be as follows:

| Material Requirements | |
|---|--|
| Tests | Requirements |
| Density (Gallon Weight) | ±0.10 lb./gal |
| Viscosity (Krebs-Stormer) | ±7 KU |
| Viscosity (Cone & Plate) | ±0.5 Poises |
| Grind | Not Less than the Standard |
| % Non-Volatile Matter | ±1.0% |
| % Pigment (white) | ±3.0% |
| % Volume Non-Volatile Matter | ±3.0% |
| Infrared Spectrum | Both component A and component B shall be analyzed to verify for control purposes that materials submitted for use are of an identical formulation as originally approved. Deviations as determined by comparison with the original sample shall be cause for rejection. |
| Trifunctional or Multifunctional Monomers | 0% |
| Isocyanate | 0% |

b) Pigmentation:

The pigment composition shall be as follows:

| Pigment Composition | Percent by Weight | |
|--|--------------------------|----------------|
| | Minimum | Maximum |
| White: | | |
| Titanium Dioxide Rutile (94% minimum purity, ASTM D 476, Type III) | 18.0 | 25.0 |
| Multi-Polymer Resin | 75.0 | 86.0 |
| Yellow: | | |
| Organic Non-Lead Yellow | 10.0 | 15.0 |
| Titanium Dioxide (ASTM D 476, Type III) | 4.0 | 9.0 |
| Multi-Polymer Resin | 75.0 | 86.0 |

The entire pigment composition shall consist of titanium dioxide.

c) Toxicity:

Upon heating to application temperature, the material shall not exude fumes which are toxic or injurious to persons or property. Upon curing the materials should be completely inert with all components fully reacted and environmentally safe.

d) Daylight Reflectance:

Chromaticity and reflectance requirements shall be as follows:

| Federal 595 Color | | Chromaticity Coordinates | | | | | | | | Daylight directional reflectance (Y) |
|----------------------|-------|--------------------------|------|------|------|------|------|------|------|---|
| | | 1 | | 2 | | 3 | | 4 | | |
| | | x | y | x | y | x | y | x | y | |
| White | 17855 | .302 | .344 | .325 | .344 | .302 | .320 | .325 | .320 | 80 min. |
| Yellow | 33538 | .543 | .472 | .475 | .472 | .543 | .425 | .475 | .425 | 50 min. |

e) Weathering Resistance:

The multi-polymer compound, both white and yellow, must be applied to 2 sets of 3"x 6" aluminum panels at 20 ± 1 mil in thickness, one set with no glass spheres and one set with glass spheres as specified herein (must ensure 50/50 distribution of Type A and Type B beads for this will impact the results of this test) and expose the prepared samples in a Q.U.V. Environmental Testing Chamber, as described in ASTM G-53, and they shall conform to the following requirements. (The test shall be conducted for 75 hours at 122°F, 4 hours humidity and 4 hours U.V., in alternating cycles. The prepared panels shall be cured at 77°F for 72 hours prior to exposure.) The color of the white multi-polymer material shall not be darker than Federal Standard No. 595A-17855. The color of the yellow multi-polymer material shall be reasonably close to Federal Standard No. 595A-13415.

f) Dry Time:

The multi-polymer resin compounds, when properly applied with the required gradations and bead application rates per gallon, shall cure to a no-track condition, when tested in accordance with ASTM D 711, within 240 minutes at 40 degrees F and not more than 35 minutes at temperature 70 degrees F.

g) Adhesion to Pavement (Concrete and Asphalt):

The multi-polymer system markings must perform for an average of 6 years. The cured pavement marking materials, when tested according to ACI Method 503, shall have such a higher degree of adhesion to the specified concrete (compressive strength, 4,000 psi minimum) or asphalt surface such that there shall be a 100% substrate failure in the performance of this test. The prepared specimens shall be conditioned at room temperature ($75^\circ\text{F} \pm 2^\circ\text{F}$) for a minimum of 24 hours and a maximum of 72 hours prior to the performance of the tests indicated.

h) Hardness:

The multi-polymer paint pavement marking material, when tested according to ASTM D 2240, shall have a Shore D Hardness from 75 to 95. The samples shall be allowed to cure at room temperature (75 ± 2 degrees F) for a minimum of 24 hours and a maximum of 72 hours prior to performing the indicated tests.

i) Abrasion:

The abrasion resistance shall be evaluated on a Taber Abrader with a 1,000 gram load and CS-17 wheels. The duration of the test shall be 1,000 cycles. The wear index shall be calculated based on ASTM C 501, and the wear index for the dual component material shall not be more than 100 milligrams. The test shall be performed on cured samples of material which have been applied, without glass beads, at a film thickness of 0.020 ± 0.0005 inches to code S-16 stainless steel plates. The samples shall be allowed to cure at room temperature (75 ± 2 degrees F) for a minimum of 24 hours and a maximum of 72 hours prior to performing the indicated tests.

j) Accelerated Life-Cycle Aging Test: The material must not show any evidence of blistering, bubbling, or delaminating when submitted to test method ATR-931. Results of the test shall be provided by the manufacturer during the approval process.

k) Thermal compatibility:

The mixed hybridized polymer system must have thermal compatibility and tensile strength requirements of 4500-6500 psi, such that, it is compatible with asphalt and Portland cement concrete under all weather conditions.

l) Delineation profile:

To enhance better profile of the marking by minimizing splattering and improved bead embedment the viscosity of the mixed Component A and Component B of the hybridized polymer system shall be greater than 4500cP at 75°F.

m) Reflective Media. The reflective media shall meet the following requirements:

1) Type A – The glass beads shall meet the requirements of Article 1095.07 of the Standard Specifications and the following requirements:

i) First Drop Glass Beads. The first drop glass beads shall be tested by the standard visual method of large glass spheres adopted by the Illinois Department of Transportation. The beads shall have a silane coating and meet the following sieve requirements:

| U.S. Standard Sieve Number | Sieve Size | % Passing By Weight (mass) |
|----------------------------|-------------|----------------------------|
| 12 | 1.70 mm | 95-100 |
| 14 | 1.40 mm | 75-95 |
| 16 | 1.18 mm | 10-47 |
| 18 | 1.00 mm | 0-7 |
| 20 | 850 μ m | 0-5 |

ii) Second Drop Glass Beads. The second drop glass beads shall meet the requirements of Article 1095.07 of the Standard Specifications for Type B.

n) Packaging:

Glass beads shall be delivered in approved moisture proof bags or weather resistant bulk boxes. Each carton shall be legibly marked with the manufacturer, specifications and type, lot number, and the month and year the glass beads were packaged. The letters and numbers used in the stencils shall be a minimum of ½ in. in height.

- a. Moisture Proof Bags. Moisture proof bags shall consist of at least five ply paper construction unless otherwise specified. Each bag shall contain 50 lb net.
- b. Bulk Weather Resistance Boxes. Bulk weather resistance boxes shall conform to the Federal Specification PPP-8-640D Class II or latest revision. Boxes are to be weather resistant, triple wall, fluted, corrugated-fiber board. Cartons shall be strapped with two metal straps. Straps shall surround the outside perimeter of the carton. The first strap shall be located approximately 2 in. from the bottom of the carton and the second strap shall be placed approximately in the middle of the carton. All cartons shall be shrink wrapped for protection from moisture. Cartons shall be lined with a minimum 4 mil polyester bag and meet Interstate Commerce Commission requirements. Cartons shall be approximately 38 x 38 in., contain 2000 lb of glass beads and be supported on a wooden pallet with fiber straps.

The material shall be shipped to the job site in substantial containers and shall be plainly marked with the manufacturer's name and address, the name and color of the material, date of manufacture, and batch number.

o) Verification:

Prior to approval and use of the multi-polymer pavement marking materials, the manufacturer shall submit 1 – quart samples and/or a notarized certification of an independent laboratory, together with the results of all tests, stating these materials meet the requirements as set forth herein. The certification test report shall state the lot tested, manufacturer's name, brand name of the multi-polymer and date of manufacture. In addition, all multi-polymer components shall be pre-approved for use on the project under the following conditions:

- Documentation of acceptable performance as certified by a Department of Transportation of surface-applied field performance of 100,000 ADT for 6 consecutive years to the standards of this specification.
- Any changes in formulation, physical or chemical properties of the approved multi-polymer resin needed to be explained in writing and submit to the Illinois Tollway within 30 days for reevaluation and approval process. The documentation shall include the Material Safety Data Sheets (MSDS).

Equipment. Application crew and equipment for the placement of reflectorized pavement marking shall be approved by the Pavement Marking Material Manufacturer to perform such operations.

In general, the applying equipment shall be mobile, truck mounted and self contained pavement marking machine, specifically designed to apply resin materials and reflective glass spheres in continuous and skip line patterns. The applying equipment shall be maneuverable to the extent that straight lines can be followed and normal curves can be made in a true arc. In

addition, the truck mounted unit shall be provided with accessories to allow for the marking of legends, symbols, crosswalks and other special patterns.

The mobile applicator shall include the following features:

1. The mobile applicator shall provide individual material reservoirs, or space, for the storage of Component A and Component B of the resin composition.
2. The applicator shall be equipped with heating equipment of sufficient capacity to maintain the individual resin components at the manufacturer's recommended temperature and produce the required amount of heat at the mixing head & gun tip and maintain those temperatures with the tolerances recommended by the resin manufacturer for spray application.
3. The applicator shall be equipped with adequate individual tanks for the storage and dispensing of Size I and Size II glass spheres and black aggregate.
4. The applicator shall be equipped with individual dispensers for the simultaneous application of Type A and Type B glass beads respectively. Each dispenser shall be capable of applying beads at a minimum rate of 20 pounds per gallon of the resin composition. The applied combined total of both types of beads should be a maximum of 25 lbs./gal. (12 to 13 lbs. of each type).
5. The applicator shall be equipped with individual metering devices or pressure gauges, on the proportioning pumps (one indicator per pump) as well as stroke counters to monitor gallon usage. All such devices shall be visible to the Engineer.
6. The applicator shall be equipped with all the necessary spray equipment, mixers, compressors and other appurtenances to allow for the placement of reflectorized pavement marking system in a simultaneous sequence of operations.
7. Each application equipment must have a proven mixing system for proper mixing of the two components.
8. Each mobile applicator must be equipped with a completely enclosed flush and purge system to clean the lines and the guns without exuding any of the solution into the environment.

The Contractor shall provide an accurate temperature-measuring device(s) that shall be capable of measuring the pavement temperature prior to application of the material, the material temperature at the gun tip and the material temperature prior to mixing.

INSTALLATION REQUIREMENTS

A. Surface Preparation:

Clean the surface by a method approved by the Engineer to remove all dirt, grease, debris, glaze, laitance and any other contaminants that may hinder the adhesion of the system to the surface with minimum or no damage to the pavement surface. New Portland cement concrete pavements shall be water, shot or sand blasted clean to remove all laitance. New pavements shall be grooved where required by design in accordance with the special provision for grooving for recessed pavement markings followed by blast cleaning. Whenever grinding/grooving, scarifying, sandblasting, shot blasting or other operations are performed, the debris generated must be contained through vacuum type equipment or equivalent and the work shall be conducted in such a manner that the finished pavement surface is not damaged or left in a pattern that will mislead or misdirect the motorist.

When these operations are completed the pavement surface shall first be power broomed and then blown off with compressed air to remove residue and debris resulting from the cleaning work. All such debris must be properly contained especially when removing yellow paint lines and disposed of in the appropriate manner.

Removal and cleaning work shall be a continuous moving operation and conducted in such a manner as to control and minimize airborne dust, and similar debris so as to prevent a hazard to motor vehicle operation or nuisance to property.

Care shall be taken on bituminous and portland cement concrete surface when performing removal and cleaning work to prevent damage or transverse and longitudinal joint sealers.

B. Limits of Work:

Cleaning and surface preparation work shall be confined to the surface area specified for the application of pavement marking materials; or the surface area of existing pavement markings that are specified for removal on the plans, or as directed by the Engineer.

Surface preparation work includes cleaning for lines or cleaning for letters and symbols. Lines will be meant to include: Solid lines, broken lines, dotted lines, channelizing lines, barrier lines, stop lines, crosswalk lines and crossbars.

When lines are cleaned, the area of preparation will be the width of the new pavement marking, or existing line, plus one (1) inch on each side. When letters and symbols are cleaned the area of preparation will be sufficiently large to accommodate the new marking, or to remove the existing marking. Markings shall be applied to the cleaned surfaces on the same calendar day. If this cannot be accomplished, the surface shall be re-cleaned prior to applying the markings. No new marking, line or symbols shall be applied on any pavement that has not been properly prepared as per this specification and until the Engineer approves the cleaning.

C. Removal of Concrete Curing Compounds:

On new portland cement concrete pavements, cleaning operations shall not begin until a minimum of 10 days after the placement of concrete. The extent of the blasting work and/or grooving shall be to clean and prepare the concrete surface such that:

- a. There is not visible evidence of curing compound on the peaks of the textured concrete surface.
- b. There are no heavy puddled deposits of curing compound in the valleys of the textured concrete surface.
- c. All remaining curing compound is intact; all loose and flaking material is removed.
- d. The peaks of the textured pavement surface are rounded in profile and free of sharp edges and irregularities.
- e. The extent of the removal should be as such to insure the laitance is removed on both old as well as new concrete.

D. Removal of Existing Pavement Markings:

Existing pavement marking shall be cleaned for the purpose of:

- a. Preparing the pavement surface for the application of a new multi-polymer pavement marking in the same location as the existing markings of a different type.
- b. To remove existing markings that are in good condition which, if allowed to remain, will interfere with or otherwise conflict with newly applied marking patterns.

It shall be understood that in this context cleaning means the removal of an existing marking. It is not intended that all deteriorated existing pavement markings be removed. Example: If a new marking is applied to an unmarked "gap" in a broken line and the existing broken line pattern is worn or deteriorated, as determined by the Engineer, to the extent that it is not misleading or confusing to the motorist, the existing markings do not require removal.

Existing pavement markings that are to be totally replaced with a multi-polymer marking shall be cleaned to the extent that 95% to 100% of the existing marking is removed. Removal operations shall be conducted in such a manner that no more than moderate color and/or surface texture change results on the surrounding pavement surface.

The determination of acceptable removal will be made by judgment of the Engineer.

- c. Existing multi-polymer pavement markings to be recapped shall be cleaned via approved light grinding or blasting operations to the extent that all loose/flaky marking materials are removed as well as oil, dirt, etc. that may contaminate the application of the new marking material. A complete removal of the existing multi-polymer pavement markings is not necessary provided that it has been

established to the Engineers' satisfaction that the existing markings are well bonded to the substrate and will not compromise the new markings. Recapping of existing markings will be limited to application over only long-life markings (TMPTA or other multifunctional monomer free systems) after verification with manufacturer and limited to one recapping event. A minimum of 20 mil of the liquid multi-polymer material is required for recapping before application of the glass beads.

E. Remove excess oils on asphalt pavements:

Removal of excess oils on SBR Latex, SBS, and SMA polymer/GTR modified asphalts shall require the following procedure (for any other type of polymer modified asphalts contact the pavement marking manufacturer for recommendations):

Remove excess oils exposing the top of the aggregates using approved light grinding or blast cleaning operations. Care shall be taken when performing this work to prevent gouging of the pavement and damage to the transverse and longitudinal joints.

F. Application:

The pavement marking system shall be applied through special machinery designed to precisely meter the two components in the ratio of proportion recommended by the material manufacturer. This equipment shall also comply with the previous specifications. The application of and combination of reflective media (glass beads and/or reflective elements) shall be applied at a rate specified by the manufacturer.

The edge of the center line or lane line shall be offset a minimum distance of 2 in. (50 mm) from a longitudinal crack or joint. Edge lines shall be approximately 2 in. (50 mm) from the edge of pavement. The finished center and lane lines shall be straight, with lateral deviation of any 10 ft. line not to exceed 1 in..

G. Atmospheric Conditions:

The pavement marking shall only be applied during conditions of dry weather and on subsequently dry pavement surfaces at the specified minimum uniform wet thickness according to the manufacturer's installation instructions. At the time of installation, the pavement surface temperature and the ambient temperature shall be above 45°F. For application at temperatures below 50°F, the hybridized polymer manufacturer shall be contacted for guidance. The Engineer shall determine the atmospheric conditions and pavement surface conditions that produce satisfactory results.

H. Application Temperatures:

Both components shall be brought to the temperature condition recommended by the manufacturer prior to mixing and spraying.

At any time throughout the duration of the project, the Contractor shall provide free access to his/her applying equipment for inspection by the Engineer, his/her authorized representative, or the materials representative.

Notification. The Contractor shall notify the Engineer 72 hours prior to the placement of the

markings in order that he/she can be present during the operation. At the time of notification, the Contractor shall provide the Engineer the manufacturer and lot numbers of multi-polymer material and reflective media that will be used.

Inspection. The multi-polymer pavement markings will be inspected following installation according to Article 780.10 of the Standard Specifications, except, no later than October 15, and inspected following a winter performance period that extends 180 days from November 1. Any request for exception to the date of October 15 for final installation shall be submitted for approval to both the pavement marking manufacturer and the Engineer.

Packaging and Shipment. The pavement marking materials shall be shipped to the jobsite in strong substantial containers. Individual containers shall be plainly marked with the following information:

- a. Name of Product
- b. Lot Number
- c. Batch Number
- d. Date of Manufacture
- e. Quantity
- f. Mixing proportions
- g. Safety information
- h. Manufacturer's Name and Address

Reflective media shall be shipped in moisture resistant bags. Each bag shall be marked with name and address of the manufacture and the name and net weight of the material with a clear indication of what type of coating is present on the beads.

Sampling and Acceptance.

- A. Certification of Compliance:
The material manufacturer shall furnish a notarized certification that the material complies with the provisions of this specification. It shall not be inferred that the provisions of a certification of compliance waives Illinois Tollway inspection, sampling or testing.
- B. Laboratory Samples: Promptly after execution of the contract, the contractor shall notify the Engineer of the sources of material he/she expects to use. The material manufacturer shall furnish samples of the hybridized polymer materials as may be required by the Engineer, a minimum of ten days before the date of intended use of these materials.
- C. Infrared Spectra: A copy of the infrared spectra of each component on each lot number shall be supplied by the manufacturer along with the certification papers. This infrared spectra will be on record with the Illinois Tollway to serve as a quality control measure for the future supply of this system to the Illinois Tollway.

Qualification.

A. Qualifying a Manufacturer:

The Manufacturer must have expertise providing a pavement marking material that meets this specification with a documented performance history to include:

- a. Verifiable installations: proof of successful installations of at least 6 years old covering a minimum of 200,000 feet in 4 states in North America inclusive of climates having high UV exposure and high snow fall/plowing (seasonal snow fall >36 inches). Documentation of installations of similar climatic and traffic conditions shall be provided to the Illinois Tollway for material approval.
- b. The manufacturer will have demonstrated field performance in the locale of proposed application for a minimum of 12 months.
- c. Production facilities; 2 geographically separate locations minimum
- d. Compliance with EPA regulations
- e. A Verifiable ISO 9001 certified Q.C. Program

B. Qualifying a Contractor:

Multi-polymer pavement markings shall only be applied by Contractors on the IDOT list of Approved Contractors maintained by the Engineer of Operations and in effect on the date of advertisement for bids.

In order for an installer of such pavement marking material to be approved, the following document must be submitted:

- a. A certificate from a pre-approved manufacturer of such pavement marking materials, certifying that such a contractor has functional, appropriate equipment to install the pavement marking material of choice. The certification must be submitted to the Illinois Tollway for review and approval prior to the installation of the pavement marking.

Performance and Warranty Requirements.

After one year from the date of installation, the pavement markings shall provide effective delineation, presence, and retroreflectivity as noted below. During this period, the Engineer will make such observations as necessary to determine conformance with these performance requirements.

- A. The pavement markings shall meet the following Minimum Retroreflectivity Requirements:

| Performance Retroreflectivity Criteria mcd/m ² /lux | |
|---|--------|
| White | Yellow |
| 400 | 350 |

Retroreflectivity requirements shall be the average retroreflectance, over a 0.1 mile section. Any 0.1 mile section that does not meet this requirement shall be replaced within 30 days, weather permitting.

- B. The pavement markings shall meet or exceed 95% present and intact. Evaluation of presence and intact shall be made on 25' sections and averaged for 0.1 mile sections. Any 0.1 mile section that does not meet this requirement shall be replaced within 30 days, weather permitting.

Method of Measurement. Lines will be measured for payment in place, in feet of multi-polymer pavement marking lines applied and accepted, measured in place.

