STATE OF DELAWARE

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in order to submit a Bid.

DEPARTMENT OF TRANSPORTATION

BID PROPOSAL

for

CONTRACT T200412202.01

FEDERAL AID PROJECT NO. NH-K008(6)

SR 1, LITTLE HEAVEN GRADE SEPARATED INTERSECTION

KENT COUNTY

ADVERTISEMENT DATE: June 16, 2015

COMPLETION TIME: 1,040 Calendar Days

SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION
DELAWARE DEPARTMENT OF TRANSPORTATION
AUGUST 2001

Bids will be received in the Bidder's Room at the Delaware Department of Transportation's Administration Building, 800 Bay Road, Dover, Delaware until 2:00 P.M. local time **July 14, 2015**

Contract No.T200412202.01
Federal Aid Project No. NH-K008(6)

SR 1, LITTLE HEAVEN GRADE SEPARATED INTERSECTION
KENT COUNTY

GENERAL DESCRIPTION

LOCATION

These improvements are located in KENT County more specifically shown on the Location Map(s) of the enclosed Plans.

DESCRIPTION

The improvements consist of furnishing all labor and materials for SR 1, Little Heaven Grade Separated Intersection, and other incidental construction in accordance with the location, notes and details shown on the plans and as directed by the Engineer.

COMPLETION TIME

All work on this contract must be complete within 1,040 Calendar Days. The Contract Time includes an allowance for 170 Weather Days. It is the Department's intent to issue a Notice to Proceed such that work starts on or about October 14, 2015.

PROSPECTIVE BIDDERS NOTES:

1. BIDDERS MUST BE REGISTERED with DelDOT and request a cd of the official plans and specifications in order to submit a bid. Contact DelDOT at dot-ask@state.de.us, or (302) 760-2031.
2. QUESTIONS regarding this project are to be e-mailed to dot-ask@state.de.us no less than six business days prior to the proposal opening date in order to receive a response. Please include T200412202.01 in the subject line. Responses to inquiries are posted on-line at http://www.bids.delaware.gov.
3. This project incorporates the electronic bidding system **Expedite**, **version 5.9a**. Bidders wishing to use the electronic bidding option will find the installation file on the plan holders bid file disk. The installation file and instructions are also available on DelDOT's Website at: http://www.deldot.gov/information/business/bids/const_proj_bid_info.shtml.
4. Each proposal must be accompanied by a deposit of either surety bond or security for a sum equal to at least 10% of the bid.
5. No retainage will be withheld on this contract.
6. The Department's External Complaint Procedure can be viewed on DelDOT's Website at; http://www.deldot.gov/information/business/, or you may request a copy by calling (302) 760-2555.

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7. **PLEASE NOTE** the requirements of special provision 'Changes to Project Documents During Advertisement' have moved to Supplemental Specifications, the special provision is no longer needed.
8. **PLEASE NOTE** federal requirements for the DBE program under 49CFR §26.53(b)(3)(i)(B) have changed effective November 3, 2014. Submission of DBE participation information is now required from the lowest apparent bidder no later than seven (7) days after bid opening *(formerly 10 days)*.
9. **BREAKOUT SHEETS** MUST be submitted either with your bid documents; or within seven (7) calendar days following the bid due date by the lowest apparent bidder. Refer to instructions adjacent to the Breakout Sheets in this document.
10. **PROPOSSED TRAINEE PLANS** as required. Number of required programs is listed in the Training Special Provisions within Contract General Notices. The program(s) must be submitted within 10 Calendar Days of notification of apparent low bidder status. Contract Award will not take place until acceptable On-the-Job (OJT) program plans are received by the Civil Rights Group of the Department.

    Failure of the apparent low bidder to present copies of an acceptable OJT Trainee Programs within ten (10) calendar days of notification of apparent low bidder status, shall create a rebuttable presumption that the bid is not responsive.

11. This project incorporates **Appendix A TECHNICAL SPECIFICATIONS**, which is a part of this contract. Appendix A contains additional specifications required for this project.

12. Cross Sections are posted for informational purposes only, they are not part of this contract.

13. The Sanitary Sewer Work Items listed in the contract are under the jurisdiction of the Kent County Department of Public Works. Three of the Items (614747, 614818, and 763687) must be performed by Contractors pre-approved by the County. For this project, the concern lies with the guided direct bore, casing installation, and pump station construction.