Measurement of the multi-polymer letters, numbers, and symbols conforming to the sizes and dimensions specified will be the total area in square feet (square meter) calculated from the following unit areas

| LETTERS SQ. FT. (SQ. M.) | | | | | | | | | |
|-------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| SIZE | A | B | C | D | E | F | G | H | I |
| 6 ft (1.8 m) | 3.1 (.28) | 4.0 (.37) | 2.7 (.25) | 3.4 (.31) | 3.3 (.31) | 2.6 (.24) | 3.3 (.31) | 3.4 (.31) | 1.5 (.14) |
| 8 ft (2.4 m) | 5.5 (.51) | 7.1 (.66) | 4.8 (.45) | 6.1 (.57) | 5.9 (.55) | 4.7 (.44) | 5.8 (.54) | 6.0 (.56) | 2.6 (.24) |
| SIZE | J | K | L | M | N | O | P | Q | R |
| 6 ft (1.8 m) | 2.1 (.20) | 3.1 (.28) | 2.2 (.20) | 4.2 (.39) | 4.0 (.37) | 3.4 (.31) | 3.0 (.28) | 3.6 (.33) | 3.6 (.33) |
| 8 ft (2.4 m) | 3.7 (.34) | 5.7 (.53) | 3.8 (.45) | 7.4 (.69) | 7.1 (.65) | 6.0 (.56) | 5.3 (.49) | 6.3 (.59) | 6.3 (.59) |
| SIZE | S | T | U | V | W | X | Y | Z | |
| 6 ft (1.8 m) | 3.2 (.30) | 2.2 (.20) | 3.2 (.30) | 2.7 (.25) | 4.2 (.39) | 2.7 (.25) | 2.2 (.20) | 2.9 (.26) | |
| 8 ft (2.4 m) | 5.7 (.53) | 3.8 (.35) | 5.6 (.52) | 4.8 (.45) | 7.3 (.68) | 4.8 (.45) | 3.9 (.36) | 5.1 (.47) | |

| NUMBERS SQ. FT. (SQ. M.) | | | | | |
|-------------------------------|---------------|---------------|---------------|---------------|---------------|
| SIZE | 1 | 2 | 3 | 4 | 5 |
| 6 ft (1.8 m) | 1.5 (0.14) | 3.3 (0.31) | 3.3 (0.31) | 2.9 (0.26) | 3.5 (0.33) |
| 8 ft (2.4 m) | 2.6 (0.24) | 5.8 (0.54) | 5.8 (0.54) | 5.1 (0.47) | 6.1 (0.57) |
| SIZE | 6 | 7 | 8 | 9 | 0 |
| 6 ft (1.8 m) | 3.5 (0.33) | 2.2 (0.20) | 3.8 (0.35) | 3.5 (0.33) | 3.4 (0.31) |
| 8 ft (2.4 m) | 6.2 (0.58) | 3.8 (0.35) | 6.7 (0.62) | 6.1 (0.58) | 6.0 (0.56) |

| SYMBOLS SQ. FT. (SQ. M.) | LARGE SIZE | SMALL SIZE |
|---|-------------|-------------|
| Through Arrow | 11.5 (1.07) | 6.5 (0.60) |
| Left or Right Arrow | 15.6 (1.47) | 8.8 (0.82) |
| Combination Left or Right and Through Arrow | 26.0 (2.42) | 14.7 (1.37) |
| Railroad "X" 20 feet (6.1 m) | 54.0 (5.02) | -- |

Basis of Payment. Payment for this work will be made at the contract unit price per foot of applied line width for MULTI-POLYMER PAVEMENT MARKING – LINE, and per square foot for MULTI-POLYMER PAVEMENT MARKING, LETTERS AND SYMBOLS.

| Pay Item Number | Designation | Unit of Measure |
|-----------------|--|-----------------|
| JT780300 | MULTI-POLYMER PAVEMENT MARKING – LINE 4” | FOOT |
| JT780305 | MULTI-POLYMER PAVEMENT MARKING – LINE 5” | FOOT |
| JT780320 | MULTI-POLYMER PAVEMENT MARKING – LINE 10” | FOOT |
| JT780355 | MULTI-POLYMER PAVEMENT MARKING – SYMBOLS (LARGE) | SQ FT |

GROOVING FOR RECESSED PAVEMENT MARKING (Illinois Tollway)

Effective: May 18, 2006

Revised: April 1, 2016

Description. This work shall consist of initial grooving of the existing pavements in preparation to furnishing and applying recessed pavement marking lines.

Equipment. The grooving equipment shall be equipped with a free-floating cutting or grinding head to provide a consistent groove depth over irregular pavement surfaces. The grinding or cutting head shall be equipped with diamond saw blades, steel star cutters and/or carbide tipped star cutters. A grinder head configuration shall be used on bituminous asphalt surfaces to achieve a rough surface texture in the bottom of the groove. Diamond saw blades shall be used on the cutting head when a smooth surface in the bottom of the groove is specified by the Engineer or specifications.

CONSTRUCTION REQUIREMENTS

- a) Pavement Grooving Methods. Using the specified grooving equipment, the grooves for recessed pavement markings shall be constructed using the following methods:
 - 1) Wet Saw Blade Operation. When water is required or used to cool the saw blades, such as during a continuous edge line grooving operation, the groove shall be flushed with high pressure water immediately following the cut to avoid build up and hardening of slurry in the groove. The pavement surface shall be allowed to dry for 24 hours prior to the application of the pavement markings following a wet saw blade operation.
 - 2) Dry Saw Blade Operation. If the grooving is done with dry saw blades, the groove shall be flushed with high-pressure air to remove debris and dust generated during the cutting operation.
- b) Pavement Grooving. Grooves shall be cut into the pavement prior to the application of the lane and edge pavement marking. The grooves shall be cut such that the width is 1 inch wider than that of the line to be placed. The position of the edge of the grooves shall be a minimum of 2 in. from the edge of concrete joints or asphalt paving seams along edge or centerlines. The depth of the groove shall be 50 mils, plus/minus 5 mils

On new bituminous concrete surfaces the Engineer shall determine if the new asphalt has achieved the necessary strength and hardness to support grooving prior to the start of a grooving operation. Some asphalt mixes may require 14 or more days to achieve adequate hardness to support a grooving operation. On existing bituminous concrete surfaces some existing asphalt pavements may not be strong enough to support a grooving operation. For all existing asphalt pavements the Engineer shall determine if the existing asphalt has the necessary strength and hardness to support grooving prior to the start of a grooving operation.

All waste materials resulting from grooving operations shall be disposed of in accordance with Article 202.03 of the Standard Specifications.

- c) Cleaning. When water has been used to cool the saw blades during the grooving operation, the Contractor shall allow 24 hours for the pavement to dry prior to the

application of the markings. Immediately prior to the application of the pavement markings the groove shall be cleaned with high-pressure air blast.

Method of Measurement. This work will be measured for payment in place, in feet of the pavement marking lines applied and accepted, for the groove width specified.

Basis of Payment. This work will be paid at the contract unit price per foot for GROOVING FOR RECESSED PAVEMENT MARKING LINES of the groove width specified.

| Pay Item Number | Designation | Unit of Measure |
|-----------------|---|-----------------|
| JT780JB1 | GROOVING FOR RECESSED PAVEMENT MARKING LINES, 6" GROOVE | FOOT |

PAVEMENT MARKING AND MARKER REMOVAL (Illinois Tollway)

Effective: September 27, 2006

Revised: November 11, 2015

This work shall consist of removing existing pavement markings and raised pavement lane markers according to Section 783 of the Standard Specifications except as modified herein.

Revise Article 783.02 of the Standard Specifications to read:

“783.02 Equipment. Equipment shall be according to the requirements of the following Articles of Section 1100 of the IDOT Standard Specifications – Equipment.

| Item | Article/Section |
|---|-----------------|
| (a) Portable Shot Blast Equipment | 1101.13 |
| (b) Grinders (note 1) | |

Water Blaster with Vacuum Recovery. The water blaster shall remove the stripe from the pavement using a high pressurized water spray with a vacuum recovery system to provide a clean, almost dry surface, without the use of a secondary cleanup process. The removal shall be to the satisfaction of the Engineer. The equipment shall contain a storage system that allows for the storage of the wastewater while retaining the debris. The operator shall be in immediate control of the blast head. Water blasting shall be used only when the air temperature is a minimum of 32 °F and rising.

Note 1. Grinding and Water Blasting equipment shall be approved by the Engineer.”

Revise the first paragraph of Article 783.03(a) to read:

“(a) Pavement Markings. The existing pavement markings on permanent pavements shall be removed from the pavement by a method that does not materially damage the surface or texture of the pavement or surfacing. Very small particles of tightly adhering existing markings may remain in place, if in the opinion of the Engineer, complete removal of the small particles will result in pavement surface damage. Any damage to the pavement or surfacing caused by pavement marking removal shall be repaired by the Contractor at his/her own expense by methods acceptable to the Engineer. Where blast cleaning is used for the removal of pavement markings, care should be taken to protect all vehicular traffic from damage. Removal by Hydro blasting shall be required on new permanent pavement. Removal by shot blasting or grinding shall be allowed only on temporary short life pavements or on existing permanent pavements as approved by the Engineer.”

Revise Article 783.06 to read:

783.06 Basis of Payment. This work will be paid for at the contract unit price per square foot for WATERBLAST PAVEMENT MARKING REMOVAL WITH VACUUM RECOVERY.

| Pay Item Number | Designation | Unit of Measure |
|--------------------|---|--------------------|
| JT783005 | WATERBLAST PAVEMENT MARKING REMOVAL WITH VACUUM RECOVERY | SQ FT |

UNDERGROUND CONDUIT, COILABLE NON-METALLIC CONDUIT, SDR 11

Description: This work shall consist of furnishing and installing coilable non-metallic conduit, fittings, and accessories, as part of a raceway bored, plowed, or trenched, and pulled in place.

Material: The conduit shall be a solid-wall high density polyethylene (HDPE) duct intended for underground use and can be manufactured and coiled or reeled in continuous transportable lengths and uncoiled for further processing and/or installation without adversely affecting its properties or performance.

The conduit shall meet the requirements of the following standards:

- American Society for Testing and Materials (ASTM) D 3350, minimum cell class of PE334480 C or E in conformance with Standards D3350 and F2160 of the American Society for Testing and Materials (ASTM).
- National Electrical Manufacturers Association (NEMA) Standard TC 7 (2013) for Smooth Wall Coilable Electrical Polyethylene Conduit

The coilable non-metallic SDR-11 conduit properties shall conform to the nominal dimensions shown in the table below:

| Nom. Duct Diameter (in) | Nom. Outside Diameter (in) | Nom. Inside Diameter (in) | Min. Wall Thickness (in) |
|-------------------------|----------------------------|---------------------------|--------------------------|
| 1 | 1.315 | 1.055 | 0.120 |
| 1 ¼ | 1.660 | 1.338 | 0.151 |
| 1 ½ | 1.900 | 1.533 | 0.173 |
| 2 | 2.375 | 1.917 | 0.216 |
| 2 ½ | 2.875 | 2.322 | 0.261 |
| 3 | 3.500 | 2.825 | 0.318 |
| 4 | 4.500 | 3.633 | 0.409 |
| 6 | 6.625 | 5.348 | 0.602 |
| 8 | 8.625 | 6.693 | 0.784 |

CONSTRUCTION REQUIREMENTS

The Contractor shall closely coordinate the work prescribed under this special provision with the Engineer. This includes, but is not limited to, the following:

Pre-Procurement Documentation Approval

The Contractor shall obtain approval of the conduit installation schedule and catalog cut sheets from the Engineer prior to purchasing, and subsequently performing the installation per the approved documents, contract plans, and specifications.

The Contractor shall make all submissions to the Engineer through the Illinois Tollway Web Based Program Management (WBPM) system.

Conduit Installation

- The conduit shall be installed in continuous lengths without splicing. Conduit bends shall be made manually to prevent conduit damage or possible reduction to the inside diameter of the conduit.
- All underground raceways shall have a minimum depth of 33 inches below finished grade unless otherwise indicated on the contract plans. All raceways installed beneath pavement shall have a minimum depth of 45 inches below the top of pavement to avoid conflicts with the underdrain system unless otherwise indicated on the plans or directed by the Engineer.
- Coilable non-metallic conduit larger than 3 inches shall be machine straightened to remove the longitudinal curvature and ovality caused by coiling the conduit onto reels. The conduit straightening process shall not deform the cross-section of the conduit.
- Plowing: Plowing shall be done with equipment capable of feeding the conduit through the plow. Equipment which pulls the conduit behind a bullet-nose plow will not be allowed except by written approval of the Engineer. The plow shall be capable of plowing a cavity and placing the conduit to the specified depth in a single operation without kinking or otherwise damaging the conduit. The conduit shall be round and free of kinks when fed into the plow and placed in the ground. Pulling of the conduit within the plowed cavity will not be allowed.

Where another circuit is plowed in parallel to the first, the distance between the two shall not be less than 1 foot nor more than 2 feet.

- Boring and Pulling: Conduit shall be installed with the use of an auger. Conduit in the subgrade of the proposed improvement shall extend a minimum of 2 feet beyond the edge of proposed pavement, stabilized shoulder, or paved median.

Areas disturbed by the augering operation shall be restored to their original condition as directed by the Engineer.

- Performance Tests: Conduit test procedures and test results shall meet the requirements of NEMA Standard No. TC 7 and ASTM F2160 Sections 4 and 5. Certified copies of the test report shall be submitted to the Engineer prior to the installation of the conduit.
- The conduit shall be cleaned by rodding and swabbing to remove all dirt and other foreign materials and capped until conductors are installed.
- For all empty conduit installed under this contract and designated for future use or cable installation by others, the Contractor shall proof the conduit system with a mandrel, as per the Table below, to remove any obstruction or debris. The Contractor shall perform the conduit proofing in the presence of the Engineer. The Contractor shall apply a pressure of 100 – 110 psi to the conduit, close the air output valve and stop compressor, and measure air pressure loss. The maximum allowable air pressure loss within 2 minutes of

pressurization is 20 psi. The Contractor shall record results on the Conduit Test form attached to this special provision. The form is signed by the Engineer and submitted via the WBPM system. Conduit proofing and pressure testing requirements noted herein are not applicable to conduit sections which are proposed to be installed as conduit sleeves, as noted in the plans.

| Conduit Size (in) | Mandrel Diameter (in) | Minimum Mandrel Length (in) | Maximum Mandrel Length (in) | Proof (%) |
|-------------------|-----------------------|-----------------------------|-----------------------------|-----------|
| 1 | 0.60 | 1.0 | 4 | 80 |
| 1 ¼ | 0.86 | 1.5 | 4 | 80 |
| 1 ½ | 1.12 | 1.8 | 4 | 80 |
| 2 | 1.62 | 2.4 | 6 | 80 |
| 3 | 2.5 | 3.25 | 8 | 80 |
| 4 | 3.5 | 4.25 | 8 | 85 |
| 6 | 5.5 | 6.25 | 10 | 85 |
| 8 | 7.5 | 8.25 | 12 | 85 |

- The Contractor shall install in all empty conduits, underground or above grade, a 5/8 inch woven polyester toneable pull tape with a minimum tensile strength of 1200 lbs-force. When multiple underground conduits are installed in the same trench, the toneable pull tape may be installed in only one conduit designated last for cable installation. A non-toneable pull tape with a minimum tensile strength of 1200 lbs-force shall be installed in all remaining conduits. All pull tapes shall have six (6) feet of extra slack extending from each end of the conduit, and shall be secured before the conduit ends are plugged.
- Underground cable marking tape shall be installed in accordance with Article 810.04 (a) of the Standard Specifications.

Method of Measurement: This work will be measured for payment in feet installed and accepted.

Basis of Payment: This work will be paid for at the contract unit price per foot for UNDERGROUND CONDUIT, COILABLE NONMETALLIC CONDUIT, SDR 11 of the size specified.

| Pay Item Number | Designation | Unit of Measure |
|-----------------|--|-----------------|
| JT810873 | UNDERGROUND CONDUIT, COILABLE NONMETALLIC CONDUIT, SDR 11, 1 1/4" DIA. | FOOT |
| JT810876 | UNDERGROUND CONDUIT, COILABLE NONMETALLIC CONDUIT, SDR 11, 2" DIA. | FOOT |

Conduit Testing Form

Date: _____ Route: _____ Direction: _____

Starting Station: _____ Ending Station: _____

Starting Mile Post: _____ Ending Mile Post: _____

| Conduit # | Conduit Color Marking (Color/Stripe) | Conduit Size (In.) | Cleaned (Rodded and Swabbed) (Check Mark) | Pressure Test Starting Pressure (PSI) | Pressure Test End Pressure (PSI) (2 Mins) | Pull Tape Installed (Check Mark) | Capped (Check Mark) |
|-----------|---|-----------------------|--|--|--|-------------------------------------|------------------------|
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| 30 | | | | | | | |

Contractor: _____

Engineer: _____

ITS ELEMENT POLE FOUNDATION STEEL HELIX (ILLINOIS TOLLWAY)

Effective: December 16, 2013

Revised: April 1, 2016

DESCRIPTION

This work shall consist of furnishing and installing a helix foundation for an ITS element pole assembly, as indicated on the Plans or directed by the Engineer.

MATERIALS

The metal foundation shall comply with Article 1070.01 of the Standard Specifications for light pole foundation, metal as modified by Section 1070 of the Illinois Tollway Supplemental Specifications.

INSTALLATION

Foundations shall be installed at the locations shown on the Plans, or as directed by the Engineer.

The steel helix foundation shall be installed in accordance with the manufacturer's recommended procedures. The installation shall be accomplished by either a boom type or a bed mounted type digger truck. The maximum torque limit of 13,000 ft-lb should not be exceeded since the possible damage to the foundation could occur.

Local soils conditions shall be verified by the Contractor prior to installation of the metal helix foundation. In the case of extremely difficult soils that cause the mechanical limit of the foundation to be exceeded, the helix foundation may be installed at the discretion of the Engineer in one of two methods. Predrilling a hold that is less than the shaft diameter of the foundation or using water as a lubricant. When foundation is installed by either method, minimum torque requirements of 5,000 ft-lb are to be followed. The installation torque may be measured by torque measuring devices currently available or by calibrating the hydraulic system of the installing equipment. As an alternative for foundation installation in extremely difficult soils, a concrete foundation may be used. The Contractor shall submit for approval his structural calculations for installation of a concrete foundation for the pole mounted ITS Element assembly.

METHOD OF MEASUREMENT

This work will be measured for payment in units of each.

BASIS OF PAYMENT

This work will be paid for at the contract unit price per each for ITS ELEMENT POLE FOUNDATION STEEL HELIX, of the specified length.

| Pay Item Number | Designation | Unit of Measure |
|--------------------|--|--------------------|
| JT836018 | ITS ELEMENT POLE FOUNDATION STEEL HELIX (10 FT) | EACH |

ITS CONCRETE SERVICE PAD

DESCRIPTION

This work shall consist of furnishing and installing a precast or cast-in-place concrete service pad at ITS pole locations of the type as shown in the Plans. Service pads shall be installed at locations as follows:

1. Type A pads shall be installed at locations with a slope of 1V:6H or less.

MATERIALS

Concrete service pad materials shall be according to the following Section and Articles of the Standard Specifications:

| <u>Item</u> | <u>Section/Article</u> |
|---|------------------------|
| (a) Portland Cement Concrete (Class SI) | 1020 |
| (b) Coarse Aggregates | 1004.01 |
| (c) Reinforcement Bars | 1006.10 |
| (d) Anchor Bolts/Rods | 1006.09 |
| (e) Structural Steel | 1006.04 |

INSTALLATION

Concrete service pads shall be installed at the locations shown on the Plans, or as directed by the Engineer. Excavation and backfill required will not be measured separately for payment. The subgrade for the concrete service pad shall be prepared in accordance with Article 424.04 of the Standard Specifications. Aggregate base shall be compacted to the satisfaction of the Engineer prior to placing the concrete pad. Earth disturbed due to construction activities shall be restored to match existing conditions of the surrounding area and will not be measured separately for payment.

METHOD OF MEASUREMENT

This work will be measured for payment in units of each.

BASIS OF PAYMENT

This work will be paid for at the contract unit price per each for ITS CONCRETE SERVICE PAD, of the specified type.

| Pay Item Number | Designation | Unit of Measure |
|-----------------|----------------------------------|-----------------|
| JT836027 | ITS CONCRETE SERVICE PAD, TYPE A | EACH |

WATER TRANSMISSION MAIN PROTECTION – MWRDGC STOCKPILE B BORROW SITE

Description:

Illinois Tollway Contract I-13-4629 previously installed protection of the Northwest Suburban Municipal Joint Action Water Agency's (NSMJAWA) water transmission main and appurtenances (water main) within the MWRDGC Stockpile B Borrow Site, including placement of the double crane pipeline protection mat, construction fencing and signing. This work shall include compliance with all the construction requirements described below, maintenance of previously installed facilities, settlement monitoring and any occurrence of fines for non-compliance. Maintenance and settlement monitoring requirements for this Contract shall begin as indicated in the Special Provision for METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO STOCKPILE B BORROW SITE.

Construction Requirements. The Contractor shall maintain and protect the previously installed construction fencing until completion of the contract, including immediate replacement of any damaged sections of the fence.

Upon completion of this contract all water main protection fencing shall remain in place.

No construction equipment or vehicles shall be allowed in this area except as indicated herein.

Storage of Materials

The Contractor shall not store materials within 15 feet of the water main.

Minimum Pipe Cover Depth

The Contractor shall maintain a minimum 3-foot cover depth over the entire length of the existing water main, measured from ground surface to top of water main. Under no circumstance will this cover depth be reduced to less than 3 feet.

Construction Access Points That Cross NSMJAWA Water Mains

- General: The Contractor shall ensure that all conditions for the previously installed crossing location comply with the requirements of this Special Provision. All water main crossing locations will be subject to approval by the Engineer, based on documentation submitted by the Contractor with a minimum of 24 hours advance notice. All crossings shall be perpendicular to the water main.
- Crossings Where Soil Cover Depths Is Less Than 4 Feet: No vehicles or equipment will be allowed to cross the water main in locations where there is less than 4 feet of soil cover depth over the pipe.
- Crossings Where Soil Cover Depth Is Greater Than 4 Feet But Does Not Exceed 8 Feet:
 - Double Crane Mat: Vehicles and equipment with a maximum loaded weight of up to 75,000 pounds shall utilize a double crane mat crossing as shown in the "Crossing Layout Plan for Double Crane Mat" detail provided in the plans. This includes all wheeled and tracked vehicles and equipment.

Vehicles and equipment with a loaded weight in excess of 75,000 pounds will be allowed to utilize a double crane mat crossing if the following criteria is met:

- Tracked Vehicles/Equipment: Divide the maximum loaded weight of the vehicle/equipment (in pounds) by the product of the length of track on ground (in feet) times the width of tracks (from outside edge of left track to outside edge of right track, measured in feet). If this number does not exceed 1,040 pounds per square foot the vehicle/equipment is acceptable to use a double crane mat crossing.
 - Wheeled Vehicles/Equipment with Two Axles: Divide the maximum loaded weight of the vehicle/equipment (in pounds) by the product of the wheelbase (from center to center of axles measured in feet) plus 0.83 times the width of wheels (from outside of left tire to outside of right tire, measured in feet). If this number does not exceed 1,040 pounds per square foot the vehicle/equipment is acceptable to use a double crane mat crossing.
 - Wheeled Vehicles/Equipment with Three Axles: This applies to vehicles/equipment with two rear axles having a spacing less than 7 feet. Divide the maximum loaded weight on the two rear axles (in pounds) by the product of the wheelbase (from center to center of axles measured in feet) plus 0.83 times the width of wheels (from outside of left tire to outside of right tire, measured in feet). If this number does not exceed 1,460 pounds per square foot the vehicle/equipment is acceptable to use a double crane mat crossing.
- Crossing Documentation to be Submitted for Review and Approval: Prior to the start of construction the Contractor shall submit a Quality Plan for review and approval by the Engineer that provides the following information:
 - Location of proposed water main crossing, including the previously installed crossing type (double mat)
 - A list of all vehicles proposed to utilize each type of crossing, including an equipment cut sheet for each vehicle that identifies the vehicle manufacturer, weight (unloaded and maximum loaded), and maximum wheel, tire or track loading
 - Detailed plan for compliance with the requirements of this specification, including traffic control and enforcement at crossings.
- Required Signage for Water Main Crossings: The Contractor shall maintain previously installed signage on both sides of each water main crossing that identifies the manufacturer and model for each individual type of vehicle and/or piece of equipment that has been approved by the Engineer to utilize the crossing. It shall be the Contractor's responsibility to ensure strict enforcement of the vehicle and equipment limits for each water main crossing.

The Contractor shall maintain two signs on each approach to the water main crossing that identifies the type of crossing. Crossing type is:

- Double Mat

The Contractor shall provide documentation in each vehicle stating which crossing type an individual vehicle is permitted to use based on approval received from the Engineer. It shall be the Contractor's responsibility to ensure strict enforcement of the vehicle and equipment limits for each water main crossing.

Ground Rutting and Settlement

The Contractor shall maintain ground surface within the limits of the fenced area free from rutting or settlement to the greatest extent practicable.

Prior to using a crossing, the Contractor shall maintain the previously installed settlement platform. Settlement platforms shall be maintained by the Contractor in the required positions at all times while a crossing is open for use. All movement or disturbance of the settlement platform shall be immediately corrected by the Contractor by repairing or replacing them as directed by the Engineer.

Settlement readings shall be taken by the Contractor each day that the crossing is open for use. Any locations where settlement, or ground rutting, exceeds six inches above the water main shall be immediately repaired and restored by the Contractor to original conditions prior to further use of the water main crossing. Daily settlement readings shall be recorded in a report format approved by the Engineer and NSMJAWA.

The grade pipe and casing pipe shall remain in place upon the completion of this contract for use by another contract.

Construction Over Water Main

No construction equipment or vehicles are allowed to work, operate, idle or sit in the construction limits designated above without prior approval of the Engineer.

Non-Compliance

Any occurrence of non-compliance with this Water Transmission Main Protection Special Provision shall be subject to a fine of \$10,000 per occurrence, and the Contractor shall take immediate corrective action to rectify the non-compliance to the satisfaction of the Engineer.

Upon completion of the work under this contract, the crane mats and construction fencing shall remain in place for use by another contract.

Method of Measurement: This work will be measured for payment in calendar months for SETTLEMENT MONITORING.

Basis of Payment: This work will be paid for at the contract price per calendar month for SETTLEMENT MONITORING.

Maintenance of previously installed facilities, including haul roads, pipeline protection systems, erosion control systems, super silt fence and gates will be paid for under ALLOWANCE FOR HAUL ROAD MAINTENANCE.

| Pay Item Number | Designation | Unit of Measure |
|-----------------|-----------------------|-----------------|
| JT900088 | SETTLEMENT MONITORING | CAL MO |

WATER TRANSMISSION MAIN PROTECTION – DES PLAINES OASIS AREA

Description. This work shall consist of protecting the Northwest Suburban Municipal Joint Action Water Agency's (NSMJAWA) water transmission main and appurtenances (water main) located within the Des Plaines Oasis Area for the duration of the contract as described below.

Construction Requirements. NSMJAWA's existing water main will be field located and staked at 100-foot intervals by NSMJAWA. All water valves and hydrants will also be staked. Cathodic protection system anode beds will not be staked.

Prior to any work taking place, the Contractor shall furnish and install temporary construction fencing 15 feet north of the existing NSMJAWA water main centerline. The area south of the temporary construction fencing shall be considered the Water Main Protection Zone. The temporary fencing shall be plastic or wood lathe snow fencing and shall be a minimum of 4 feet high with stakes placed a maximum of 15 feet apart.

The Contractor shall maintain and protect the temporary construction fencing until substantial completion of the contract, including immediate replacement of any damaged sections of the fence. Upon substantial completion of the Contract, the Contractor shall remove all water main protection temporary construction fencing.

Work within the Water Main Protection Zone. Work within the Water Main Protection Zone is not required for this Contract. The Contractor shall not enter this area without written permission of the water main owner.

Storage of materials within the Water Main Protection Zone is prohibited without written permission of the water main owner.

Construction equipment and vehicles are not permitted to work, operate, idle or sit within the Water Main Protection Zone without written permission of the water main owner.

Excavations. Any excavation that occurs below the NSMJAWA water main and are within 1H:1V slope from the Water Main Protection Zone shall require the Contractor to provide a slope stability analysis of the area. Slope stability calculations shall be submitted to the water main owner. The Contractor shall install sheeting, shoring, bracing and other stability protection measures as needed to protect the water main. Stability protection calculations shall be submitted to the water main owner. All calculations shall be sealed by a Structural Engineer licensed in the State of Illinois.

Pile Driving. No piling shall be driven within 20 feet of the transmission main.

Method of Measurement. Water Transmission Main Protection will not be measured for payment.

TEMPORARY CONSTRUCTION FENCE will be measured for payment in feet in feet.

Basis of Payment. This work will be paid for at the contract unit price per foot for TEMPORARY CONSTRUCTION FENCE.

| Pay Item Number | Designation | Unit of Measure |
|--------------------|------------------------------|--------------------|
| JT900202 | TEMPORARY CONSTRUCTION FENCE | FOOT |

EMBANKMENT MODIFICATION (Illinois Tollway)
Effective: November 30, 2017

Description. This work shall consist of the chemical treatment of suitable but excessively moist embankment soils that require modification using a modifier (lime or fly ash).

Materials. Materials shall be according to the following Article/Section of the Standard Specifications:

| Item | Article/Section |
|---|-----------------|
| (a) Fly Ash | 1010.02 |
| (b) Hydrated Lime | 1012.01 |
| (c) By-Product, Non-Hydrated Lime | 1012.03 |
| (d) Water..... | 1002 |

Quicklime must meet the requirements of AASHTO M216.

Equipment. Equipment shall be in accordance with Article 302.03 of the Standard Specifications.

CONSTRUCTION REQUIREMENTS

General. The modified soil shall be constructed when the temperature of the soil, measured 6 inches below the surface is above 45 °F and ambient air temperature is above freezing and rising. The modifier will not be applied to or mixed with frozen soil. The quantity of modified embankment constructed or treated must be limited to that which can be covered with subbase, base or pavement within the same construction season unless otherwise permitted by the Engineer.

Testing and Mix Design. The Contractor shall be responsible for all testing required to determine the chemical modifier type and optimum chemical modifier content. The modifier selection, laboratory testing, and mix design shall be performed by a firm prequalified in Geotechnical Services by IDOT. Particle size analysis shall be performed on the untreated soil according to AASHTO T 88. The Standard Dry Density and the Optimum Moisture Content of the soil-modifier mixture shall be determined according to AASHTO T 99 (Method C).

Lime shall be used as a modifier only when the soil has a minimum clay content of 15 percent, determined according to AASHTO T 88; and has a maximum organic matter content of 10 percent, determined according to AASHTO T 194.

Test results and the geotechnical consultant’s recommendation for modifier type and content shall be submitted to the Engineer prior to use. The source or type of chemical modifier shall not be changed during the progress of the work without approval of the Engineer. A change in source or chemical type shall require a new mix design.

Application of Modifier. The modifier shall be applied uniformly as follows.

The surface of the grade shall be lightly scarified or disked prior to the distribution of the modifier. Such disking must break down any soil lumps so that at least 75% of the soil particles are less than one inch in any dimension. The modifier must then be distributed uniformly over

the surface. The Engineer may reject any application procedure which does not provide even distribution of the modifier.

The modifier must not be applied when wind conditions are such that blowing modifier becomes objectionable to adjacent property owners or creates a hazard to air traffic or to vehicular traffic on adjacent highways as determined by the Engineer.

The spreading of modifier must be limited to that amount which can be incorporated into the soil within the same working day.

The Contractor's Quality Control Plan shall include the methods to verify modifier application of the design amount (oven dry basis), treatment thickness, and required compaction.

Mixing. The modifier, soil and water (if necessary) must be thoroughly blended by rotary speed mixers or a disk harrow. The mixing must continue until it has been determined by the Engineer that a homogeneous layer of the required thickness has been obtained. The loose thickness of a single layer of modified soil must not exceed 8 inches if a disk harrow is used, or 14 inches if a rotary speed mixer is used.

Compaction. Compaction of soil modified with fly ash shall be completed no later than one hour after mixing begins.

Compaction of soil modified with hydrated lime or by-product non-hydrated lime shall be completed within the same day.

The modified soil shall be compacted to a minimum dry density, maximum moisture content, and stability in accordance with the Illinois Tollway special provision for Embankment. Aeration by means of further mixing, or the addition of water and further mixing, may be required by the Engineer to achieve the required compaction.

Method of Measurement. This work will be measured for payment as follows:

The processing work will be measured in embankment fill areas in cubic yards, complete in place.

Chemical modifiers will be measured for payment in tons. The modifier will be measured in trucks or freight cars. The Contractor shall furnish or arrange for use of scales of a type approved by the Engineer. When the modifier is shipped in trucks, it will be measured at the place of loading, at the place of unloading, or at such other place as the Engineer may designate. The Engineer may accept original signed freight bills in lieu of determining the weight.

Basis of Payment. This work will be paid for at the contract unit price per cubic yard for EMBANKMENT MODIFICATION.

FLY ASH and LIME will be paid for at the contract unit price per ton.

| Pay Item Number | Designation | Unit of Measure |
|--------------------|-------------------------|--------------------|
| 30201500 | LIME | TON |
| JT900521 | EMBANKMENT MODIFICATION | CU YD |

ASPHALT BINDER AND SURFACE COURSE MIXTURES (Illinois Tollway)

Effective: December 13, 2011

Revised: February 15, 2018

Description. This work shall consist of constructing either hot-mix asphalt (HMA) or warm mix asphalt (WMA) binder and/or surface course on a prepared base as required by contract design. When WMA pay items are required by design, an HMA mix may be utilized for special or low tonnage applications in lieu of WMA mixtures upon approval by the Engineer at no additional cost to the Illinois Tollway. When HMA pay items are required by design, a WMA mix may be utilized for special or low tonnage application in lieu of HMA mixtures upon approval by the Engineer at no additional cost to the Illinois Tollway. Work shall be according to Sections 406, 407, 1030 and 1032 of the Standard Specifications except as modified herein.

Materials. Article 406.02 of the Standard Specifications shall govern the requirements for materials except as modified herein and in the Illinois Tollway's special provision ASPHALT-TACK COAT.

Revise Article 1030.02(c) of the Standard Specifications to read:

"(c)RAP Material..... Illinois Tollway special provision for Reclaimed Asphalt Pavement"

Replace Article 1030.02(i) of the Standard Specifications with the following:

"(i)Warm Mix Additives / Processes. When a WMA is specified or permitted, the warm mix technology used shall be a recognized additive / process with successful project(s) constructed nationally or internationally that allow for a reduction in the temperature at which the HMA is produced and placed. Warm mix additives/processes that may be considered for Illinois Tollway approval and Contractor use include the following:

- (1) Organic Additives (requiring minor plant modifications)
- (2) Chemical Additives (requiring minor plant modifications)
- (3) Water Injection Foaming Processes (requiring major plant modifications)

The Illinois Tollway maintains an approved list of warm-mix asphalt technologies or processes.

For Binder or Surface mixtures containing more than 20 percent binder replacement, a chemical additive shall be used as the WMA technology.

The Contractor shall ensure that a Technical Representative from the approved warm mix asphalt additive or process manufacturer is present during the first day of production and placement of HMA produced with warm mix technology."

Add the following to Article 1030.02 of the Standard Specifications:

“(k)RAS Material..... Illinois Tollway special provision for Reclaimed Asphalt Shingles”

Revise note 2 or Article 1030.02 of the Standard Specifications to read as follows:

“Note 2. The Contractor shall use the asphalt binder grade as shown below:

N50 Binder

| Reclaimed Material | Binder Replacement % | Asphalt Binder Grade |
|---------------------------------------|-----------------------------|-----------------------------|
| RAS/RAP/FRAP | 0-20 | PG 64-22 |
| Category 1 or 2 FRAP only or with RAS | 21-40 | PG 58-28 |
| Category 1 or 2 FRAP with RAS | 41-60 ¹ | PG 52-34 ^{2,3} |

1/ DCT (ASTM D7313) value as tested both in design and 1st day of production after an approved Test Strip shall meet or exceed 400 J/m² when tested at -12 °C. DCT test to be performed by an AMRL certified Laboratory.

2/ PG 46-34 shall be considered an equivalent to PG 52-34

3/ Alternate Grades or Modifiers may be considered with approval of the engineer for mixtures to be used on the shoulder.

N70 Binder and N90 Binder

| Reclaimed Material | Binder Replacement % | Asphalt Binder Grade |
|--|-----------------------------|-----------------------------|
| RAS/RAP/FRAP | 0-20 | PG 64-22 |
| RAS by itself or with Category 1 or 2 FRAP | 21-30 | PG 58-22 |
| RAS with Category 1 FRAP | 31-40 | PG 58-28 |

N70 Surface

| Reclaimed Material | Binder Replacement % | Asphalt Binder Grade |
|--|-----------------------------|-----------------------------|
| RAS/RAP/FRAP | 0-20 | PG 64-22 |
| RAS by itself or with Category 1 or 2 FRAP | 21-40 | PG 58-28 |

Add the following to Article 1032.05(b) of the Standard Specifications:

“At the contractor’s option, the modified asphalt binder shall be either an SBS/SBR polymerized PG 76-22 binder, or a GTR modified PG 64-22 GTR 12 binder that complies with the requirements defined herein. For any mixture only FRAP / RAP with no RAS, the asphalt binder shall be either an SBS/SBR polymerized PG 70-28 binder or a PG 58-28 GTR 12 binder when the mix design’s binder replacement is between 20 percent and 25 percent. For any mixture containing RAS, the asphalt binder shall be an SBS/SBR polymerized PG 70-22 binder or a GTR modified PG 58-22 GTR 12 binder that complies with requirements defined herein when the mix design’s binder replacement is 20 percent or less; or shall be an SBS/SBR polymerized PG 70-28 binder or a GTR modified PG 58-28 GTR 12 binder that complies with requirements defined herein when the mix design’s binder replacement is greater than 20 percent. This table summarizes these options:

| Reclaimed Material | Binder Replacement, % | Asphalt Binder Options |
|---|------------------------------|-------------------------------------|
| None | 0 | SBS/SBR PG 76-22 PG 64-22 GTR 12 |
| FRAP / RAP only | Less than 20 | SBS/SBR PG 76-22 PG 64-22 GTR 12 |
| | 20 to 25 | SBS/SBR PG 70-28 PG 58-28 GTR 12 |
| RAS By itself, or with Category 1 or 2 FRAP | Less than 20 | SBS/SBR PG 70-22 PG 58-22 GTR 12 |
| | 20 to 40 | SBS/SBR PG 70-28 PG 58-28 GTR 12 |

- (1) SBS/SBR PG 76-22, PG 70-22, or PG 70-28 Binder. The SBS/SBR PG 76-22, PG 70-22, or PG 70-28 binder shall meet the requirements of Article 1032.05(b) of the Standard Specifications. In addition, the elastic recovery of the Asphalt Binder used shall be a minimum of 80.
- (2) Ground Tire Rubber (GTR) Binder. The base asphalt cement (AC) that is blended with the Ground Tire Rubber (GTR) shall be a PG 64-22 performance-grade (PG) when used in mix designs with a binder replacement of 20 percent or less, or shall be a PG 58-28 performance-grade (PG) when used in a mix design with a binder

replacement greater than 20 percent, meeting the requirements of Article 1032.05 of the Standard Specifications. The GTR shall be produced from processing automobile and/or truck tires by the ambient grinding method. Heavy equipment tires, uncured or de-vulcanized rubber will not be permitted. The GTR shall not exceed 1/16 in. in length and shall contain no free metal particles. Detection of free metal particles shall be determined by thoroughly passing a magnet through a 2 oz. sample. Metal embedded in rubber particles will be permitted.

The GTR shall be stored in a dry location protected from the rain. When the GTR is combined with the asphalt cement, the moisture content of the GTR shall not cause foaming of the blend.

When tested in accordance with ASTM C-136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates, (Illinois-modified AASHTO T-27, Sieve Analysis of Fine and Coarse Aggregates) a 2 oz. sample of the GTR shall conform to the following gradation requirements:

| <u>Sieve Size</u> | <u>Percent Passing</u> |
|-------------------|------------------------|
| No. 8 (2.36 mm) | 100 |
| No. 16 (1.18 mm) | 98 ± 2 |
| No. 30 (600 µm) | 95 ± 5 |
| No. 50 (300 µm) | 50 ± 10 |
| No. 100 (150 µm) | 10 ± 5 |
| No. 200 (75 µm) | 2 ± 2 |

A mineral powder (such as talc) meeting AASHTO M17, Mineral Filler for Bituminous Paving Mixtures, requirements may be added, up to a maximum of 4% by weight of GTR particles, to reduce sticking and caking of the GTR particles.