    For items 614747 and 614818, the excavation and preparation of the boring pits may be performed by the Prime Contractor or other approved Subcontractor, but the actual guided bore and casing installation must be performed by a Contractor pre-approved by Kent County. Contractors currently approved by the County for Guided Bore and Casing Installation work are:

    a. George and Lynch, Inc.
       150 Lafferty Lane
       Dover, DE 19901
       Phone: 302-736-3031
       FAX: 302-734-9743

    b. Spring and Associates, Inc.
       29565 Chilcutt Road
       Easton, MD 21601
       Phone: 410-822-0485
       FAX: 410-820-9096

    c. Icon Equipment Distributors, Inc.
       300 Ryders Lane
       East Brunswick, NJ 08816
       Phone: 732-254-6000
       FAX: 732-254-0101

    For the Pump Station Construction (Item 763687), only the listed Contractors are currently pre-approved by Kent County for the following components:

    a. Site, Structural, and Mechanical Work

       Teal Construction, Inc.
       612 Mary Street
       Dover, DE 19904
       Phone: (302) 678-9500
       Fax: (302) 678-9715

       Fab-crete
       P.O. Box 199
       Spring City, PA 19475
       Phone: (610) 948-4600
       Fax: (610) 948-2082

       MGK Industries, Inc.
       240 South Roland Street
       P.O. Box 276
       Pottstown, PA 19464
       Phone No.: (610) 705-5700

    b. Electrical Work

       Tudor Electric, Inc.
       801 Otis Drive
       Dover, DE 19901
       Phone: (302) 736-1444

       Power Plus Electrical Contracting
       4985 North DuPont Highway
       Dover, DE 19901
       Phone: (302) 736-5070

    c. Integration Work

       TriJay Systems Inc.
       10 Maple Avenue
       Line Lexington, PA 18932
       Phone: (215) 997-5833
       Fax: (215) 997-5834

Atlantic Control Systems
7873 South DuPont Highway
Felton, DE 19943
Phone: (302) 284-9700

Power Electronics
3011 Millington Road
Millington, MD 21651
Phone: (410) 928-7700
Fax: (410) 928-3438

Requests to approve other Contractors to perform Items 614747, 614818, and/or 763687 may be submitted. Such requests shall be submitted to DelDOT Contract Administration a minimum of 10 calendar days in advance of the contract bid date.

The requests should include the following information:

a. Contractor name and contact information

b. Name and resume of the project superintendent that will be assigned to this project

c. List and detailed description of work on similar projects performed in the past 5 years with points of contact for the owners of the projects.

d. Any other information deemed relevant to demonstrate that the Contractor has the experience and capability to successfully complete the work.

e. Additional information that may be requested.

The requests to approve other Contractors should be sent to:

Email: DOT-ask@state.de.us

Approval or denial of the request shall lie solely with the Kent County Department of Public Works. The approved Superintendent must be on-site during performance of the work. If a firm other than those listed above is being proposed, an approval letter or printed email approval from DelDOT Contract Administration must be submitted and received within ten (10) calendar days after receipt of bids (and prior to award). Subcontractors for Items 614747, 614818, and 763687 must be approved by Kent Co. and agreed to by DelDOT prior to awarding the contract.

14. Bidders are advised that a Diesel Fuel Cost Price Adjustment Option sheet is included after the Bid Sheets and must be completed and submitted with your bid.

15. Numerous work Item Numbers and Standard Specification numbers have been updated by the Department. Charts are provided below to cross-reference the outdated numbers with the current ones. Outdated numbers that are included in any plan notes or details are located on the chart and the revised Item Number and/or Specification Number shall be understood to apply. The Contractor shall comply with the new specifications at no additional cost to DelDOT.

SR1, LITTLE HEAVEN GRADE SEPARATED INTERSECTION

CURRENT SECTION REFERENCE	NEW SECTION REFERENCE	NEW SECTION DESCRIPTION
250	*Delete*	Removed this subsection in its entirety.
251	905	Sediment Trapping Devices
252	905	Sediment Trapping Devices
254	907	Water Control Practices
255	905	Sediment Trapping Devices
257	*Delete*	Removed this subsection in its entirety.
258	*Delete*	Removed this subsection in its entirety.
259	*Delete*	Removed this subsection in its entirety.
260	*Delete*	Removed this subsection in its entirety.
261	907	Water Control Practices
262	909	Waterway Construction Practices
263	906	Dewatering Practices
264	*Delete*	Removed this subsection in its entirety.
265	909	Waterway Construction Practices
266	909	Waterway Construction Practices
268	908	Soil Stabilization Practices
269	909	Waterway Construction Practices
270	906	Dewatering Practices
271	910	Stormwater Management Facilities
272	910	Stormwater Management Facilities
273	*Delete*	Removed this subsection in its entirety.
274	910	Stormwater Management Facilities
732	908	Soil Stabilization Practices
733	908	Soil Stabilization Practices
734	908	Soil Stabilization Practices
735	908	Soil Stabilization Practices