GTR shall have a specific gravity of 1.15 ± 0.05 when tested in accordance with ASTM D-1817, Standard Test Method for Rubber Chemicals-Density.

Extender Oils or Polymeric Additions With approval of the Engineer, compatible extender oils and/or polymers may be added to the GTR or to the asphalt-rubber blend. The additional costs for the extender oils and/or polymer additions shall be borne by the Contractor. The Contractor shall provide material product information along with usage rates for approval.”

Equipment. Add the following to the list of specific references of Article 406.03 of the Standard Specifications.

| | |
|-------------------------------|--|
| “(j) RAP Processing Equipment | Illinois Tollway special provision for Reclaimed Asphalt Pavement |
| “(k) RAS Processing Equipment | Illinois Tollway special provision for Reclaimed Asphalt Shingles” |

Add the following to Article 406.02 of the Standard Specifications.

“For the production of WMA binder and surface course mixes, use equipment and WMA technologies capable of producing an asphalt mixture that is workable at the minimum placement and compaction temperature desired, regardless of storage or haul distance considerations.”

Add the following to Article 1030.03 of the Standard Specifications.

“When a mix is produced using an approved warm mix asphalt technology, the asphalt mixing plant shall be modified as required by the additive or process manufacturer to introduce the technology and produce a WMA mixture meeting the volumetric properties specified herein. Plant modifications may include additional plant instrumentation, the installation of asphalt binder foaming systems and/or WMA additive delivery systems, tuning the plant burner and adjusting the flights in order to operate at lower production temperatures and/or reduced tonnage.

All metering devices will meet the current IDOT requirement for liquid or mineral additives. Document the integration of plant controls and interlocks when using WMA additive metering devices.”

Mixture Design. Revise Article 1030.04(a)(1) of the Standard Specifications and the Supplemental Specifications to read:

“(1) High ESAL Mixtures. The Job Mix Formula (JMF) shall fall within the following limits.

| Sieve Size | IL-19.0 mm ^{3/} | | IL-12.5 mm | | IL-9.5 mm | |
|---------------------------------|--------------------------|-----|------------|-----|-----------|------------------|
| | min | max | min | max | min | max |
| 1 in. (25 mm) | | 100 | | | | |
| 3/4 in. (19 mm) | 90 | 100 | | 100 | | |
| 1/2 in. (12.5 mm) | 69 | 89 | 90 | 100 | | 100 |
| 3/8 in. (9.5 mm) | | | | 89 | 90 | 100 |
| #4 (4.75 mm) | 45 | 60 | 28 | 65 | 32 | 69 |
| #8 (2.36 mm) | 30 | 45 | 28 | 48 | 32 | 52 ^{2/} |
| #16 (1.18 mm) | 20 | 35 | 10 | 32 | 10 | 32 |
| #50 (300 µm) | 8 | 16 | 4 | 15 | 4 | 15 |
| #100 (150 µm) | 6 | 9 | 3 | 10 | 3 | 10 |
| #200 (75 µm) | 3 | 6 | 4 | 6 | 4 | 6 |
| Ratio Dust/Asphalt Binder | | 1.0 | | 1.0 | | 1.0 |

- 1/ Based on percent of total aggregate weight.
- 2/ The mixture composition shall not exceed 44 percent passing the #8 (2.36 mm) sieve for surface courses with Ndesign = 90.
- 3/ For mixture IL-19-0 Ndesign = 90, the fine fraction shall consist of at least 67% manufactured sand meeting the FA 20 gradation. The manufactured sand shall be stone sand, slag sand, steel slag sand, or combinations thereof.

Revise the table in Article 1030.04(b)(1) of the Standard Specifications to read:

| "VOLUMETRIC REQUIREMENTS High ESAL | | | | | |
|---------------------------------------|---------------------------------|---|---------|--------|--|
| Ndesign | Design Air Voids Target % | Voids in the Mineral Aggregate (VMA), % minimum | | | Voids Filled with Asphalt Binder (VFA), % |
| | | IL-19.0 | IL-12.5 | IL-9.5 | |
| 50 | 3.0 | 13.5 | 14.0 | 15.0 | 65 – 80 |
| 70 | 4.0 | | | | 65 - 75 |
| 90 | 4.0 | | | | |

Revise the first and second paragraphs of Article 1030.04(c) of the Standard Specifications to read:

“(c) Determination of Need for Anti-Stripping Additive. The mix designer shall determine if an additive is needed in the mix to prevent stripping. The determination will be made on the basis of moisture sensitivity testing (IL Modified AASHTO T 283) on production ingredient materials sampled at the HMA plant. The results will inform the contractor of the need for an anti-strip additive in the mix based on the following minimums:

- 1) for polymer modified asphalt mix have a conditioned tensile strength of 115 psi or better with no TSR requirements, for non-modified asphalt mix have a conditioned tensile strength of 100 psi or better for 6 in. specimens;
- 2) for polymer modified asphalt mix have a conditioned tensile strength of 100 psi or better with a TSR of 0.85 or better for 6 in. specimens, for non-modified asphalt mix have a conditioned tensile strength of 80 psi or better with a TSR of 0.85 or better for 6 in. specimens;
- 3) any asphalt mix with anti-strip (liquid or lime) conditioned tensile strength may not be lower than the original mix conditioned tensile strength without anti-strip and no visual stripping of the coarse or fine aggregate in the broken faces shall be observed.

If it is determined that an additive is required, the additive may be hydrated lime, slaked quicklime, or a liquid additive, at the Contractor’s option.”

Add the following to Article 1030.04 of the Standard Specifications:

“(e) Warm Mix Technology. A Warm Mix Technology shall be used with an approved HMA mix design.

The mixture design for any WMA binder or surface course shall be developed based on a lab produced HMA mix design modified as a WMA mix design through trial batch production of the WMA mixture and test strip placements. The original HMA mix design to be modified shall be designed and submitted to the Engineer without including the WMA additive or technology. When a WMA surface or binder course mix using an additive is to be used, document the additive used and recommend the dosage rate on a resubmittal of the original HMA mix design that is to be modified as a WMA mix design. The Illinois Tollway Material Engineer and Contractor will verify the original HMA mix design with any WMA technology based on plant produced samples taken from the WMA test strip. Any needed mix design adjustments will apply to the development of the WMA binder course or surface course mix design.

In addition to the HMA mix design, for WMA mix designs proposed using organic or chemical additives, Hamburg Wheel testing according to Illinois Modified AASHTO T324 shall be conducted on a laboratory mixed sample at the recommended dosage rate. The Hamburg Wheel testing requirements from this sample are:

| Asphalt Binder Grade | # Wheel Passes | Maximum Rut Depth, in. |
|----------------------|----------------|------------------------|
| PG 76-XX | 20,000 | ½ inch |
| PG 70-XX | 15,000 | ½ inch |
| PG 64-XX | 10,000 | ½ inch |
| PG 58-XX | 10,000 | ½ inch |
| PG 52-XX | 10,000 | ½ inch |
| PG 46-XX | 10,000 | ½ inch |

The final adjusted design for the WMA mix design shall be submitted for acceptance with the following information included:

- 1) All information required for Superpave HMA.
- 2) WMA technology and/or WMA additives information.
- 3) WMA technology manufacturer's established recommendations for usage.
- 4) WMA technology manufacturer's established target rate for water and additives, the acceptable variation for production, and documentation showing the impact of excessive production variation.
- 5) WMA technology material safety data sheets (MSDS).
- 6) Documentation of at least 3 past WMA technology field applications including project type, project owner, tonnage, location, mix design, mixture volumetrics, field density, and performance.
- 7) Temperature range for mixing.
- 8) Temperature range for compacting.
- 9) Asphalt binder performance grade test data over the range of WMA additive percentages proposed for use.
- 10) WMA mixture QC/QA test results measured from the test strip samples specific to the Contractor's proposed WMA technology.
- 11) Laboratory test data, samples and sources of all mixture components, and asphalt binder viscosity-temperature relationships.
- 12) Mix production Hamburg test results from WMA test strip.

The Illinois Tollway may accept an existing WMA mixture design with a WMA additive / process previously used on a Illinois Tollway project and may waive the test strip trial batch required to verify the WMA mix design.”

Quality Control / Quality Assurance. Article 1030.05 of the Standard Specifications shall govern the requirements for Quality Control / Quality Assurance (QC/QA) of HMA and WMA mixtures, with this revision: the correlation coefficient ("r" value) for correlating nuclear gauge densities with core densities shall be greater than 0.85.

WMA Production. WMA shall be produced at a temperature range recommended by the additive / process manufacturer and verified through a QC/QA mixture test strip. It may be necessary to initially produce HMA mixes at conventional HMA temperatures immediately before WMA production at lower temperatures in order to prime the plant for proper operating temperatures.

A QC/QA mixture test strip will be required for all WMA mixes. The test strip shall be constructed at a location approved by the Engineer to determine the mix properties, density, and laydown characteristics, and as needed to finalize any proposed mix design. These test results and visual inspections on the mixture shall be used to make corrective adjustments if necessary. For all mixtures produced with a WMA technology, the QC/QA WMA mixture test strip shall be constructed at an approved off-site location to determine the mix properties, density, production temperature target, compaction procedure, and laydown characteristics. A field TSR test of the mix produced for any WMA test strip will be required.

Prior to the start of mix production and placement, The Illinois Tollway Materials Engineer will review and approve all test strip results, WMA mix designs, and rolling pattern.

The test strips will be performed as follows:

- (a) Team Members. The start-up team, if required, shall consist of the following:
 - (1) Resident Engineer
 - (2) Illinois Tollway Project Manager, or representative
 - (3) Illinois Tollway Materials Engineer, or representative
 - (4) Engineer's Nuclear Density Gauge Specialist
 - (5) Contractor's QC Manager
 - (6) Engineer's QA representative
 - (7) Contractor's QC technician
 - (8) AC Supplier representative (Required for GTR, optional for other AC types)
 - (9) Illinois Tollway Independent Assurance Engineer
- (b) Communication. The Contractor shall advise the team members of the anticipated start time of production for the test strip. The QC Manager shall direct the activities of the test strip team. An Illinois Tollway-appointed representative from the start-up team will act as spokesperson for the Illinois Tollway.
- (c) The Test Strip(s) for HMA mixtures shall be in accordance with Article 406.06 of the Standard Specifications. The Test Strip(s) for WMA mixtures shall consist of approximately 300 tons. It shall contain two growth curves which shall be compacted by a static steel-wheeled roller and tested as outlined herein.

- (1) Mix Information. On the day of construction of the Test Strip, the Contractor shall provide the start-up team documentation of test data showing the combined hot-bin or the combined aggregate belt sample and mineral filler at a drier-drum plant.
- (2) Mix and Gradation Test Strip Samples. The first and second sets of mixture and gradation samples shall be taken by the Contractor at such times as to represent the mixture between the two growth curves and the rolling pattern area, respectively. All test strip samples shall be processed by the Contractor for determination of mix composition and Superpave properties including air voids. This shall include washed gradation tests. This information shall then be compared to the JMF and required design criteria. Prepare and test any WMA test strip mixtures, including Superpave gyratory compacted specimens for QC/QA using the same test methods, procedures and frequencies as specified for HMA, except that the WMA mixture shall be aged at the production temperature for a period of 2 hours before gyratory or performance based test specimens are compacted.

Hamburg Wheel testing according to Illinois Modified AASHTO T324 shall be conducted from the test strip production mixture. The Hamburg Wheel testing requirements from this sample are:

| Asphalt Binder Grade | # Wheel Passes | Maximum Rut Depth, in. |
|----------------------|----------------|------------------------|
| PG 76-XX | 20,000 | ½ inch |
| PG 70-XX | 15,000 | ½ inch |
| PG 64-XX | 10,000 | ½ inch |
| PG 58-XX | 10,000 | ½ inch |
| PG 52-XX | 10,000 | ½ inch |
| PG 46-XX | 10,000 | ½ inch |

- (3) Construction of the Test Strip. After the Contractor has produced the mix, transported the mix, and placed approximately 100 to 150 tons of mix, placement of the mix shall stop, and a growth curve shall be constructed. After completion of the first growth curve, paving shall resume for 50 to 100 tons of mix, placement shall stop, and the second growth curve shall be constructed within this area. Additional growth curves may be required if an adjustment/plant change is made during the test strip. The Contractor shall use the specified rolling procedures for all portions of the test strip except for the growth curve areas which shall be compacted as directed by the Engineer.
- (4) Location of Test Strip. The test strip shall be located on a pavement type similar to the contract pavement and acceptable to the Engineer. It shall be on a relatively flat portion of the roadway. Descending/Ascending grades or ramps shall be avoided.
- (5) Compaction Temperature. For WMA mixtures, the temperature of the mix at the beginning of the growth curve shall be within the additive / process manufacturer's recommended temperature range for compaction.

- (6) Compaction and Testing. The QC Manager will specify the roller(s) speed and number of passes required to obtain a completed growth curve. The nuclear gauge shall be placed near the center of the hot mat and the position marked for future reference. With the bottom of the nuclear gauge and the source rod clean, a 15 seconds nuclear reading (without mineral filler) shall be taken after each pass of the roller. Rolling shall continue until the maximum density is achieved and three consecutive passes show no appreciable increase in density or no evidence of destruction of the mat. The growth curve shall be plotted.
- (7) Evaluation of Growth Curves. Mixtures which exhibit density potential less than 94 percent or greater than 97 percent of the maximum theoretical density (D) shall be considered as sufficient cause for mix adjustment. If a mix adjustment is made, an additional test strip may be constructed. The Illinois Tollway will pay half the cost of the contract unit price for a test strip if additional one is required. The information shall then be compared to the AJMF and required design criteria.

If the nuclear density potential of the mixture does not exceed 91 percent, the operation will cease until all test data is analyzed or a new mix design is produced.

In addition, other aspects of the mixture, such as appearance, segregation, texture, or other evidence of mix problems, should be noted and corrective action taken at this time.

- (d) Documentation. The WMA test strip and rolling pattern information (including growth curves) will be tabulated by the contractor with copies provided to each team member, and the original submitted to the Engineer. Any change to the rolling pattern shall be approved by the Engineer.

CONSTRUCTION REQUIREMENTS

Placing. Article 406.06 of the Standard Specifications shall govern the requirements of HMA and WMA placement except as modified herein:

Revise the first and second paragraphs of Article 406.06(b) of the Standard Specifications to read:

“General. HMA and WMA shall be placed on a clean, dry base and when weather conditions are suitable. The HMA leveling binder and HMA binder courses shall be placed only when the temperature in the shade is at least 40°F and the forecast is for rising temperatures. The HMA surface course shall be placed only when the air temperature in the shade is at least 45°F and the forecast is for rising temperatures. The WMA leveling binder and WMA binder courses shall be placed only when the temperature in the shade is at least 32°F and the forecast is for rising temperatures. The WMA surface course shall be placed only when the air temperature in the shade is at least 35°F and the forecast is for rising temperatures.

The HMA shall be delivered at a temperature of 250 to 350°F. The WMA shall be delivered on dates when the ambient air temperatures during placement will be at least 50° F and rising within a temperature range as established by the WMA additive / process

manufacturer and reported by the Contractor to the Engineer with the WMA mix design submittal. The temperature of WMA shall not exceed the manufacturer's recommended maximum placement temperature when measured immediately behind the paver when the air temperature is 50°F and rising. The WMA shall be delivered at a temperature of 250 to 350°F on dates when the ambient air temperatures during placement will be between the WMA specified minimum temperature and 50°F."

Revise the first paragraph of Article 406.06(d) of the Standard Specifications to read:

(d) Lift Thickness. The minimum compacted lift thickness for constructing HMA binder and surface courses shall be as follows, unless otherwise noted on the plans.

Compaction. Article 406.07 of the Standard Specifications shall govern the requirements of HMA and WMA compaction except as modified herein:

Add the following paragraph to Article 406.07 of the Standard Specifications:

"Compact WMA immediately after spreading and before the WMA mixture temperature falls below the minimum job mix compaction temperature as recommended by the manufacturer of the WMA technology used. Discontinue paving if the Contractor is unable to achieve the specified density before the mixture cools below the minimum recommended WMA job mix design compaction temperature."

Method of Measurement. This work will be measured in accordance with Article 406.13 of the Standard Specifications.

Basis of Payment. This work will be paid for in accordance with Article 406.14 of the Standard Specifications except as modified herein:

Add the following to the second paragraph of Article 406.14 of the Standard Specifications:

"The WMA surfacing will be paid for at the contract unit price per ton for WARM MIX ASPHALT BINDER COURSE, of the mixture composition and Ndesign specified; and WARM MIX ASPHALT SURFACE COURSE, of the friction aggregate mixture and Ndesign specified."

Replace the third paragraph of Article 406.14 of the Standard Specifications with the following:

"The HMA surfacing in which polymer or GTR modified asphalt binders are required, will be paid for at the contract unit price per ton for MODIFIED HOT-MIX ASPHALT BINDER COURSE, of the mixture composition and Ndesign specified; and MODIFIED HOT-MIX ASPHALT SURFACE COURSE, of the friction aggregate mixture and Ndesign specified.

The WMA surfacing in which polymer or GTR modified asphalt binders are required, will be paid for at the contract unit price per ton for MODIFIED WARM-MIX ASPHALT BINDER COURSE, of the mixture composition and Ndesign specified; and MODIFIED WARM-MIX ASPHALT SURFACE COURSE, of the friction aggregate mixture and Ndesign specified."

Add the following to Article 406.14 of the Standard Specifications:

“WMA test strips will be evaluated for payment at the contract unit price each for CONSTRUCTING WARM MIX ASPHALT TEST STRIP, according to the following:

- (a) If the WMA placed during the initial test strip is determined to be acceptable, the mixture and test strip will be paid at the contract unit prices.
- (b) If the WMA placed during the initial test strip (1) is determined to be unacceptable to remain in place by the Engineer, and (2) was not produced within the tolerances of the JMF, the initial mixture and test strip will not be paid for and shall be removed at no additional cost to the Illinois Tollway. An additional test strip will be paid for in full, if produced within the JMF tolerances.
- (c) If the WMA placed during the initial test strip (1) is determined to be unacceptable to remain in place by the Engineer, and (2) was produced within the tolerances for the JMF, the mixture shall be removed. Removal will be paid for according to Article 109.04 of the Tollway Supplemental Specifications. This initial mixture and test strip will be paid for at the contract unit price, and any additional test strips will be paid for at one half the unit price of each test strip.
- (d) If the WMA placed during a test strip is determined to be acceptable to remain in place by the Engineer and the Engineer deems a new start-up is required for any reason, the initial mixture and test strip will be paid for at the contract unit prices. The additional mixture will be paid for at the contract unit price and any additional test strips will be paid for at one-half the unit price for each test strip.
- (e) If the Contractor requests and is granted approval for a mix design other than the initial approved WMA mix design, he/she shall construct a test strip for the new mix design at no additional cost to the Illinois Tollway.

Add the following to Article 406.14 of the Standard Specifications:

“HMA and WMA mixtures will be paid for under its respective item. If permissive use of an HMA mixture in place of a specified WMA mixture is granted by the Engineer, a new pay item will be established for the HMA with the same unit price. If permissive use of a WMA mixture in place of a specified HMA mixture is granted by the Engineer, a new pay item will be established for the WMA with the same unit price.”

**ASPHALT MIXTURE LONGITUDINAL JOINT DENSITY MODIFIED
(Illinois Tollway)**

Effective: September 21, 2011

Revised: April 1, 2016

Description. This work shall consist of testing the density of longitudinal joints as part of the quality control / quality assurance (QC/QA) of hot-mix asphalt (HMA) or warm mix asphalt (WMA). This work shall be according to Section 1030 of the Standard Specifications except as follows.

Quality Control / Quality Assurance (QC/QA). Delete the second and third sentences of the third paragraph of Article 1030.05(d)(3) of the Standard Specifications.

Add the following paragraphs to Article 1030.05(d)(3) of the Standard Specifications.

“Longitudinal joint density testing shall be performed at each random density test location. Longitudinal joint testing shall be located at a distance equal to the lift thickness, or a minimum of two inches, from each pavement edge (i.e. for a four inch lift the near edge of the density gauge or core barrel shall be within four inches from the edge of pavement). It shall be documented as to whether the joint was confined or unconfined. The joint density value shall be determined using either a correlated nuclear gauge or cores.

- a. Confined Edge. Each confined edge density shall be represented by a one-minute nuclear density reading or a core density and shall be included in the average of density readings or core densities taken across the mat which represents the Individual Test.
- b. Unconfined Edge. Each unconfined edge joint density shall be represented by an average of two one-minute density readings or a single core density at the given density test location and shall meet the density requirements specified herein. When using a correlated nuclear gauge, the gauge shall be rotated 180 degrees between readings. If the two readings are not within 1.5 lb/cu ft, then one additional reading shall be taken. Additional density readings taken at a given site shall not be allowed to replace the original density readings unless an obvious error has occurred (i.e. the nuclear gauge was sitting on debris).”

Revise the density control limits table of Article 1030.05(d)(4) of the Standard Specifications to read:

| "Mixture Composition | Parameter | Individual Test (includes confined edges) | Unconfined Edge Joint Density Minimum |
|----------------------|--------------|---|---------------------------------------|
| IL-9.5 | Ndesign = 90 | 92.0 – 96.0% | 90.0% |
| IL-9.5, IL-9.5L, | Ndesign < 90 | 92.5 – 97.4% | 90.0% |
| IL-19.0 | Ndesign = 90 | 93.0 – 96.0% | 90.0% |
| IL-19.0, IL-19.0L, | Ndesign < 90 | 93.0 ^{2/} – 97.4% | 90.0% |
| SMA | Ndesign = 80 | 93.5 – 97.4% | 91.0% |
| All Other | Ndesign = 50 | 95.0 – 97.4 ^{2/} | 92.0% |

COARSE AGGREGATE FOR BACKFILL, TRENCH BACKFILL AND BEDDING (Illinois Tollway)

Effective: August 14, 2013

This work shall be according to Article 1004.05 of the Standard Specifications except for the following:

Reclaimed Asphalt Pavement (RAP) maybe blended with gravel, crushed gravel, crushed stone crushed concrete, crushed slag, chats, crushed sand stone or wet bottom boiler slag. The RAP materials shall be crushed and screened. Unprocessed RAP grindings will not be permitted. The RAP shall be uniformly graded and shall pass the 1.0 in. (25 mm) screen. When RAP is blended with any of the coarse aggregate listed above, the blending shall be done mechanically with calibrated feeders. The feeders shall have an accuracy of ± 2.0 percent of the actual quantity of material delivered. The final blended product shall not contain more than 40 percent by weight RAP.

The coarse aggregate listed above shall meet CA 6 and CA 10 gradations prior to being blended with the processed and uniformly graded RAP.

FINE AGGREGATE FOR ASPHALT MIXTURES (Illinois Tollway)

Effective: September 21, 2011

Revised: January 25, 2018

Revise Article 1003.03 of the Standard Specifications to read:

“1003.03 Fine Aggregate for Asphalt Mixtures. The aggregate shall be according to the Article 1003.01 and the following.

- (a) Description. Fine aggregate for all binder course and surface course asphalt mixtures produced for mainline placement shall consist of natural sand, crushed stone sand, slag sand, or steel slag sand. Fine aggregate for all other asphalt mixes shall consist of natural sand, crushed stone sand, chats, slag sand, or steel slag sand. For gradation FA 22, uncrushed material will not be permitted.
- (b) Quality. The fine aggregate for all asphalt mixtures shall be Class B Quality or better.
- (c) Gradation. The fine aggregate gradation for all binder course and surface course asphalt mixtures produced for mainline overlay placement shall be FA 20 or FA 22. The fine aggregate gradation for all other HMA shall be FA 1, FA 2, FA 20, FA 21, or FA 22. When Reclaimed Asphalt Pavement (RAP) and/or Fractionated Reclaimed Asphalt Pavement (FRAP) and/or Reclaimed Asphalt Shingles (RAS) are incorporated into the asphalt mixture design, the use of FA 21 gradation will not be permitted.

Gradation FA 1, FA 2, or FA 3 shall be used when required for prime coat aggregate application for asphalt mixtures.”

EPOXY COATING ON REINFORCEMENT (Illinois Tollway)

Effective: April 29, 2013

Revised: June 17, 2015

DESCRIPTION

For work outside the limits of bridge approach pavement, all references in the Highway Standards and Standard Specifications for reinforcement shall be epoxy coated, unless noted on the plan. This includes dowel bars and tie bars in all pavement, shoulders, curb, gutter, combination curb and gutter and median; and chair supports for CRC pavement.

Reinforcement for IDOT Highway Standard drainage structures shall be as shown on the Standards, unless otherwise noted on the plans.

PERFORMANCE-RELATED SPECIAL PROVISION FOR HIGH PERFORMANCE CONCRETE MIX DESIGNS FOR CONCRETE SUPERSTRUCTURE (Illinois Tollway GBSP)

Effective: October 12, 2012

Revised: April 1, 2016

DESCRIPTION

This work consists of designing and furnishing Illinois Tollway Class HP high performance portland cement concrete. The objective of this performance-related special provision is to provide the Illinois Tollway with a methodology to assure high quality concrete with reduced shrinkage potential, while simultaneously allowing the Contractor the maximum freedom in deciding how to develop the mix design and place the concrete to achieve this objective. Construction of superstructures using high performance concrete shall be in accordance with Section 503 of the IDOT Standard Specifications except where modified by this special provision.

REFERENCE STANDARDS

Except where modified by the Illinois Department of Transportation or the Illinois Tollway, the following Standards shall apply:

Illinois Department of Transportation (IDOT)

- Standard Specifications for Road and Bridge Construction, Supplemental Specifications and Recurring Special Provisions
- Test Procedures referenced herein, as described in the current edition of the Manual of Test Procedures for Materials, as well these test procedures:
 - AASHTO T 22 Compressive Strength of Cylindrical Concrete Test Specimens
 - AASHTO T 105 Chemical Analysis of Hydraulic Cement
 - AASHTO T 119 Standard Test Method for Slump of Hydraulic-Cement Concrete
 - AASHTO T 152 Air Content of Freshly Mixed Concrete by the Pressure Method
 - AASHTO T 160 Length Change of Hardened Hydraulic-Cement Mortar and Concrete
 - AASHTO T 161 Standard Method of Test for Resistance of Concrete to Rapid Freezing and Thawing (Procedure A – modified)
 - AASHTO T 277 Electrical Indication of Concrete's Ability to Resist Chloride Ion Penetration
 - AASHTO T 303 Potential alkali reactivity of aggregates (mortar-bar method)
 - ASTM A820 Standard Specification for Steel Fibers for Fiber-Reinforced Concrete
 - ASTM C94 Standard Specification for Ready-Mixed Concrete
 - ASTM C457 Microscopical Determination of Parameters of the Air-Void System in Hardened Concrete (Method B)
 - ASTM C494 Standard Specification for Chemical Admixtures for Concrete
 - ASTM C856 Petrographic Examination of Hardened Concrete

- ASTM C1581 Determining Age at Cracking and Induced Tensile Stress Characteristics of Mortar and Concrete under Restrained Shrinkage
- ASTM C1666 Standard Specification for Alkali Resistant (AR) Glass Fiber for GFRC and Fiber-Reinforced Concrete and Cement
- ASTM C1761 Standard Specification for Lightweight Aggregate for Internal Curing of Concrete
- ASTM D7508 Standard Specification for Polyolefin Chopped Strands for Use in Concrete

MATERIALS

Portland cement, mixing water, fine and coarse aggregates, supplementary cementitious materials, and concrete admixtures shall conform to the requirements of Section 1000 of *Standard Specifications* with exceptions as noted. Specific references are as follows:

| Material | Section |
|---|-------------------|
| Cement (See Note 1) | 1001 |
| Mixing Water | 1002 |
| Fine Aggregates (See Note 2) | 1003 |
| Coarse Aggregates (See Note 2) | 1004 |
| Supplementary Cementitious Materials (See Note 3) | 1010 |
| Concrete Admixtures (See Note 4) | 1021 |
| Other Materials | see Notes 5 and 6 |

- Note 1: Portland cement shall be according to AASHTO M 85 and blended cement shall be according to AASHTO M 240 with no additional restrictions. Limestone is classified as a processing addition to Portland cement, not as a supplementary cement. The use of other cements shall require approval of the Illinois Tollway materials department.
- Note 2: Fine and coarse aggregate requirements shall be per IDOT Class BS concrete
- Note 3: Supplementary cementitious materials must have an alkali content less than 3.5 percent ($\text{Na}_2\text{O}_{\text{eq}}$).
- Note 4: Shrinkage reducing admixtures (SRA) and slump retention admixtures from a Illinois Tollway approved source may be used.
- Note 5: Fiber reinforcement shall be permitted provided the material is used in accordance with the product manufacturer's recommendations and it is demonstrated that the concrete complies with the herein established performance requirements. Steel fibers shall conform to ASTM A820, Alkali-resistant (AR) glass fibers shall conform to ASTM C1666 and synthetic fibers shall conform to ASTM D7508.

- Note 6: Saturated lightweight aggregate may be used in accordance with ASTM C1761.

MIXTURE QUALIFICATION REQUIREMENTS

Contractor shall provide a concrete mixture design according to the following performance requirements. The testing shall be performed by an AASHTO-accredited laboratory. Mixture designs not used in the current calendar year will require a current report of petrographic examination, performed in accordance with ASTM C856, using concrete produced from a trial batch witnessed by the Illinois Tollway in the current calendar year.

Slump Loss

Unless otherwise approved by the Illinois Tollway, the initial slump (measured within 10 minutes after the addition of water) shall be between 3 and 8 inches. The slump shall be no less than 3 inches for at least 45 minutes after the addition of water as measured by AASHTO T 119. The change in slump shall be no greater than 2 inches in 20 minutes and 4 inches from the initial measurement (measured within 10 minutes after the addition of water). The concrete temperature during testing shall be greater than 65°F.

Compressive Strength

Compressive strength measured in accordance with AASHTO T 22 shall not be less than 4,000 psi at 14 days. Test cylinders shall be made and cured in accordance with AASHTO T 23. The compressive strength determined in the laboratory shall be designated as f'_{target} for future acceptance of the mixture.

Time to Cracking

Net time to cracking shall not be less than 28 days when determined in accordance with ASTM C1581. Prior to batching for a test sample, all coarse aggregate particles exceeding ¾-inch shall be removed and replaced with an equal volume of minus ¾-inch graded material. This test shall be waived if the concrete mixture contains 605 lb/yd³ or less total cementitious material and a minimum dosage of 1.5 gal/yd³ of approved shrinkage reducing admixture (SRA).

Length Change

Measured shrinkage shall not be greater than 0.030 percent after 21 days of air drying when determined in accordance with AASHTO T 160. Specimens shall be wet cured for 7 days prior to air-drying. The initial reading for calculation of shrinkage shall be taken at the initiation of drying.

Freeze-Thaw Durability

Durability factor shall be no less than 80 percent after 300 cycles of freezing and thawing as determined in accordance with AASHTO T 161 (Procedure A) with the following modifications: the 14-day curing period prior to freeze-thaw cycling shall consist of 7 days immersion, in saturated lime water at 73.4 ± 3.0 °F followed by 7 days of storage in

air at 73.4 ± 2.0 °F and at a relative humidity of 50 ± 4.0 %.

The concrete will possess an air-void system having the following characteristics as determined by ASTM C457 (Method B):

- Spacing factor not exceeding 0.008-in.
- Specific surface not less than 600 in²/in³
- Total air content not less than 4.0 percent

The air-void system requirements will be waived if testing in accordance with AASHTO T 161 (Illinois Tollway-modified) results in a durability factor equal to or greater than 90 percent after 300 cycles of freezing and thawing.

Freeze-thaw testing in accordance with AASHTO T 161 (Illinois Tollway-modified) may be waived at the discretion of the Illinois Tollway if the air-void system parameters are met.

Chloride Penetrability

The total charge passed shall not exceed 1250 coulombs at 28 days as determined in accordance with AASHTO T 277 using the accelerated curing procedure. Test specimens shall be made in accordance with AASHTO T 23. Specimens shall be cured for one week at 73 °F and the following three weeks at 100 °F. An interim test result can be provided at the option of the contractor. A test shall consist of three specimens.

Alkali Silica Reactivity

Each aggregate shall be evaluated individually in accordance with AASHTO T 303 and must have a measured expansion no greater than 0.10 percent after 16 days. Each aggregate shall be evaluated separately. Each aggregate that does not meet this limit when tested with portland cement alone may demonstrate acceptance using a blended cement or a combination of portland cement and supplementary cementitious materials proposed for the HPC mixture. The supplementary cementitious replacement content needed to pass the AASHTO T 303 requirement shall become the minimum required replacement percentage of the concrete mixture.

This test shall be waived if the concrete is proportioned such that the maximum total alkali content ($\text{Na}_2\text{O}_{\text{eq}}$) contributed by portland cement (as determined in accordance with AASHTO T 105) does not exceed 4.0 lb/yd³.

The test shall also be waived if the aggregate has been evaluated in accordance with ASTM C1293 within the last 12 months and has an average expansion of three concrete specimens equal to or less than 0.04 % at one year.

FIELD TRIAL BATCH ACCEPTANCE

Qualification of the concrete mixture will require a field trial batch in addition to laboratory testing. The field trial must be produced at the batch plant under the supervision of the Illinois Tollway materials department and must meet the following characteristics:

- Compressive strength measured in accordance with AASHTO T 22 at 14 days (f_c) shall be within $4000 \leq f_c \leq [f_{\text{target}} + 1500]$ psi where f_{target} is defined as the 14 day strength obtained in the laboratory qualification test.
- Unless otherwise approved by the Illinois Tollway, the slump shall be between 3 and 8 inches. The slump shall be no less than 3 inches for at least 45 minutes after the addition of water as measured by AASHTO T 119. The change in slump shall be no greater than 2 inches in 20 minutes and 4 inches from the initial measurement (taken within 10 minutes after the addition of water). The concrete temperature during testing shall be greater than 70°F.
- Plastic air content measured in accordance with AASHTO T 152 shall be ± 1.5 percent from the design. The plastic air content measured at the end of slump loss testing shall be greater than 4.0 percent.. A hardened air void analysis in accordance with ASTM C457 may be submitted as an alternative.
- Water / cementitious materials ratio – Design -0.03, +0.00
- The total charge passed shall not exceed 1500 coulombs at 28 days as determined in accordance with AASHTO T 277 using the accelerated curing procedure. Test specimens shall be made in accordance with AASHTO T 23. Specimens shall be cured for one week at 73 °F and the following three weeks at 100 °F. A test shall consist of three specimens.

MIXTURE QUALIFICATION SUBMITTAL

Submittal shall include:

1. Mixture design, showing:
 - a. Quantities, description, sources and mill certifications of all mixture ingredients
 - b. Design water-cementitious materials ratio (w/cm)
 - c. Design Slump
 - d. Design Air content
 - e. Gradation and absorption of all aggregates
 - f. Bulk specific gravity (SSD) of all cementitious materials and aggregates
 - g. Theoretical mass and fresh density
 - h. Admixture dosage
2. A mixture qualification report demonstrating that the concrete complies with the performance requirements herein specified.
3. Report of petrographic examination of trial batch concrete, performed in accordance with ASTM C856.
4. Report of chemical analysis by X-ray Fluorescence of trial batch concrete, performed in accordance with AASHTO T 105.

MATERIAL TOLERANCES

Portland Cement or Blended Cement

Once a mixture qualification has been approved, no re-submittal shall be required under the condition that the portland cement or blended cement source complies with the following tolerances:

- Alkali content ($\text{Na}_2\text{O}_{\text{eq}}$): \pm 0.20 percent. The alkali silica reactivity requirements for the mixture qualification shall be met with the new alkali content.
- Tri-calcium aluminate content: -2.0 percent, +1.0 percent

Substitution of cement from sources not meeting the above tolerances shall only be permitted at the discretion of the Illinois Tollway materials department¹.

Coarse and Fine Aggregate

Substitution of aggregates from different sources or size classifications shall only be permitted at the discretion of the Illinois Tollway materials department¹. Similar aggregate type and lithology are recommended to ensure that no change in constructability or performance occurs.

Supplementary Cementitious Materials

No change in grade, classification, or fly ash type shall be permitted without resubmittal unless approved by the Illinois Tollway materials department¹.

Concrete Admixtures and Other Materials

Contractor may change between ASTM C494 Type A and Type D admixtures as seasonal conditions warrant. No other changes in manufacturer or product shall be permitted without re-submittal unless approved by the Illinois Tollway materials department¹.

¹ Changes other than those described herein may be permitted without re-submittal if approved by the Illinois Tollway materials department. A field trial batch may be required to demonstrate similarity and additional laboratory testing may be required to validate performance. Testing will be limited only to tests in this specification, and may consist only of selected tests depending on the substitution. The proposed substitution must be reviewed by the Illinois Tollway materials department to select the required tests for re-qualification. Some examples are:

- Mixtures using ASR susceptible aggregates shall require retesting to demonstrate ASR mitigation for any change to cementitious materials.
- Cementitious materials changes deemed to cause additional cracking risk, such as increases in fineness or reactivity shall require retesting restrained ring shrinkage, linear drying shrinkage, and slump loss.
- Changes to admixture products may require retesting for slump loss and hardened air-voids.

CURING AND PROTECTION

A proposed Illinois Tollway Class HP mixture that complies with the specified properties defined herein shall be considered “fully optimal” if the mix contains no less than 6% (based on total weight) pre-wetted lightweight fines, contains a minimum of 35% (of total cement weight) supplementary cementing materials, shall contain a minimum dosage of 2.0 gal/yd³ of approved shrinkage reducing admixture (SRA), and has a gradation that is well optimized with a minimum of 2 fine aggregates (natural sand and lightweights) and 2 coarse aggregates blended at the production plant to fall within the following gradation band.

AGGREGATE BLEND FOR THE “FULLY OPTIMAL” CLASS HP MIX Percent by weight passing

| Sieve Size | % Passing |
|------------|--------------|
| 1 in. | 100 |
| ¾ in. | 85-98 |
| ½ in. | 65-85 |
| ⅜ in. | 55-77 |
| # 4 | 40-60 |
| # 8 | 28-45 |
| # 16 | 18-35 |
| # 30 | 10-25 |
| # 50 | 5-17 |
| #100 | 1-12 |
| #200 | 0-8 |

Curing For Optimal Class HP Mix Designs

Curing shall be in accordance with Article 1020.13(a)(5) of the standard specifications except as modified below.

Add the following paragraph to Article 1020.13(a)(5) of the standard specifications:

“The curing period for decks built with an approved “fully optimal” HPC mix design shall be no less than 4 days.”

Curing For Other Class HP Mix Designs

Curing shall be in accordance with Article 1020.13(a)(5) of the Standard Specifications for a 7 day period.

For All Class HP Mix Designs

Low air temperature protection methods shall be in accordance with Articles 1020.13(d)(1)(2) of the Standard Specifications except as modified below:

Replace the first sentence of Article 1020.13(d)(1) of the standard specifications with the following:

“When the official National Weather Service forecast for the construction area predicts a low below 45°F, or if the actual temperature drops below 45°F, concrete less than 72 hours old shall be provided protection. When protection is required, the temperature of water for curing shall be no less than 45°F.”

The temperature of the curing water shall not be more than 20 °F cooler than the surface temperature of the concrete at the time the water and concrete come in contact. The curing water temperature shall be measured in the storage tank. The surface temperature of the concrete shall be measured under the cotton mats placed for curing. Measuring the

temperatures of the curing water and concrete surface, and any required heating or cooling of the curing water, shall be the responsibility of the contractor. Water shall be potable, meet the requirements of ASTM C 94, and be free of materials that have the potential to stain concrete. Use black or dark colored plastic sheets when the daily high ambient temperature is below 60 °F. Use white or similarly reflective plastic sheets when the daily high ambient temperature is above 85°F. Use any color or transparency of plastic sheet at temperatures between 60 and 85 °F.

TEMPERATURE CONTROL FOR PLACEMENT

Temperature control for concrete placement shall be according to Article 1020.14 of the standard specifications except as modified below:

Replace Article 1020.14(b) of the standard specifications with the following:

“Concrete in structures may be placed when the ambient air temperature is 40°F and rising, and concrete placement shall stop when the falling temperature reaches 45°F or below, unless otherwise approved by the Engineer. The temperature of the surfaces to receive concrete shall not be less than 40°F.

The temperature of the concrete at the point of placement shall not be less than 60°F for ternary mixtures or for any concrete with more than 20% fly ash or 35% slag replacement of Portland cement, and shall not be less than 45°F for all other mixtures, and shall not be more than 90°F for any mixture. The use of non-chloride accelerating admixture conforming to ASTM C494 Type C or E is allowed during cold weather placements when air temperatures below 45°F are anticipated before the expiration of the specified curing period, provided the accelerator is included in the original mixture qualification. When insulated forms are used, the maximum temperature of the concrete mixture shall be 80°F. Illinois Tollway Class HP high performance concrete mixtures shall not be placed when the ambient air temperature exceeds 90°F without approval of the Engineer. The maximum concrete temperature shall be 85°F for the cast-in-place Class HP concrete mixtures at the point of placement, except when placement operations are conducted at night, when the maximum concrete temperature shall be 90°F. The difference in temperature of the forms and concrete shall be <10°F at time of placement.”