SR1, LITTLE HEAVEN GRADE SEPARATED INTERSECTION

CURRENT ITEM NO. REFERENCE	NEW ITEM NO. REFERENCE	UOM	NEW ITEM DESCRIPTION
New	900500	LS	Environmental Performance Incentive (Disincentive)
250000	*Delete*	---	SEDIMENT REMOVAL - Incidental to the individual items per the Specifications.
251000	905001	LF	SILT FENCE
251001	905002	LF	REINFORCED SILT FENCE
252000	905004	EACH	INLET SEDIMENT CONTROL, DRAINAGE INLET
252001	905005	EACH	INLET SEDIMENT CONTROL, CURB INLET
254000	907011	TON	STONE CHECK DAM
255000	905003	CY	SEDIMENT TRAP
261000	907012	LF	TEMPORARY SLOPE DRAIN, 12"
263001	906003	EACH	SUMP PIT, TYPE 1
265500	909005	LS	STREAM DIVERSION
266000	909001	CY	SANDBAG DIKES
268000	908023	TON	STABILIZED CONSTRUCTION ENTRANCE
270000	906001	EACH	PORTABLE SEDIMENT TANK
270500	906002	EACH	DEWATERING BAG
271000	910008	CY	STORMWATER MANAGEMENT POND
272000	910007	LS	OUTLET STRUCTURE
272001	910007	LS	OUTLET STRUCTURE
272002	910007	LS	OUTLET STRUCTURE
272003	910007	LS	OUTLET STRUCTURE
272004	910007	LS	OUTLET STRUCTURE
272500	906004	EACH	SKIMMER DEWATERING DEVICE
272502	*Delete*	---	ENERGY DISSIPATOR - See Standard Detail for Item References.
274001	910005	CY	CLAY BORROW, STORMWATER MANAGEMENT POND, POND LINER
733002	908010	SY	TOPSOILING, 6" DEPTH
733004	908007	SY	TOPSOILING
734013	908014	SY	PERMANENT GRASS SEEDING, DRY GROUND
734015	908015	SY	PERMANENT GRASS SEEDING, WET GROUND
734017	908017	SY	TEMPORARY GRASS SEEDING, DRY GROUND
734018	908018	SY	TEMPORARY GRASS SEEDING, WET GROUND
734531	908019	SY	STREAMBANK SEED MIX
734552	908502	SY	WET GROUND EROSION CONTROL GRASS SEEDING - FLATS
734553	908503	SY	WETLAND MITIGATION GRASS SEEDING
735535	908020	SY	EROSION CONTROL BLANKET MULCH
735536	908021	SY	TURF REINFORCEMENT MATTING, TYPE I

CONSTRUCTION ITEMS UNITS OF MEASURE

English Code	English Description	Multiply By	Metric Code	Metric Description	Suggested CEC Metric Code
ACRE	Acre	0.4047	ha	Hectare	HECTARE
BAG	Bag	N/A	Bag	Bag	BAG
C.F.	Cubic Foot	0.02832	m^3	Cubic Meter	M3
C.Y.	Cubic Yard	0.7646	m^3	Cubic Meter	M3
EA-DY	Each Day	N/A	EA-DY	Each Day	EA-DY
EA-MO	Each Month	N/A	EA-MO	Each Month	EA-MO
EA/NT	Each Night	N/A	EA-NT	Each Night	EA/NT
EACH	Each	N/A	EA	Each	EACH
GAL	Gallon	3.785	L	Liter	L
HOUR	Hour	N/A	h	Hour	HOUR
INCH	Inch	25.4	mm	Millimeter	MM
L.F.	Linear Foot	0.3048	m	Linear Meter	L.M.
L.S.	Lump Sum	N/A	L.S.	Lump Sum	L.S.
LA-MI	Lane Mile	1.609	LA-km	Lane-Kilometer	LA-KM
LB	Pound	0.4536	kg	Kilogram	KG
MFBM	Thousand Feet of Board Measure	2.3597	m^3	Cubic Meter	M3
MGAL	Thousand Gallons	3.785	kL	Kiloliter	KL
MILE	Mile	1.609	km	Kilometer	KM
S.F.	Square Foot	0.0929	m^2	Square Meter	M2
S.Y.	Square Yard	0.8361	m^2	Square Meter	M2
SY-IN	Square Yard-Inch	0.8495	m^2-25 mm	Square Meter-25 Millimeter	M2-25 MM
TON	Ton	.9072	t	Metric Ton (1000kg)	TON
N.A.*	Kip	4.448	kN	Kilonewton	N.A.*
N.A.*	Thousand Pounds per Square Inch	6.895	MPa	Megapascal	N.A.*