QUALITY MANAGEMENT PLAN

At least 14 days prior to the first concrete placement, the Contractor shall submit a Quality Management Plan (QMP), for materials and construction in accordance with the Illinois Tollway recurring Special Provision for Contractor’s Quality Program. Minimum job-site testing procedures shall be per the IDOT QC/QA Special Provision. Contractor personnel performing testing shall be IDOT certified Level I PCC Technician or higher.

PRODUCTION FACILITY AND TRANSPORTATION EQUIPMENT

The production facility and transportation equipment shall conform to the certification requirements of the Illinois Department of Transportation.

FIELD ACCEPTANCE

Acceptance to this specification shall be based on the following characteristics:

- Compressive strength measured in accordance with AASHTO T 22 at 14 days (f_c) shall

be within $4000 \leq f_c \leq [f_{\text{target}} + 1500]$ psi where f_{target} is defined as the 14 day strength obtained in the laboratory qualification test.

- Unless otherwise approved by the Illinois Tollway, the slump shall be between 3 and 8 inches when delivered to the project site.
- Plastic air content measured in accordance with AASHTO T 152 shall be ± 1.5 percent from the design, with a minimum of 4.0 percent. A hardened air void analysis in accordance with ASTM C457 may be submitted as an alternative.
- Water / cementitious materials ratio – Design -0.03, +0.00

Other quality assurance testing required by the Illinois Tollway, but not included as a basis for payment shall consist of:

- The total charge passed shall not exceed 1500 coulombs at 28 days as determined in accordance with AASHTO T 277 using the accelerated curing procedure. Test specimens shall be made in accordance with AASHTO T 23 at the same frequency as compressive strength testing. A minimum of two tests shall be required for each bridge deck placement where each test consists of three specimens. Specimens shall be cured for one week at 73 °F and the following three weeks at 100 °F.
- A petrographic examination in accordance with ASTM C856 and chemical analysis according to AASHTO T 105 may be used at the discretion of the Illinois Tollway to screen for changes in composition.

RECLAIMED ASPHALT PAVEMENT (RAP) (Illinois Tollway)

Effective: October 6, 2011

Revised: January 25, 2018

Revise Section 1031 of the Standard Specifications to read:

“SECTION 1031. RECLAIMED ASPHALT PAVEMENT

1031.01 Description. Reclaimed asphalt pavement (RAP) is reclaimed asphalt pavement resulting from cold milling or crushing of an existing dense graded hot-mix asphalt (HMA) pavement. The Contractor shall supply written documentation that the RAP originated from routes or airfields under federal, state, or local agency jurisdiction. This special provision provides the option for the use of screened fractionated RAP. Fractionated RAP (FRAP) consists of the fine aggregate portion (material passing the #4 screen) and the coarse aggregate portion, controlled with one-or-more larger screens.

1031.02 Stockpiles. The Contractor shall construct individual, sealed RAP stockpiles meeting one of the definitions for both non-fractionated and fractionated RAP described in the following subsections. No additional RAP shall be added to the pile after the pile has been sealed. Stockpiles shall be sufficiently separated to prevent intermingling at the base. Stockpiles shall be identified by signs indicating the type of non-fractionated RAP as listed below (i.e. “Homogeneous Surface”), and by signs indicating the category and size of fractionated RAP (i.e. “Category 1, fine portion – 0 to #4”).

(1) When using Non-Fractionated RAP

Prior to milling, the Contractor shall request the IDOT or the Illinois Tollway to provide verification of the quality of the RAP to clarify appropriate stockpile.

- (a) Homogeneous. Homogeneous RAP stockpiles shall consist of RAP from Class I, Superpave (High ESAL), HMA (High ESAL), or equivalent mixtures and represent:
 - 1) the same aggregate quality, but shall be at least C quality;
 - 2) the same type of crushed aggregate (either crushed natural aggregate, ACBF slag, or steel slag);
 - 3) similar gradation; and
 - 4) similar asphalt binder content. If approved by the Engineer, combined single pass surface/binder millings may be considered “homogenous” with a quality rating dictated by the lowest coarse aggregate quality present in the mixture.
- (b) Conglomerate 5/8. Conglomerate 5/8 RAP stockpiles shall consist of RAP from Class I, Superpave (High ESAL), HMA (High ESAL), or equivalent mixtures. The coarse aggregate in this RAP shall be crushed aggregate and may represent more than one aggregate type and/or quality but shall be at least C quality. This RAP may have an inconsistent gradation and/or asphalt binder content prior to processing. All conglomerates 5/8 RAP shall be processed prior to testing by crushing to where all RAP shall pass the 5/8 in. or smaller screen. Conglomerate 5/8 RAP stockpiles shall not contain steel slag or other expansive material as determined by the Illinois Tollway or IDOT.

- (c) Conglomerate 3/8. Conglomerate 3/8 RAP stockpiles shall consist of RAP from Class I, Superpave (High ESAL), HMA (High ESAL), or equivalent mixtures. The coarse aggregate in this RAP shall be crushed aggregate and may represent more than one aggregate type and/or quality but shall be at least B quality. This RAP may have an inconsistent gradation and/or asphalt binder content prior to processing. All conglomerate 3/8 RAP shall be processed prior to testing by crushing to where all RAP shall pass the 3/8 in. or smaller screen. Conglomerate 3/8 RAP stockpiles shall not contain steel slag or other expansive material as determined by the Illinois Tollway or IDOT.
- (d) Conglomerate "D" Quality (DQ). Conglomerate DQ RAP stockpiles shall consist of RAP from Class I, Superpave (High or Low ESAL), HMA (High or Low ESAL), or equivalent mixtures. The coarse aggregate in this RAP may be crushed or round but shall be at least D quality. This RAP may have an inconsistent gradation and/or asphalt binder content. Conglomerate DQ RAP stockpiles shall not contain steel slag or other expansive material as determined by the Illinois Tollway or IDOT.
- (e) Non-Quality. RAP stockpiles that do not meet the requirements of the stockpile categories listed above shall be classified as "Non-Quality".

(2) When using Fractionated RAP (mechanical separation of RAP materials into appropriate sizes using an approved separation device)

The Contractor is required to have a QC plan approved by the Illinois Tollway Materials Engineer, a fractionation device approved the Illinois Tollway Materials Engineer, and sufficient cold feed bins. Fractionated RAP shall be separated by source (category 1 and 2) and size (fine and coarse portions). Separate calibrated cold feed bins are required for each size of fractionated RAP.

Ensure that the fractionated RAP source meets one of the following source categories:

Category 1: Milled Mainline/Ramp RAP – asphalt material milled from mainline pavements or ramps under Illinois Tollway jurisdiction.

Category 2: Non-Mainline/Ramp RAP – milled, crushed and screened material removed from Illinois Tollway shoulders or from other routes or airfields under federal, state or local agency jurisdiction.

Ensure that the fractionated RAP sizes comply with the following:

Fine Portion: The fine portion of fractionated RAP is the portion of the processed material passing the No. 4 screen. The fine portion of category 1 fractionated RAP that contains steel slag or other expansive material as determined by the Illinois Tollway shall be stockpiled separately and may be used under this special provision as fractionated RAP in surface friction course mixes or SMA surface mixes.

Coarse Portion: The coarse portion of fractionated RAP is one or more of the coarse portions of the processed material larger than the No. 4 screen. The coarse portion of the fractionated RAP that contains steel slag as determined by the Illinois Tollway shall be from Category 1 sources only and stockpiled separately for potential use as fractionated RAP in surface friction course mixes. The maximum top size of the coarse portion of fractionated RAP may not exceed the following:

| Nominal Asphalt Mix Designation | Maximum FRAP Screen Size 100% Passing |
|---------------------------------|---------------------------------------|
| 25.0 mm | 1.5 inch |
| 19.0 mm | 1 inch |
| 12.5 mm | 3/4 inch |
| 9.5 mm | 1/2 inch |

Prior to milling for fractionated RAP, the Contractor shall request the Illinois Tollway to provide verification of the quality of the RAP to clarify the appropriate category and size (identification) of the fractionated RAP stockpile as detailed below.

- (a) Category 1 fine portion without steel slag. Category 1 fine portion RAP shall consist of RAP from Class I, Superpave (High ESAL), HMA (High ESAL), or equivalent mixtures milled from Illinois Tollway mainline and ramp pavements. The fine aggregate in this RAP shall be manufactured sand and may represent more than one aggregate type. All category 1 fine portion RAP shall be processed prior to testing by screening to where all RAP shall pass the No. 4 screen. Category 1 fine portion without steel slag stockpiles shall not contain steel slag or other expansive material as determined by the Illinois Tollway.
- (b) Category 1 fine portion with steel slag. Category 1 fine portion with steel slag RAP stockpiles shall consist of RAP from Class I, Superpave (High ESAL), HMA (High ESAL), or equivalent mixtures milled from Illinois Tollway mainline or ramp surface friction course pavements. The fine aggregate in this RAP shall be manufactured sand and may represent more than one aggregate type. The coarse aggregate in this processed RAP shall be crushed aggregate including steel slag sources. All category 1 fine aggregate with steel slag RAP shall be processed prior to testing by screening to where all RAP shall pass the No. 4 screen.
- (c) Category 2 fine portion. Category 2 fine portion RAP shall consist of RAP from Class I, Superpave (High ESAL), HMA (High ESAL), or equivalent mixtures removed from Illinois Tollway shoulders or from other routes or airfields under federal, state or local agency jurisdiction. The fine aggregate in this RAP shall be manufactured or natural sand and may represent more than one aggregate type. All category 2 fine portion RAP shall be processed prior to testing by screening to where all RAP shall pass the No. 4 screen. Category 2 fine portion stockpiles shall not contain steel slag or other expansive material as determined by the Illinois Tollway.
- (d) Category 1 coarse portion without steel slag. Category 1 coarse portion RAP stockpiles shall consist of RAP from Class I, Superpave (High ESAL), HMA (High ESAL), or equivalent mixtures milled from Illinois Tollway mainline or ramp pavements. The coarse aggregate in this RAP shall be crushed aggregate and may represent more than one aggregate type and/or quality but shall be at least B quality. All category 1 coarse

aggregate RAP shall be processed prior to testing by screening to where all RAP shall be retained on the No. 4 or larger screen. Category 1 coarse portion RAP stockpiles shall not contain steel slag or other expansive material as determined by the Illinois Tollway.

- (e) Category 1 coarse portion with steel slag. Category 1 coarse portion with steel slag RAP stockpiles shall consist of RAP from Class I, Superpave (High ESAL), HMA (High ESAL), or equivalent mixtures milled from Illinois Tollway mainline or ramp surface friction course pavements. The coarse aggregate in this RAP shall be crushed aggregate including steel slag sources. All category 1 coarse aggregate with steel slag RAP shall be processed prior to testing by screening to where all RAP shall be retained on the No. 4 or larger screen.
- (f) Category 2 coarse portion. Category 2 coarse portion RAP stockpiles shall consist of RAP from Class I, Superpave (High ESAL), HMA (High ESAL), or equivalent mixtures removed from Illinois Tollway shoulders or from other routes or airfields under federal, state or local agency jurisdiction. The coarse aggregate in this RAP may be crushed aggregate and may represent more than one aggregate type and/or quality but shall be at least C quality. All category 2 coarse aggregate RAP shall be processed prior to testing by screening to where all RAP shall be retained on the No. 4 or larger screen. Category 2 coarse portion RAP stockpiles shall not contain steel slag or other expansive material and shall not contain uncrushed gravel as determined by the Illinois Tollway.

RAP/FRAP containing contaminants, such as earth, brick, sand, concrete, sheet asphalt, bituminous surface treatment (i.e. chip seal), pavement fabric, joint sealants, etc., will be unacceptable unless the contaminants are removed to the satisfaction of the Engineer. Sheet asphalt shall be stockpiled separately.

1031.03 Testing. When used in asphalt mixtures, the RAP/FRAP shall be sampled and tested either during or after stockpiling.

For testing during stockpiling, washed extraction samples shall be run at the minimum frequency of one sample per 500 tons for the first 2000 tons and one sample per 2000 tons thereafter. A minimum of five tests shall be required for stockpiles less than 4000 tons.

For testing after stockpiling, the Contractor shall submit a plan for approval to the IDOT District or to the Illinois Tollway proposing a satisfactory method of sampling and testing the RAP/FRAP pile either in-situ or by re-stockpiling. The sampling plan shall meet the minimum frequency required above and detail the procedure used to obtain representative samples throughout the pile for testing.

Before extraction, each field sample shall be split to obtain two samples of test sample size. One of the two test samples from the final split shall be labeled and stored for Illinois Tollway use. The Contractor shall extract the other test sample according to IDOT procedure. With the approval of the Engineer, a certified and calibrated Asphalt Analyzer or similar technology may be used to perform the extraction. The Engineer reserves the right to test any sample (split or Department/ Illinois Tollway-taken) to verify Contractor test results.

- (a) Testing Conglomerate 3/8. In addition to the requirements above, conglomerate 3/8 RAP shall be tested for maximum theoretical specific gravity (G_{mm}) at a frequency of one sample per 500 tons for the first 2000 tons and one sample per 2000 tons thereafter. A minimum of

five tests shall be required for stockpiles less than 4000 tons.

- (b) Evaluation of Test Results. All of the extraction results shall be compiled and averaged for asphalt binder content and gradation and, when applicable G_{mm} . Individual extraction test results, when compared to the averages, will be accepted if within the tolerances listed below.

| Parameter | Homogeneous / Conglomerate | Conglomerate "D" Quality | Fractionated – Fine Portion | Fractionated – Coarse Portion |
|-------------------|----------------------------|--------------------------|-----------------------------|-------------------------------|
| 1 in. (25 mm) | | ± 5 % | | |
| 1/2 in. (12.5 mm) | ± 8 % | ± 15 % | | ± 8 % |
| No. 4 (4.75 mm) | ± 6 % | ± 13 % | | ± 6 % |
| No. 8 (2.36 mm) | ± 5 % | | ± 5 % | |
| No. 16 (1.18 mm) | | ± 15 % | | |
| No. 30 (600 μm) | ± 5 % | | ± 5 % | |
| No. 200 (75 μm) | ± 2.0 % | ± 4.0 % | ± 2.0 % | |
| Asphalt Binder | ± 0.4 % ^{1/} | ± 0.5 % | ± 0.3 % | ± 0.3 % |
| G_{mm} | ± 0.02 ^{2/} | | | |

1/ The tolerance for conglomerate 3/8 shall be ± 0.3 %.

2/ Applies only to conglomerate 3/8. When variation of the G_{mm} exceeds the ± 0.02 % tolerance, a new conglomerate 3/8 stockpile shall be created which will also require an additional mix design.

If more than 20 percent of the individual sieves are out of the gradation tolerances, or if more than 20 percent of the asphalt binder content test results fall outside the appropriate tolerances, the RAP shall not be used in asphalt mixtures unless the RAP representing the failing tests is removed from the stockpile. All test data and acceptance ranges shall be sent to the IDOT or the Illinois Tollway for evaluation.

With the approval of the Engineer, the ignition oven may be substituted for extractions according to the Illinois Test Procedure, "Calibration of the Ignition Oven for the Purpose of Characterizing Reclaimed Asphalt Pavement (RAP)".

1031.04 Quality Designation of Aggregate in RAP/FRAP.

(a) The aggregate quality of the RAP for homogenous, conglomerate, and conglomerate "D" quality stockpiles shall be set by the lowest quality of coarse aggregate in the RAP stockpile and are designated as follows.

(1) RAP from Class I, Superpave (High ESAL), or HMA (High ESAL) surface mixtures are designated as containing Class B quality coarse aggregate.

(2) RAP from Superpave (Low ESAL)/HMA (Low ESAL) IL-19.0L binder and IL-9.5L surface mixtures are designated as Class D quality coarse aggregate.

(3) RAP from Class I, Superpave (High ESAL), or HMA (High ESAL) binder mixtures, bituminous base course mixtures, and bituminous base course widening mixtures

are designated as containing Class C quality coarse aggregate.

(4) RAP from bituminous stabilized subbase and BAM shoulders are designated as containing Class D quality coarse aggregate.

(b) The aggregate quality of FRAP shall be determined as follows.

(1) For Category 2 FRAP taken from a Illinois Tollway location, if the Engineer has documentation of the quality of the FRAP aggregate, the Contractor shall use the assigned quality provided by the Engineer. If the quality is not known, the quality shall be determined according to Article 1031.04(b)(2).

(2) For Category 2 FRAP taken from other routes or airfields under federal, state or local agency jurisdiction, the quality shall be determined according to Article 1031.04(b)(2).

(3) Category 1 FRAP taken from a Illinois Tollway Class I, Superpave mainline (high ESAL) surface or binder mixtures is designated as containing Class B quality coarse aggregate.

1031.05 Use of RAP in Asphalt Mixtures.

(1) Use of Non-Fractionated RAP in asphalt mixtures. The use of RAP in asphalt mixtures shall be as follows.

(a) Coarse Aggregate Size. The coarse aggregate in all RAP shall be equal to or less than the nominal maximum size requirement for the asphalt mixture to be produced.

(b) Steel Slag Stockpiles. RAP stockpiles containing steel slag or other expansive material, as determined by the IDOT or the Illinois Tollway, shall be homogeneous and will be approved for use in High ESAL and Low ESAL surface mixtures only.

(c) Use in Asphalt Surface Mixtures (High and Low ESAL). RAP stockpiles for use in asphalt surface mixtures (High and Low ESAL) shall be either homogeneous or conglomerate 3/8, in which the coarse aggregate is Class B quality or better.

(d) Use in Asphalt Binder Mixtures (High and Low ESAL), Asphalt Base Course, and Asphalt Base Course Widening. RAP stockpiles for use in asphalt binder mixtures (High and Low ESAL), asphalt base course, and asphalt base course widening shall be homogeneous, conglomerate 5/8, or conglomerate 3/8, in which the coarse aggregate is Class C quality or better.

(e) Use in Shoulders and Subbase. RAP stockpiles for use in asphalt shoulders and asphalt stabilized subbase shall be homogeneous, conglomerate 5/8, conglomerate 3/8, or conglomerate DQ.

(f) The use of RAP shall be a contractor's option when constructing asphalt mixtures in all contracts. When the contractor chooses the RAP option, the percentage of RAP shall not exceed the amounts indicated in the table for a given N Design.

Maximum RAP Percentage Using Non-Fractionated RAP

| Asphalt Mixtures ^{1/} | Maximum %, Non-Fractionated RAP | | |
|--------------------------------|---------------------------------|---------|---------------------|
| Ndesign | Binder/Leveling Binder | Surface | Polymer Modified |
| 50 | 25 | 15 | 10 |
| 70 | 25 | 10 | 10 |
| 90 | 25 | 10 | 10 |

1/ When RAP exceeds 20 percent, the high and low virgin asphalt binder grades shall each be reduced by one grade (i.e. 25 percent RAP would require a virgin asphalt binder grade of PG 64-22 to be reduced to a PG 58-28).

- (2) Use of Fractionated RAP in Asphalt Mixtures. The use of fractionated RAP in asphalt mixtures shall be as follows.
- (a) Coarse Aggregate Size. The coarse aggregate in the coarse portion of fractionated RAP shall be equal to or less than the nominal maximum size requirement for the asphalt mixture to be produced.
 - (b) Steel Slag Stockpiles. Fractionated RAP stockpiles containing steel slag or other expansive material, as determined by the Illinois Tollway, shall be approved for use in High ESAL surface mixtures only.
 - (c) Use in Asphalt Surface and Asphalt Binder Mixtures (High ESAL). Fractionated RAP for use in asphalt surface mixtures (High ESAL) shall be Category 1 or 2 fractionated RAP, in which the coarse aggregate is Class B quality or better.
 - (d) Use in Asphalt Surface Mixtures (Low ESAL). Fractionated RAP for use in asphalt surface mixtures (Low ESAL) shall be Category 1 or 2 fractionated RAP, in which the coarse aggregate is Class C quality or better.
 - (e) Use in Asphalt Binder Mixtures (Low ESAL) and Asphalt Base Course. Fractionated RAP for use in asphalt binder mixtures (Low ESAL) and asphalt base course mixtures shall be Category 1 or 2 fractionated RAP, in which the coarse aggregate is Class C quality or better.
 - (f) Use in Asphalt Shoulders and Asphalt Stabilized Subbase. Fractionated RAP for use in asphalt shoulder mixtures or asphalt stabilized subbase mixtures shall be Category 1 or 2 fractionated RAP.
 - (g) Use in SMA Mixtures. Fractionated RAP for use in SMA surface course and SMA binder course mixtures shall be the fine portion of Category 1 fractionated RAP, in which the fine aggregate is manufactured sand only.
 - (h) The use of fractionated RAP shall be a contractor's option when constructing asphalt mixtures in all contracts. When the contractor chooses the fractionated RAP option, the percentage of fractionated RAP shall not exceed the amounts indicated in the following tables for a given Ndesign. The percentage amounts of fractionated RAP

for any given mix design shall be a combination of both fine and coarse portion FRAP.

Maximum RAP Percentage Using Category 1 Fractionated RAP

| Asphalt Mixtures Ndesign | Maximum %, Category 1 Fractionated RAP ^{2/} | |
|-----------------------------|--|-----------------------|
| | Binder/Leveling Binder ^{1/} | Surface ^{4/} |
| 50 | 40 | 35 |
| 70 | 40 | 35 |
| 90 | 40 | 30 ^{3/} |

- 1/ For Asphalt Shoulder Binder Course N50, the amount of FRAP shall not exceed 40 percent, and for Asphalt Base Course N50, the amount of FRAP shall not exceed 50 percent of the mixture. For IL-4.75 Level Binder the amount of FRAP shall not exceed 35% of the mixture.
- 2/ When FRAP exceeds 20 percent the high and low virgin asphalt binder grades shall each be reduced by one grade (i.e. 30 percent FRAP would require a virgin asphalt binder grade of PG 64-22 to be reduced to a PG 58-28).
- 3/ Category 1 coarse portion fractionated RAP containing steel slag may be blended with virgin steel slag aggregate to obtain the specified properties in asphalt surface friction course mixes.
- 4/ Includes polymer modified surface course mixtures.

Maximum RAP Percentage Using Category 2 Fractionated RAP

| Asphalt Mixtures Ndesign | Maximum %, Category 2 Fractionated RAP ^{2/} | |
|-----------------------------|--|---------|
| | Binder/Leveling Binder ^{1/} | Surface |
| 50 | 40 | 30 |
| 70 | 40 | 30 |
| 90 | 30 | 15 |

- 1/ For Asphalt Shoulder Binder Course N50, the amount of FRAP shall not exceed 40%, and for Asphalt Base Course N50, the amount of FRAP shall not exceed 50% of the mixture. For IL-4.75 Level Binder the amount of FRAP shall not exceed 25% of the mixture.
- 2/ When FRAP exceeds 20 percent, the high and low virgin asphalt binder grades shall each be reduced by one grade (i.e. 30 percent RAP would require a virgin asphalt binder grade of PG 64-22 to be reduced to a PG 58-28).

Maximum RAP Percentage Using Category 1 Fractionated RAP

| SMA Mixtures ^{1/} | Maximum %, Category 1 Fine Portion Fractionated RAP ^{2/} | Maximum % Category 1 Coarse Portion Fractionated RAP ^{2/} |
|----------------------------|---|--|
| Binder | 20 | 10 |
| Surface | 20 | 10 |

1/ Positive dust control must be used in the production of SMA mixtures.

2/ When total FRAP exceeds 20 percent in an SMA mix, the high and low virgin asphalt binder grades shall each be reduced by one grade (i.e. 25 percent FRAP would require a virgin asphalt binder grade of PG 76-22 to be reduced to a PG 70-28 in a polymerized mix or require a virgin asphalt binder grade of PG 64-22 GTR-12 to be reduced to a PG 58-28 GTR-12 in a GTR mix).

1031.06 Asphalt Mix Designs. At the Contractor's option, asphalt mixtures may be constructed utilizing RAP/FRAP material meeting the above detailed requirements.

RAP/FRAP designs shall be submitted for volumetric verification. If additional RAP/FRAP stockpiles are tested and found that no more than 20 percent of the results, as defined under "Testing" herein, are outside of the control tolerances set for the original RAP/FRAP stockpile and asphalt mix design, and meets all of the requirements herein, the additional RAP/FRAP stockpiles may be used in the original mix design at the percent previously verified.

With approval of the Engineer, for asphalt plants using positive dust control, the mix designer may choose to develop the mix design with less than 1.0 percent mineral filler added in the laboratory.

The Contractor's mix design shall use a bulk aggregate specific gravity (G_{sb}) of the RAP/FRAP equal to 2.660. As an option, the Contractor may have the Illinois Tollway conduct G_{sb} of the RAP/FRAP stockpile(s), for possible use in the mix design. If the Contractor chooses this option, the following procedure will be used for determining G_{sb} :

1. Provide the Illinois Tollway with a 20,000 gram representative sample of each RAP/FRAP material.
2. The RAP/FRAP will be heated to 230°F, and the RAP/FRAP agglomerations broken down, as if conducting a maximum specific gravity test.
3. The asphalt content will be determined on a 1,000 – 1,500 gram sample of the RAP/FRAP.
4. A 3,000 gram sample of the RAP/FRAP will be dried to a constant weight. One percent virgin asphalt binder will be added to the RAP/FRAP and mixed thoroughly. The sample will be split into two parts, and the maximum specific gravity (G_{mm}) of each sample determined.
5. The G_{se} of each sample will be calculated and averaged.
6. If historical mix data or the mix design of the RAP/FRAP source is available, the asphalt absorption from that information will be used to calculate the G_{sb} of the RAP/FRAP. If

no information is available on the RAP/FRAP source, an asphalt absorption of 1.0 percent will be used to calculate the G_{sb} of the RAP/FRAP.

1031.07 Asphalt Mixture Production. The coarse aggregate in all RAP/FRAP used shall be equal to or less than the nominal maximum size requirement for the asphalt mixture being produced.

To remove or reduce agglomerated material, a scalping screen, crushing unit, or comparable sizing device approved by the Engineer shall be used in the RAP/FRAP feed system to remove or reduce oversized material. If material passing the sizing device adversely affects the mix production or quality of the mix, the sizing device shall be set at a size specified by the Engineer.

If the RAP/FRAP control tolerances or QC/QA test results require corrective action, the Contractor shall cease production of the mixture containing RAP/FRAP and either switch to the virgin aggregate design or submit a new RAP/FRAP design. When producing SMA mixtures or mixtures containing conglomerate 3/8 RAP, a positive dust control system shall be utilized.

Asphalt mixture plants utilizing RAP/FRAP shall be capable of automatically recording and printing the following information.

(a) Dryer Drum Plants.

- (1) Date, month, year, and time to the nearest minute for each print.
- (2) Asphalt mix number assigned by IDOT or Illinois Tollway.
- (3) Accumulated weight of dry aggregate (combined or individual) in tons (metric tons) to the nearest 0.1 ton.
- (4) Accumulated dry weight of RAP/FRAP in tons to the nearest 0.1 ton.
- (5) Accumulated mineral filler in revolutions, tons, etc. to the nearest 0.1 unit.
- (6) Accumulated asphalt binder in gallons, tons, etc. to the nearest 0.1 unit.
- (7) Residual asphalt binder in the RAP/FRAP material as a percent of the total mix to the nearest 0.1 percent.
- (8) Aggregate and RAP/FRAP moisture compensators in percent as set on the control panel. (Required when accumulated or individual aggregate and RAP/FRAP are printed in wet condition.)

(b) Batch Plants.

- (1) Date, month, year, and time to the nearest minute for each print.
- (2) Asphalt mix number assigned by IDOT or Illinois Tollway.

- (3) Individual virgin aggregate hot bin batch weights to the nearest pound (kilogram).
- (4) Mineral filler weight to the nearest pound.
- (5) RAP/FRAP weight to the nearest pound.
- (6) Virgin asphalt binder weight to the nearest pound.
- (7) Residual asphalt binder in the RAP/FRAP material as a percent of the total mix to the nearest 0.1 percent.

The printouts shall be maintained in a file at the plant for a minimum of one year or as directed by the Engineer and shall be made available upon request. The printing system will be inspected by the Engineer prior to production and verified at the beginning of each construction season thereafter.

1031.08 RAP in Aggregate Surface Course and Aggregate Shoulders. The use of RAP in aggregate surface course and aggregate shoulders shall be as follows.

- (a) Stockpiles and Testing. RAP stockpiles may be any of those listed in Article 1031.02, except "Non-Quality" and "FRAP." The testing requirements of Article 1031.03 shall not apply.
- (b) Gradation. One hundred percent of the RAP material shall pass the 1 1/2 in. sieve. The resulting gradation shall vary by no more than 25% Cumulative Retained when screened across 1 1/2", 1", 3/4", 5/8", 1/2", 3/8", 1/4" #4, #16, #30, #40, #50, #100, and #200. Gradations may be performed dry, without the need for washing, per ASTM C 136.

1031.09 Use of RAP in Porous Granular Embankment. The use of RAP in porous granular embankment, as outlined in the Illinois Tollway Special Provision "Subgrade Aggregate, Special" shall be as follows:

- (a) Stockpiles and Testing. RAP stockpiles may be any of those listed in Article 1031.02, except "Conglomerate 5/8," Conglomerate 3/8," and "FRAP." The testing requirements of Article 1031.03 shall not apply.
- (b) Gradation. One hundred percent of the RAP material shall pass the 4 in. sieve. The RAP gradation shall be such that the "Crushed Concrete with Crushed RAP Materials" gradation requirements in the Illinois Tollway Special Provision "Subgrade Aggregate, Special" are achieved.

RECLAIMED ASPHALT SHINGLES (RAS) (Illinois Tollway)

Effective: November 6, 2011

Revised: January 26, 2018

Description. Reclaimed asphalt shingles (RAS) meeting Type 1 or Type 2 requirements used as an asphalt binder and fine aggregate source, may be included in both shoulder and mainline wearing surface course and non-wearing binder / leveling course asphalt mixtures produced in accordance with Section 406 of the Standard Specifications and applicable contract special provisions when shown on the plans and approved by the Engineer; however, the use of Type 1 RAS may be restricted when shown on the plans. Type 1 or Type 2 RAS used as a fiber reinforcement substitution, may be included in mainline surface and non-wearing binder course Stone Matrix Asphalt (SMA) mixtures. Type 1 or Type 2 RAS used as an asphalt binder source, may be used in Asphalt stabilized subbase produced in accordance with Section 312 of the Standard Specifications. Type 1 and Type 2 RAS shall not be blended in any asphalt mixture.

Definitions. RAS shall meet either Type 1 or Type 2 requirements as specified herein.

- (a) Type 1. Type 1 RAS shall be processed, pre-consumer asphalt shingles salvaged from the manufacturer of asphalt roof shingles.
- (b) Type 2. Type 2 RAS shall be processed post-consumer shingles only, salvaged from residential dwellings of four units or less, that are not subject to the National Emission Standards for Hazardous Air Pollutants (NESHAP).

Materials. All RAS materials shall be processed by certified producers such that the following gradation requirements are met:

| Gradation | |
|------------------|-----------------|
| Sieve | Percent Passing |
| 3/8 in. (9.5 mm) | 100 |
| No. 4 (4.75 mm) | 93 - 100 |

The final product shall have no particle exceeding the maximum aggregate size allowed for the specific mixture as defined by contract specifications. To conduct the gradation testing, a 500 – 700 gram sample of processed shingle material is air dried and then dry sieved over the 3/8” and No. 4 sieves and weighed.

The RAS producer may mechanically blend sand (FM 01, FM 02, FM 20 or FM 22) or fine, processed reclaimed asphalt pavement (RAP) up to an equal weight of processed RAS will be permitted. The process and procedures to incorporate sand or RAP shall be included in the producers QC Plan. The sand shall be “B Quality” or better from an approved Aggregate Gradation Control System source.

RAS asphalt binder content is to be determined by chemical extraction in accordance with Illinois Method AASHTO T164. With the approval of the Engineer, a certified and calibrated Asphalt Analyzer or similar technology may be used to perform the extraction.

Before a mix design containing RAS for a particular mixture is authorized, the following shall be submitted with the mix design for volumetric verification:

Certification by the IEPA permitted post-consumer or IDOT approved pre-consumer processor of the RAS material, as to the RAS content and source. Certification forms are located at the back of this special provision and also available from the Illinois Tollway Materials Office.

With approval of the Engineer, for asphalt plants using positive dust control, the mix designer may choose to develop the mix design with less than 1.0 percent mineral filler added in the laboratory.

Deleterious Materials. Processed Type 1 or Type 2 RAS materials shall not contain more than 0.5% deleterious materials. Deleterious materials including, but not limited to, asbestos, metals, glass, rubber, nails, soil, brick, tars, paper, wood, and plastics, shall not exceed 0.5% by weight as determined on material retained on the 4.75 mm (No. 4) sieve. To conduct deleterious material testing, a 500 – 700 gram sample of processed RAS material is sieved on the No. 4 sieve and any deleterious material is picked and weighed.

Type 2 RAS from post-consumer sources shall contain less than the maximum percentage of asbestos fibers based on testing procedures and frequencies established by the Illinois Tollway, state or federal environmental regulatory agencies.

QUALITY CONTROL REQUIREMENTS

RAS stockpiles shall be sampled and tested by the processor or their accredited lab for gradation, asphalt content, and deleterious material content as follows:

- a. Sampling. Washed extraction samples for binder content and gradation, and dry gradation samples for deleterious content shall be obtained at the minimum frequency of one sample per 200 tons for the first 1000 tons and one sample per 1000 tons thereafter. A minimum of 5 sets of samples shall be required for stockpiles less than 1000 tons to establish an average gradation and asphalt cement content of the RAS for use in an asphalt mix design.
- b. Extraction / Gradation. Before extraction, each field sample shall be split to obtain two samples of test sample size. One of the two test samples from the final split shall be labeled and stored for agency use. The processor shall extract the other test sample according to Illinois Method AASHTO T164 for solvent extraction to determine binder content and gradation. With the approval of the Engineer, the ignition oven may be substituted for extractions according to the IDOT test procedure, "Calibration of the Ignition Oven for the Purpose of Characterizing Reclaimed Asphalt Pavement (RAP)". The agency reserves the right to test any sample (split or agency-taken) to verify the processors' test results.
- c. Specific Gravity. For asphalt mix designs that contain RAS that has not been mechanically blended with any other product, a bulk specific gravity (G_{sb}) of 2.300 shall be used for RAS in the design. Blended RAS products may have other specific gravity values for use in asphalt mix design but shall be verified by the Illinois Tollway. When the blended RAS product is approved by the Illinois Tollway an approval letter will be sent to the supplier with the approved gradation and specific gravity assignment.

- d. Deleterious Content. 500 to 700 grams of the RAS samples shall be air dried and dry sieved on the No. 4 sieve and any deleterious material shall be removed and weighed. The agency reserves the right to test any sample (split or agency-taken) to verify the processors' test results.
- e. Evaluation of Results. All of the extraction and deleterious content results shall be compiled and averaged for asphalt binder content, gradation, and deleterious content. Individual extraction test results, when compared to the averages, will be accepted if within the tolerances listed below.

| Parameter | RAS Sample |
|------------------|------------|
| No. 8 (2.36 mm) | ±5% |
| No. 16 (1.18 mm) | ±5% |
| No. 30 (600 µm) | ±4% |
| No. 200 (75 µm) | ±2.0% |
| Asphalt Binder | ±1.5% |

If more than 20 percent of the individual sieves are out of the gradation tolerances, or if more than 20 percent of the asphalt binder content test results fall outside the appropriate tolerances, the RAS source will no longer be allowed for use in asphalt mixtures.

Processed RAS materials from Type 1 or Type 2 RAS sources shall be stockpiled separately from other recycled materials. Blending of RAS materials in a stockpile with other recycled materials from other sources is prohibited.

Use of RAS in asphalt mixtures. Type 1 or Type 2 RAS may be used in all asphalt mixtures as follows:

(a) SMA Mixes:

(1) The maximum allowable RAS usage in SMA shall be as follows:

- a. RAS shall not exceed 5.0 percent by weight of the total mix.
- b. RAS shall not be used in conjunction with standard Reclaimed Asphalt Pavement (RAP). If Category 2 Fractionated Reclaimed Asphalt Pavement (FRAP) is used, the Fine Aggregate Angularity (FAA) of the Category 2 FRAP as tested in accordance with AASHTO T 304 method A, must be ≥ 45.0 .
- c. If used in conjunction with Category 1 FRAP the contribution of asphalt binder from the RAS and FRAP combined in any dense graded HMA mixture shall not exceed 35 percent of the total asphalt binder content in the mix design, or in any WMA mixture shall not exceed 40 percent of the total asphalt binder content in the mix design.

- d. If used in conjunction with Category 1 FRAP, the contribution of asphalt binder from RAS and FRAP combined in any WMA SMA mixture shall not exceed 50%¹ of the total asphalt binder content in the mix design.
- (2) The virgin asphalt binder grade shall be per the Illinois Tollway Stone Matrix Warm Mix Asphalt Special Provision based on Recycle Type/Amount.

(b) N70 Shoulder Surface Mixes:

- (1) The maximum allowable RAS usage in N70 shoulder surface mixtures (Mix D) shall be as follows:
 - a. RAS shall not exceed 5.0 percent by weight of the total mix.
 - b. If used in conjunction with standard RAP the contribution of asphalt binder from the RAS and RAP combined shall not exceed 20 percent of the total asphalt binder content in the mix design.
 - c. If used in conjunction with Category 1 or 2 FRAP the contribution of asphalt binder from the RAS and FRAP combined shall not exceed 50 percent of the total asphalt binder content in the mix design.
- (2) The virgin asphalt binder grade shall be as follows:

| | Percent RAS/Standard RAP/FRAP Asphalt Binder Replacement |
|----------------------------|--|
| <u>Mix Type</u> | < 20% |
| N70 Shoulder Surface Mixes | No grade bump ^{1/} |

| | Percent RAS/FRAP Asphalt Binder Replacement | |
|----------------------------|---|---|
| <u>Mix Type</u> | 21-40% | 41– 50% ² |
| N70 Shoulder Surface Mixes | Reduce High and Low temperature by one grade ¹ | Reduce high & low temperature by two grades ^{1/} |

^{1/}One asphalt binder grade bump represents a change of 6°C.

^{2/}40% Max allowed unless DCT criteria is met per Asphalt Shoulder Special Provision.

(c) N70/N90 Binder and N70/N90 Leveling Binder Mixes:

- (1) The maximum allowable RAS usage in N70/N90 Binder and IL-19.0 Leveling Binder Mixes shall be as follows:
 - a. RAS shall not exceed 5.0 percent by weight of the total mix.

- b. If used in conjunction with Standard RAP the contribution of asphalt binder from the RAS and RAP combined shall not exceed 30 percent of the total asphalt binder content in the mix design.
- c. If used in conjunction with Category 1 FRAP the contribution of asphalt binder from the RAS and RAP combined shall not exceed 45 percent of the total asphalt binder content in the mix design.
- d. If used in conjunction with Category 2 FRAP the contribution of asphalt binder from the RAS and RAP combined shall not exceed 35 percent of the total asphalt binder content in the mix design.

(2) Virgin asphalt binder grade shall be as follows:

| | Percent RAS/Standard RAP Asphalt Binder Replacement | |
|---|---|--|
| <u>Mix Type</u> | < 20% | 20 – 30% |
| N70/N90 Binder or N70/N90 Leveling Binder | No grade bump ^{1/} | Reduce high & low temperature by one grade ^{1/} |

| | Percent RAS/Category 1 FRAP Asphalt Binder Replacement | |
|---|--|--|
| <u>Mix Type</u> | < 20% | 20 – 45% |
| N70/N90 Binder or N70/N90 Leveling Binder | No grade bump ^{1/} | Reduce high & low temperature by one grade ^{1/} |

| | Percent RAS/Category 2 FRAP Asphalt Binder Replacement | |
|---|--|--|
| <u>Mix Type</u> | < 20% | 20 – 35% |
| <u>N70/90 Binder or N70/N90 Leveling Binder</u> | No grade bump ¹ | Reduce high & low temperature by one grade ^{1/} |

^{1/}One asphalt binder grade bump represents a change of 6°C.

(d) N50 IL-4.75 mm Leveling Binder Mix:

- (1) The maximum allowable RAS usage in the N50 IL-4.75 Leveling Binder Mix shall be as follows:
 - a. RAS shall not exceed 5.0 percent by weight of the total mix.
 - b. If used in conjunction with Standard RAP the contribution of asphalt binder from the RAS and RAP combined shall not exceed 20 percent of the total asphalt binder content in the mix design.
 - c. If used in conjunction with Category 1 FRAP the contribution of asphalt binder from the RAS and RAP combined shall not exceed 50 percent of the total asphalt binder content in the mix design.
 - d. If used in conjunction with Category 2 FRAP the contribution of asphalt binder from the RAS and RAP combined shall not exceed 30 percent of the total asphalt binder content in the mix design.
- (2) The virgin asphalt binder grade shall be per Illinois Tollway Asphalt Mixture IL-4.75 Special Provision based on Recycle Type/Amount.