*Not used for units of measurement for payment.

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GENERAL NOTICES

SPECIFICATIONS:

The specifications entitled "Delaware Standard Specifications for Road and Bridge Construction, August, 2001", hereinafter referred to as the Standard Specifications; Supplemental Standard Specifications; the Special Provisions; notes on the Plans; this Bid Proposal; and any addenda thereto, shall govern the work to be performed under this contract.

CLARIFICATIONS:

Under any Section or Item included in the Contract, the Contractor shall be aware that when requirements, responsibilities, and furnishing of materials are outlined in the details and notes on the Plans and in the paragraphs preceding the " Basis of Payment" paragraph in the Standard Specifications or Special Provisions, no interpretation shall be made that such stipulations are excluded because reiteration is not made in the "Basis of Payment" paragraph.

ATTESTING TO NON-COLLUSION:

The Department requires as a condition precedent to acceptance of bids a sworn statement executed by, or on behalf of, the person, firm, association, or corporation to whom such contract is to be awarded, certifying that such person, firm, association, or corporation has not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding in connection with such contract. The form for this sworn statement is included in the proposal and must be properly executed in order to have the bid considered.

QUANTITIES:

The quantities shown are for comparison of bids only. The Department may increase or decrease any quantity or quantities without penalty or change in the bid price.

PREFERENCE FOR DELAWARE LABOR:

Delaware Code, Title 29, Chapter 69, Section 6962, Paragraph (d), Subsection (4)b

> "In the construction of all public works for the State or any political subdivision thereof, or by firms contracting with the State or any political subdivision thereof, preference in employment of laborers, workmen or mechanics shall be given to bona fide legal citizens of the State who have established citizenship by residence of at least 90 days in the State. Each public works contract for the construction of public works for the State or any political subdivision thereof shall contain a stipulation that any person, company or corporation who violates this section shall pay a penalty to the Secretary of Finance equal to the amount of compensation paid to any person in violation of this section."

EQUALITY OF EMPLOYMENT OPPORTUNITY ON PUBLIC WORKS:

Delaware Code, Title 29, Chapter 69, Section 6962, Paragraph (d), Subsection (7)

> "a. As a condition of the awarding of any contract for public works financed in whole or in part by State appropriation, such contracts shall include the following provisions:
>
> `During the performance of this contract, the contractor agrees as follows:
>
> 1. The contractor will not discriminate against any employee or applicant for employment because of race, creed, color, sex, sexual orientation or natural origin. The contractor will take positive steps to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, creed, color, sex, sexual orientation or national origin. Such action shall include, but not be limited to, the following: employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places available to employees and applicants for employment notices to be provided by the contracting agency setting forth this nondiscrimination clause.

2. The contractor will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive consideration for employment without regard to race, creed, color, sex or national origin.'

TAX CLEARANCE:

As payments to each vendor or contractor aggregate $2,000, the Division of Accounting will report such vendor or contractor to the Division of Revenue, who will then check the vendor or contractor's compliance with tax requirements and take such further action as may be necessary to insure compliance.

LICENSE:

A person desiring to engage in business in this State as a contractor shall obtain a license upon making application to the Division of Revenue. Proof of said license compliance to be made prior to, or in conjunction with, the execution of a contract to which he has been named.

SUBCONTRACTOR LICENSE: 29 DEL. C. §6967:

(c) Any contractor that enters a public works contract must provide to the agency to which it is contracting, within 30 days of entering such public works contract, copies of all occupational and business licenses of subcontractors and/or independent contractors that will perform work for such public works contract. However, if a subcontractor or independent contractor is hired or contracted more than 20 days after the contractor entered the public works contract the occupational or business license of such subcontractor or independent contractor shall be provided to the agency within 10 days of being contracted or hired.

DIFFERING SITE CONDITIONS,

SUSPENSIONS OF WORK and SIGNIFICANT CHANGES IN THE CHARACTER OF WORK:

Differing site conditions: During the progress of the work, if subsurface or latent physical conditions are encountered at the site differing materially from those indicated in the contract of if unknown physical conditions of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in the work provided for in the contract are encountered at the site, the party discovering such conditions shall promptly notify the other party in writing of the specific differing conditions before they are disturbed and before the affected work is performed.

Upon written notification, the engineer will investigate the conditions, and if he/she determines that the conditions materially differ and cause an increase or decrease in the cost or time required for the performance of any work under the contract, an adjustment, excluding loss of anticipated profits, will be made and the contract modified in writing accordingly. The engineer will notify the contractor of his/her determination whether or not an adjustment of the contract is warranted. No contract adjustment which results in a benefit to the contractor will be allowed unless the contractor has provided the required written notice. No contract adjustment will be allowed under their clause for any effects caused on unchanged work.

Suspensions of work ordered by the engineer: If the performance of all or any portion of the work is suspended or delayed by the engineer in writing for an unreasonable period of time (not originally anticipated, customary or inherent to the construction industry) and the contractor believes that additional compensation and/or contract time is due as a result of such suspension or delay, the contractor shall submit to the engineer in writing a request for adjustment within 7 calendar days of receipt of the notice to resume work. The request shall set fourth the reasons and support for such adjustment.

Upon receipt, the engineer will evaluate the contractor's request. If the engineer agrees that the cost and/or time required for the performance of the contract has increased as a result of such suspension and the suspension was caused by conditions beyond the control of and not the fault of the contractor, its suppliers, or subcontractors at any approved tier, and not caused by weather, the engineer will make an adjustment (excluding profit) and modify the contract in writing accordingly. The engineer will notify the contractor of his/her determination whether or not an adjustment of the contract is warranted.

No contract adjustment will be allowed unless the contractor has submitted the request for adjustment within the time prescribed.

No contract adjustment will be allowed under this clause to the extent that performance would have been suspended or delayed by any other cause, or for which an adjustment is provided for or excluded under any other term or condition of this contract.

Significant changes in the character of work: The engineer reserves the right to make, in writing, at any time during the work, such changes in quantities and such alterations in the work as are necessary to satisfactorily complete the project. Such changes in quantities and alterations shall not invalidate the contract nor release the surety, and the contractor agrees to perform the work as altered.

If the alterations or changes in quantities significantly change the character of the work under the contract, whether or not changed by any such different quantities or alterations, an adjustment, excluding loss of anticipated profits, will be made to the contract. The basis for the adjustment shall be agreed upon prior to the performance of the work. If a basis cannot be agreed upon, then an adjustment will be made either for or against the contractor in such amount as the engineer may determine to be fair and equitable.

The term "significant change" shall be construed to apply only to the following circumstances:

(A) When the character of the work as altered differs materially in kind or nature from that involved or included in the original proposed construction or

(B) When a major item of work, as defined elsewhere in the contract, is increased in excess of 125 percent or decreased below 75 percent of the original contract quantity. Any allowance for an increase in quantity shall apply only to that portion in excess of 125 percent of original contract item quantity, or in case of a decrease below 75 percent, to the actual amount of work performed.

CONFLICT WITH FEDERAL STATUTES OR REGULATIONS:

Delaware Code, Title 29, Chapter 69, Section 6904, Paragraph (a):

"If any provision of this subchapter conflicts or is inconsistent with any statute, rule or regulation of the federal government applicable to a project or activity, the cost of which is to be paid or reimbursed in whole or in part by the federal government, and due to such conflict or inconsistency the availability of federal funds may be jeopardized, such provision shall not apply to such project or activity."

FEDERAL LABOR AND EMPLOYMENT REQUIREMENTS

Federal Regulation 23 CFR § 635.117(b) Labor and employment, states:

"No procedures or requirement shall be imposed by any State which will operate to discriminate against the employment of labor from any other State, possession or territory of the United States, in the construction of a Federal-aid project."

CONVICT PRODUCED MATERIALS:

(a) Materials produced after July 1, 1991, by convict labor may only be incorporated in a Federal-aid highway construction project if such materials have been:

(1) Produced by convicts who are on parole, supervised release, or probation from a prison or

(2) Produced in a qualified prison facility and the cumulative annual production amount of such materials for use in Federal-aid highway construction does not exceed the amount of such materials produced in such facility for use in Federal-aid highway construction during the 12-month period ending July 1, 1987.

(b) Qualified prison facility means any prison facility in which convicts, during the 12-month period ending July 1, 1987, produced materials for use in Federal-aid highway construction projects.

TO REPORT BID RIGGING ACTIVITIES:

The U. S. Department of Transportation (DOT) operates the below toll-free "hotline" Monday through Friday, 8:00 a.m. to 5:00 p.m. eastern time. Anyone with knowledge of possible bid rigging, bidder collusion, or other fraudulent activities should use the "hotline" to report such activities.

The "hotline" is part of the DOT's continuing effort to identify and investigate highway construction contract fraud and abuse and is operated under the direction of the DOT Inspector General. All information will be treated confidentially and caller anonymity will be respected.

TO REPORT BID RIGGING ACTIVITIES
CALL 1-800-424-9071

NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY (EXECUTIVE ORDER 11246)

1. The Offeror's or Bidder's attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Specifications" set forth herein.

2. The goals and timetables for minority and female participation, expressed in percentage terms for the Contractor's aggregate work force in each trade on all construction work in the covered area, are as follows:

Goals for Minority Participation In Each Trade	Goals for Female Participation In Each Trade
12.3% (New Castle County) 14.5% (Kent & Sussex Counties)	6.9% (Entire State)

These goals are applicable to all the Contractor's construction work (whether or not it is Federal or federally assisted) performed in the covered area. If the contractor performs construction work in a geographical area located outside of the covered area, it shall apply the goals established for such geographical area where the work is actually performed. With regard to this second area, the contractor also is subject to the goals for both its federally involved and non-federally involved construction.

The Contractor's compliance with the Executive Order and the Executive Order and the regulations in CFR Part 60-4 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in 41 CFR 60-4.3(a), and its efforts to meet the goals. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade, and the contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, the Executive Order, and the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed.

3. The Contractor shall provide written notification to the Director of the Office of Federal Contract Compliance Programs within 10 working days of award of any construction subcontract in excess of $10,000 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the name, address, and telephone number of the subcontractor; employer identification number of the subcontractor; estimated dollar amount of the subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the subcontract is to be performed.

4. As used in this Notice, and in the contract resulting from this solicitation, the "covered area" is KENT County.

REV. 11-3-80

STANDARD FEDERAL EQUAL EMPLOYMENT OPPORTUNITY
CONSTRUCTION CONTRACT SPECIFICATIONS (EXECUTIVE ORDER 11246)

1. As used in these specifications:

   a. "Covered area" means the geographical area described in the solicitation from which this contract resulted;
   b. "Director" means Director, Office of Federal Contract Compliance Programs, United States Department of Labor, or any person to whom the Director delegates authority;
   c. "Employer identification number" means the Federal Social Security number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941.
   d. "Minority" includes:
      i. Black (all persons having origins in any of the Black African racial groups not of Hispanic origin);
      ii. Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish Culture or origin, regardless of race);
      iii. Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and
      iv. American Indian or Alaskan Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).

2. Whenever the Contractor, or any Subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of $10,000 the provisions of these specifications and the Notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations from which this contract resulted.

3. If the Contractor is participating (pursuant to 41 CFR 60-4.5) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each Contractor or Subcontractor participating in an approved Plan is individually required to comply with its obligations under the EEO clause, and to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by other Contractors or Subcontractors toward a goal in an approved plan does not excuse any covered Contractor's or Subcontractor's failure to take good faith efforts to achieve the Plan goals and timetables.

4. The Contractor shall implement the specific affirmative action standards provided in paragraphs 7a through 7p of these specifications. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the Contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. Covered Construction contractors performing construction work in geographical areas where they do not have a Federal or federally assisted construction contract shall apply the minority and female goals established for the geographical area where the work is being performed. Goals are published periodically in the Federal Register in notice form, and such notices may be obtained from any Office of Federal Contract Compliance Program Office or from the Federal procurement contracting offices. The Contractor is expected to make substantially uniform progress in meeting its goals in each craft during the period specified.

5. Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the Contractor has a collective bargaining agreement, to refer either minorities or women shall excuse the Contractor's obligations under these specifications, Executive Order 11246, or the regulations promulgated pursuant thereto.

6. In order for the nonworking training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the Contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.

7. The Contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully, and shall implement affirmative action steps at least as extensive as the following:

   a. Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and in all facilities at which the Contractor's employees are assigned to work. The Contractor, where possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents, and other on-site supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities.
   b. Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organizations' responses.
   c. Maintain a current file of the names, addresses and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with the reason therefor, along with whatever additional actions the Contractor may have taken.
   d. Provide immediate written notification to the Director when the union or unions with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.
   e. Develop on-the-job training opportunities and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under 7b above.
   f. Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc.; by specific review of the policy with all management personnel and with all minority and female employees at least once a year; and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.
   g. Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination or other employment decisions including specific review of these items with on-site supervisory personnel such as Superintendents, General Foreman, etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.
   h. Disseminate the Contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the Contractor's EEO policy with other Contractors and Subcontractors with whom the Contractor does or anticipates doing business.
   i. Direct its recruitment efforts, both oral and written, to minority, female and community organizations, to schools with minority and female students and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the Contractor shall send written notification to organizations such as the above, describing the openings, screening procedures, and tests to be used in the selection process.
   j. Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer and vacation employment to minority and female youth both on the site and in other areas of a Contractor's work force.
   k. Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR Part 60-3.

l. Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.

m. Ensure that seniority practices, job classifications, work assignments and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the Contractor's obligations under these specifications are being carried out.

n. Ensure that all facilities and company activities are nonsegregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.

o. Document and maintain a record of all solicitations of offers for subcontractors from minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.

p. Conduct a review, at least annually, of all supervisors' adherence to and performance under the Contractor's EEO policies and affirmative action obligations.

8. Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations (7a through p). The efforts of a contractor association, joint contractor-union, contractor-community, or other similar group of which the Contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under 7a through p of these Specifications provided that the Contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the Contractor's minority and female work force participating, makes a good faith effort to meet its individual goals and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply, however, is the Contractor's and failure of such a group to fulfill an obligation shall not be a defense for the Contractor's noncompliance.

9. A single goal for minorities and a separate single goal for women have been established. The Contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, the Contractor may be in violation of the Executive Order if a particular group is employed in a substantially disparate manner (for example, even though the Contractor has achieved its goals for women generally, the Contractor may be in violation of the Executive Order if a specific minority group of women is under utilized).

10. The Contractor shall not use the goals and timetables or affirmative action standards to discriminate against any person because of race, color, religion, sex, or national origin.

11. The Contractor shall not enter into any Subcontract with any person or firm debarred from Government contracts pursuant to Executive Order 11246.

12. The Contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, termination and cancellation of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations, by the Order of Federal Contract Compliance Programs. Any Contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246, as amended.

13. The Contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in paragraph 7 of these specifications, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of the Executive Order, the implementing regulations, or these specifications, the Director shall proceed in accordance with 41 CFR 60-4.8.

14. The Contractor shall designate a responsible official to monitor all employment-related activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as may be required by the Government, and to keep records. Records shall at least include for each employee the name, address, telephone numbers, construction trade, union affiliation if any, employee identification number when assigned, social security number, race, sex, status (e.g., mechanic, apprentice, trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate

of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, contractors shall not be required to maintain separate records.

15. Nothing herein provided shall be construed as a limitation upon the application of other laws which establish different standards of compliance or upon the application of requirements for the hiring of local or other area residents (e.g., those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).

* * * * *

TRAINING SPECIAL PROVISIONS

This Training Special Provision supersedes subparagraph 7b of the Special Provision entitled "Specific Equal Employment Opportunity Responsibilities", (Attachment 1), and is in implementation of 23 U.S.C. 140(a). As part of the contractor's equal employment opportunity affirmative action program, training shall be provided as follows:

The contractor shall provide on-the-job training aimed at developing full journeyman in the type of trade or job classification involved.

The number of trainees to be trained under the special provision will be __3__. In the event the contractor subcontracts a portion of the contract work, he shall determine how many, if any, of the trainees are to be trained by the subcontractor, provided however, that the contractor shall retain the primary responsibility for meeting the training requirements imposed by this special provision. The contractor shall also insure that this Training Special Provision is made applicable to such subcontract. Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year apprenticeship or training.

The number of trainees shall be distributed among the work classification on the basis of the contractor's needs and the availability of journeymen in the various classifications within a reasonable area of recruitment. Prior to commencing construction, the contractor shall submit to the Department of Highways and Transportation for approval the number of trainees to be trained in each selected classification and training program to be used. Furthermore, the contractor shall specify the starting time for training in each of the classifications. The contractor will be credited for each trainee employed by him on the contract work who is currently enrolled or becomes enrolled in an approved program and will be reimbursed for such trainees as provided hereinafter.

Training and upgrading of minorities and women toward journeyman status is a primary objective of this Training Special Provision. Accordingly, the contractor shall make every effort to enroll minority trainees and women (e.g., by conducting systematic and direct recruitment through public and private sources likely to yield minority and women trainees) to the extent that such persons are available within a reasonable area of recruitment. The contractor will be responsible for demonstrating the steps that he has taken in pursuance thereof, prior to a determination as to whether the contractor is in compliance with this Training Special Provision. This training commitment is not intended, and not be used, to discriminate against any applicant for training, whether a member of a minority group or not.

No employee shall be employed as a trainee in any classification in which he has successfully completed a training course leading to journeyman status or in which he has been employed as a journeyman. The contractor should satisfy this requirement by including appropriate questions in the employee application or by other suitable means. Regardless of the method used the contractor's records should document the findings in each case.

The minimum length and type of training for each classification will be as established in the training program selected by the contractor and approved by the Department of Highways and Transportation and the Federal Highway Administration. The Department of Highways and Transportation and the Federal Highway Administration shall approve a program if it is reasonably calculated to meet the equal employment opportunity obligations of the contractor and to qualify the average trainee for journeyman status in the classification concerned by the end of the training period. Furthermore, apprenticeship programs registered with the U.S. Department of Labor, Bureau of Apprenticeship and Training, or with a State apprenticeship agency recognized by the Bureau and training programs approved but not necessarily sponsored by the U.S. Department of Labor, Manpower Administration, Bureau of Apprenticeship and Training shall also be considered acceptable provided it is being administered in a manner consistent with the equal employment

obligations of Federal-aid highway construction contracts. Approval or acceptance of a training program shall be obtained from the State prior to commencing work the classification covered by the program. It is the intention of these provisions that the training is to be provided in the construction crafts rather than clerk-typists or secretarial-type positions. Training is permissible in lower level management positions such as office engineers, estimators, timekeepers, etc., where the training is oriented toward construction applications. Training in the laborer classification may be permitted provided that significant and meaningful training is provided and approved by the division office. Some off-site training is permissible as long as the training is an integral part of an approved training program and does not comprise a significant part of the overall training.

Except as otherwise noted below, the contractor will be reimbursed 80 cents per hour of training given an employee on this contract in accordance with an approved training program. As approved by the engineer, reimbursement will be made for training persons in excess of the number specified herein. This reimbursement will be made even though the contractor receives additional training program funds from other sources, provided such other sources does not specifically prohibit the contractor from receiving other reimbursement. Reimbursement for off-site training indicated above may only be made to the contractor where he does one or more of the following and the trainees are concurrently employed on a Federal-aid project; contributes to the cost of the training; provides the instruction of the trainee; or pays the trainee's wages during the off-site training period.

No payment shall be made to the contractor if either the failure to provide the required training, or the failure to hire the trainees as a journeyman, is caused by the contractor and evidences a lack of good faith on the part of the contractor in meeting the requirements of this Training Special Provision. It is normally expected that a trainee will begin his training on the project as soon as feasible after start of work utilizing the skill involved and remain on the project as long as training opportunities exist in his work classification or until he has completed his training program. It is not required that all trainees be on board for the entire length of the contract. A contractor will have fulfilled his responsibilities under this Training Special Provision if he has provided acceptable training to the number of trainees specified. The number trained shall be determined on the basis of the total number enrolled on the contract for a significant period.

Trainees will be paid a least 60 percent of the appropriate minimum journeymen's rate specified in the contract for the first half of the of the training period, 75 percent for the third quarter of the training period, and 90 percent for the last quarter of the training period, unless apprentices or trainees is an approved existing program are enrolled as trainees on this project. In fact case, the appropriate rates approved by the Department of Labor or Transportation in connection with the existing program shall apply to all trainees being trained for the same classification who are covered by this Training