(e) N50 Asphalt Binder Mixes:

- (1) The maximum allowable RAS usage in N50 Binder Mixes shall be as follows:
 - a. RAS shall not exceed 5.0 percent by total weight of mix.
 - b. If used in conjunction with standard RAP the contribution of asphalt binder from the RAS and RAP combined shall not exceed 30 percent of the total asphalt binder content in the mix design.
 - c. If used in conjunction with Category 1 or 2 FRAP the contribution of asphalt binder from the RAS and FRAP combined shall not exceed 40 percent of the total asphalt binder content in the mix design.
 - d. If used in conjunction with Category 1 or 2 FRAP the contribution of asphalt binder from the RAS and FRAP combined shall not exceed 60%¹ of the total asphalt content of the mix design.
1/ 40% Max allowed unless DCT criteria is met per Asphalt Binder and Surface course or Asphalt Shoulder Special Provision.

(2) Virgin asphalt binder grade shall be as follows:

| Percent RAS/Standard RAP Asphalt Binder Replacement | | |
|---|-----------------------------|--|
| <u>Mix Type</u> | < 20% | 20 – 30% |
| N50 Binder | No grade bump ^{1/} | Reduce high and low temperature by one grade ^{1/} |

| Percent RAS/ FRAP Asphalt Binder Replacement | | |
|--|-----------------------------|--|
| <u>Mix Type</u> | < 20% | 20 – 40% |
| N50 Binder | No grade bump ^{1/} | Reduce high & low temperature by one grade ^{1/} |

^{1/} One asphalt binder grade bump represents a change of 6°C.

| Percent RAS/ FRAP Asphalt Binder Replacement | | |
|--|-----------------------------|---|
| <u>Mix Type</u> | < 20% | 41-60% ² |
| N50 Binder | No grade bump ^{1/} | Reduce high & low temperature by two grades ^{1/} |

^{1/} One asphalt binder grade bump represents a change of 6°C.

^{2/} 40% Max allowable unless DCT criteria is met per Asphalt Binder and Surface course or Asphalt Shoulder Special Provision.

(f) Asphalt Stabilized Subbase Mixes:

(3) The maximum allowable RAS usage in Asphalt Stabilized Subbase Mixes shall be as follows:

- a. RAS shall not exceed 5.0 percent by total weight of mix.
- b. If used in conjunction with Category 1 or 2 FRAP the contribution of asphalt binder from the RAS and FRAP combined shall not exceed 65 percent of the total asphalt binder content in the mix design.

(4) Virgin asphalt binder grade shall be as follows:

| Percent RAS/Standard RAP/FRAP Asphalt Binder Replacement | | |
|--|-----------------------------|--|
| <u>Mix Type</u> | < 20 | 20 – 50 |
| Asphalt Stabilized Subbase | No grade bump ^{1/} | Reduce high & low temperature by one grade ^{1/} |

| Percent RAS/ FRAP Asphalt Binder Replacement | | |
|--|-----------------------------|--|
| <u>Mix Type</u> | < 20 | 20 – 65 |
| Asphalt Stabilized Subbase | No grade bump ^{1/} | Reduce high & low temperature by one grade ^{1/} |

1/ One asphalt binder grade bump represents a change of 6°C.

Asphalt Mix Production. RAS shall be incorporated into the asphalt mixture either by a separate weight depletion system or by using the RAP weigh belt. Either feed system shall be interlocked with the aggregate feed or weigh system to maintain correct proportions for all rates of production and batch sizes. While an auger-feed system is preferred, any system must provide a consistent, even flow of material and be approved by the Illinois Tollway. The portion of RAS shall be controlled accurately to within ± 0.5 percent of the amount of RAS utilized. When using the weight depletion system, flow indicators or sensing devices shall be provided and interlocked with the plant controls such that mixture production is halted when RAS flow is interrupted.

When producing asphalt mixtures containing RAS, a positive dust control system shall be utilized, and the incoming RAS material shall be sampled and tested weekly by chemical extraction in accordance with Illinois Method AASHTO T164, as a check for compliance with the RAS producer's master band.

Asphalt mixture plants utilizing RAS shall be capable of automatically recording and printing the following information:

(a) Dryer Drum Plants.

- (1) Date, month, year, and time to the nearest minute for each print.
- (2) Asphalt mix number assigned by the Agency.
- (3) Accumulated weight of dry aggregate (combined or individual) in tons to the nearest 0.1 ton.
- (4) Accumulated dry weight of RAS in tons to the nearest 0.1 ton.
- (5) Accumulated mineral filler in revolutions, tons, etc. to the nearest 0.1 unit.
- (6) Accumulated asphalt binder in gallons, tons, etc. to the nearest 0.1 unit.
- (7) Residual asphalt binder in the RAS material as a percent of the total mix to the nearest 0.1 percent.
- (8) Aggregate and RAS moisture compensators in percent as set on the control panel. (Required when accumulated or individual aggregate and RAS are printed in wet conditions).

(b) Batch Plants.

- (1) Date, month, year, and time to the nearest minute for each print.
- (2) Asphalt mix number assigned by the Agency.
- (3) Individual virgin aggregate hot bin batch weights to the nearest pound.
- (4) Mineral filler weight to the nearest pound.
- (5) RAS weight to the nearest pound.
- (6) Virgin asphalt binder weight to the nearest pound.
- (7) Residual asphalt binder in the RAS material as a percent of the total mix to the nearest 0.1 percent.

The printouts shall be maintained in a file at the plant for a minimum of one year or as directed by the Engineer and shall be made available upon request. The printing system will be inspected by the Engineer prior to production and verified at the beginning of each construction season thereafter.

Approved Asphalt Shingle Recycling Facility
Quality Control / Quality Assurance Certification Form
Delivered Recycled Asphalt Shingles

Asphalt Shingle Recycling Facility: _____

Address: _____

Contact: _____

Phone: _____

Approved Facility No: _____

We the undersigned certify the delivered product meets the following specifications:

1. RAS is ground to 3/8" minus.
2. The material does not contain more than 1.5% deleterious material by weight.
3. ***Supply Certification Forms*** were completed and are on file at
_____ (recycling facility).

Note: Deleterious material is defined as paper, plastic, wood or other material that is not part of the asphalt shingle (i.e. fibers, aggregate etc).

RAS **Delivered** **to:**

Company Name: _____

Address: _____

Contact: _____

Tonnage of RAS Delivered: _____

Record keeping: Copies of these forms shall be maintained by the Asphalt Shingle Recycling Facility and Hot Mix Asphalt Plant for a minimum period of 3 years, and made available to state agencies upon request.

Asphalt Shingle Recycling Facility (signature) *Date* _____

Hot Mix Asphalt Plant (signature) *Date* _____

RECLAIMED CONCRETE PRODUCTION WATER FOR USE IN CONCRETE (Illinois Tollway)

Effective: July 10, 2014

Revised: April 1, 2016

Description. This specification covers the blending, testing, storing, use of and requirements for reclaimed water in Portland cement concrete pavement.

Material. Reclaimed water from concrete production operations shall be according to the requirements of ASTM C 1602 "Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete" and applies only to the reclaimed water sources identified in Section 3.2.5 of ASTM C 1602.

Use. Reclaimed water will only be allowed in Illinois Tollway Class TL concrete mix designs at a maximum of 20.0% total by weight of mix water. Reclaimed water is prohibited in all other concrete class mix designs. This material will only be allowed in work without reinforcement bars. Dowel bars and tie bars are not considered reinforcement bars

Reclaimed water shall be weighed or metered separately from water conforming to Article 1002.01 of the Standard Specifications and shall be detailed separately on batch sheets used to document concrete batch weights.

Quality. The reclaimed water shall be clean, clear, and free from sugar. Reclaimed water shall be combined at a 1:4 ratio with water conforming to Article 1002.01 of the Standard Specifications. The combined water shall be tested for compliance with Table 1 of ASTM C 1602 and all the chemical limits in Table 2 of ASTM C 1602. The Contractor shall perform and submit test results to the Engineer at the frequencies listed in ASTM C 1602 or more often when there is reason to believe that a change has occurred in the characteristics of the source.

Water Intake. Reclaimed water shall enter a settling pond before being filtered to remove the necessary amount of solids to meet the limits in Table 1 and 2 of ASTM C 1602. The intake of the pipeline shall be at a minimum height of 2 feet above the bottom of the reclaimed water settling pond. A properly labeled tank shall be provided for storage of the reclaimed water. The tank is to be separate from water which has been approved by the Illinois Department of Public Health for drinking or household use. The tank may be heated, however the maximum water temperature of the reclaimed water shall not exceed 150 °F (65 °C).

Quality Control Plan. The Contractor's project specific Concrete Quality Control Plan shall include an amendment detailing the producer's approach to controlling the quality of the reclaimed water. The amendment shall include:

- A detailed description of the water reclamation system, including how incoming and outgoing water will be monitored and controlled.
- A detailed schedule of how all chemical and physical tests will be completed and documented to verify compliance with ASTM C 1602.
- Identification of the lab and all laboratory personnel who will conduct physical and/or chemical analysis tests.
- The lab manager's signature and contact information.
- Instructions detailing the lab manager's method of transmitting test results to the Engineer.

CHECK SHEET FOR RECURRING SPECIAL PROVISIONS

Adopted January 1, 2018

The following RECURRING SPECIAL PROVISIONS indicated by an "X" are applicable to this contract and are included by reference:

Recurring Special Provisions

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PIPE UNDERDRAINS FOR STRUCTURES

Effective: May 17, 2000

Revised: January 22, 2010

Description. This work shall consist of furnishing and installing a pipe underdrain system as shown on the plans, as specified herein, and as directed by the Engineer.

Materials. Materials shall meet the requirements as set forth below:

The perforated pipe underdrain shall be according to Article 601.02 of the Standard Specifications. Outlet pipes or pipes connecting to a separate storm sewer system shall not be perforated.

The drainage aggregate shall be a combination of one or more of the following gradations, FA1, FA2, CA5, CA7, CA8, CA11, or CA13 thru 16, according to Sections 1003 and 1004 of the Standard Specifications.

The fabric surrounding the drainage aggregate shall be Geotechnical Fabric for French Drains according to Article 1080.05 of the Standard Specifications.

Construction Requirements. All work shall be according to the applicable requirements of Section 601 of the Standard Specifications except as modified below.

The pipe underdrains shall consist of a perforated pipe drain situated at the bottom of an area of drainage aggregate wrapped completely in geotechnical fabric and shall be installed to the lines and gradients as shown on the plans.

Method of Measurement. Pipe Underdrains for Structures shall be measured for payment in feet (meters), in place. Measurement shall be along the centerline of the pipe underdrains. All connectors, outlet pipes, elbows, and all other miscellaneous items shall be included in the measurement. Concrete headwalls shall be included in the cost of Pipe Underdrains for Structures, but shall not be included in the measurement for payment.

Basis of Payment. This work will be paid for at the contract unit price per foot (meter) for PIPE UNDERDRAINS FOR STRUCTURES of the diameter specified. Furnishing and installation of the drainage aggregate, geotechnical fabric, forming holes in structural elements and any excavation required, will not be paid for separately, but shall be included in the cost of the pipe underdrains for structures.

BRIDGE DECK CONSTRUCTION

Effective: October 22, 2013

Revised: December 21, 2016

When Diamond Grinding of Bridge Sections is specified, hand finishing of the deck surface shall be limited to areas not finished by the finishing machine and to address surface corrections according to Article 503.16(a)(2). Hand finishing shall be limited as previously stated solely for the purpose of facilitating a more timely application of the curing protection. In addition the requirements of 503.16(a)(3)a. and 503.16(a)(4) will be waived.

Revise the Second Paragraph of Article 503.06(b) to read as follows.

“When the Contractor uses cantilever forming brackets on exterior beams or girders, additional requirements shall be as follows.”

Revise Article 503.06(b)(1) to read as follows.

“(1) Bracket Placement. The spacing of brackets shall be per the manufacturer’s published design specifications for the size of the overhang and the construction loads anticipated. The resulting force of the leg brace of the cantilever bracket shall bear on the web within 6 inches (150 mm) of the bottom flange of the beam or girder.”

Revise Article 503.06(b)(2) to read as follows.

“(2) Beam Ties. The top flange of exterior steel beams or girders supporting the cantilever forming brackets shall be tied to the bottom flange of the next interior beam. The top flange of exterior concrete beams supporting the cantilever forming brackets shall be tied to the top flange of the next interior beam. The ties shall be spaced at 4 ft (1.2 m) centers. Permanent cross frames on steel girders may be considered a tie. Ties shall be a minimum of 1/2 inch (13 mm) diameter threaded rod with an adjusting mechanism for drawing the tie taut. The ties shall utilize hanger brackets or clips which hook onto the flange of steel beams. No welding will be permitted to the structural steel or stud shear connectors, or to reinforcement bars of concrete beams, for the installation of the tie bar system. After installation of the ties and blocking, the tie shall be drawn taut until the tie does not vary from a straight line from beam to beam. The tie system shall be approved by the Engineer.”

Revise Article 503.06(b)(3) to read as follows.

“(3) Beam Blocks. Suitable beam blocks of 4 in x 4 in (100 x 100 mm) timbers or metal structural shapes of equivalent strength or better, acceptable to the Engineer, shall be wedged between the webs of the two beams tied together, within 6 inches (150 mm) of the bottom flange at each location where they are tied. When it is not feasible to have the resulting force from the leg brace of the cantilever brackets transmitted to the web within 6 inches (150 mm) of the bottom flange, then additional blocking shall be placed at each bracket to transmit the resulting force to within 6 inches (150 mm) of the bottom flange of the next interior beam or girder.”

Delete the last paragraph of Article 503.06(b).

MAINTENANCE OF ROADWAYS

Effective: September 30, 1985

Revised: November 1, 1996

Beginning on the date that work begins on this project, the Contractor shall assume responsibility for normal maintenance of all existing roadways within the limits of the improvement. This normal maintenance shall include all repair work deemed necessary by the Engineer, but shall not include snow removal operations. Traffic control and protection for maintenance of roadways will be provided by the Contractor as required by the Engineer.

If items of work have not been provided in the contract, or otherwise specified for payment, such items, including the accompanying traffic control and protection required by the Engineer, will be paid for in accordance with Article 109.04 of the Standard Specifications.

PUBLIC CONVENIENCE AND SAFETY (D-1)

Effective: May 1, 2012

Revised: July 15, 2012

Add the following to the end of the fourth paragraph of Article 107.09:

“If the holiday is on a Saturday or Sunday, and is legally observed on a Friday or Monday, the length of Holiday Period for Monday or Friday shall apply.”

Add the following sentence after the Holiday Period table in the fourth paragraph of Article

107.09: “The Length of Holiday Period for Thanksgiving shall be from 5:00 AM the wednesday prior to 11:59 PM the Sunday After”

Delete the fifth paragraph of Article 107.09 of the Standard Specifications:

“On weekends, excluding holidays, roadways with Average Daily Traffic of 25,000 or greater, all lanes shall be open to traffic from 3:00 P.M. Friday to midnight Sunday except where structure construction or major rehabilitation makes it impractical.”

NIGHTTIME WORK ZONE LIGHTING (District One)

Effective: November 1, 2008

Revised: June 15, 2010

Description. This work shall consist of furnishing, installing, maintaining, moving, and removing lighting for nighttime work zones. Nighttime shall be defined as occurring shortly before sunset until after sunrise.

Materials. The lighting shall consist of mobile and/or stationary lighting systems as required herein for the specific type of construction. Mobile lighting systems shall consist of luminaires attached to construction equipment or moveable carts. Stationary lighting systems shall consist of roadway luminaires mounted on temporary poles or trailer mounted light towers at fixed locations. Some lighting systems, such as balloon lights, may be adapted to both mobile and stationary applications.

Equipment. The Contractor shall furnish an illuminance meter for use by the Engineer. The meter shall have a digital display calibrated to NIST standards, shall be cosine and color corrected, and shall have an accuracy of \pm five percent. The sensor shall have a level indicator to ensure measurements are taken in a horizontal plane.

CONSTRUCTION REQUIREMENTS

General. At the preconstruction conference, the Contractor shall submit the type(s) of lighting system to be used and the locations of all devices.

Before nighttime construction may begin, the lighting system shall be demonstrated as being operational.

Nighttime Flagging. The requirements for nighttime flagging shall be according to Article 701.13 of the Standard Specifications and the glare control requirements contained herein.

Lighting System Design. The lighting system shall be designed to meet the following.

- (a) Lighting Levels. The lighting system shall provide a minimum of 5 foot candles (54 lux) throughout the work area. For mobile operations, the work area shall be defined as 25 ft (9 m) in front of and behind moving equipment. For stationary operations, the work area shall be defined as the entire area where work is being performed.

Lighting levels will be measured with an illuminance meter. Readings will be taken in a horizontal plane 3 ft (1 m) above the pavement or ground surface.

- (b) Glare Control. The lighting system shall be designed and operated so as to avoid glare that interferes with traffic, workers, or inspection personnel. Lighting systems with flood, spot, or stadium type luminaires shall be aimed downward at the work and rotated outward no greater than 30 degrees from nadir (straight down). Balloon lights shall be positioned at least 12 ft (3.6 m) above the roadway.

As a large component of glare, the headlights of construction vehicles and equipment shall not be operated within the work zone except as allowed for specific construction operations. Headlights shall never be used when facing oncoming traffic.

- (c) Light Trespass. The lighting system shall be designed to effectively light the work area without spilling over to adjoining property. When, in the opinion of the Engineer, the lighting is disturbing adjoining property, the Contractor shall modify the lighting arrangement or add hardware to shield the light trespass.

Construction Operations. The lighting design required above shall be provided at any location where construction equipment is operating or workers are present on foot. When multiple operations are being carried on simultaneously, lighting shall be provided at each separate work area.

The lighting requirements for specific construction operations shall be as follows.

- (a) Installation or Removal of Work Zone Traffic Control. The required lighting level shall be provided at each truck and piece of equipment used during the installation or removal of work zone traffic control. Headlights may be operated in the work zone.
- (b) Guardrail, Fence and High Tension Cable Barrier Median Repair. The required lighting level shall be provided by mounting a minimum of one balloon light to each piece of mobile construction equipment used in the work zone. This would include all machines but not include trucks used to transport materials and personnel or other vehicles that are continuously moving in and out of the work zone. The headlights of construction equipment shall not be operated within the work zone.
- (c) Pavement Marking and Raised Reflective Pavement Marker Removal/Installation. The striping truck and the attenuator/arrow board trucks may be operated by headlights alone; however, additional lighting may be necessary for the operator of the striping truck to perform the work.

For raised reflective pavement marker removal and installation and other pavement marking operations where workers are on foot, the required lighting level shall be provided at each truck and piece of equipment.

- (d) Sweeping. The required lighting level shall be mounted on the sweeping train vehicles during the sweeping operations. Headlights may be operated in the work zone.
- (e) Layout, Testing, and Inspection. The required lighting level shall be provided for each active area of construction layout, material testing, and inspection. The work area shall be defined as 15 ft (7.6 m) in front and back of the individual(s) performing the tasks.

Nighttime Work Zone Lighting will not be paid for as a separate item, but the cost shall be considered as included in the contract unit prices for the construction items involved, and no additional compensation will be allowed.

TRAFFIC CONTROL FOR WORK ZONE AREAS

Effective: September 14, 1995

Revised: January 1, 2007

Work zone entry and exit openings shall be established daily by the Contractor with the approval of the Engineer. All vehicles including cars and pickup trucks shall exit the work zone at the exit openings. All trucks shall enter the work zone at the entry openings. These openings shall be signed in accordance with the details shown elsewhere in the plans and shall be under flagger control during working hours.

The Contractor shall plan his trucking operations into and out of the work zone as well as on to and off the expressway to maintain adequate merging distance. Merging distances to cross all lanes of traffic shall be no less than 1/2 mile. This distance is the length from where the trucks enter the expressway to where the trucks enter the work zone. It is also the length from where the trucks exit the work zone to where the trucks exit the expressway. The stopping of expressway traffic to allow trucks to change lanes and/or cross the expressway is prohibited.

Failure to comply with the above requirements will result in a Traffic Control Deficiency charge. The deficiency charge will be calculated as outlined in Article 105.03 of the Standard Specifications. The Contractor will be assessed this daily charge for each day a deficiency is documented by the Engineer.

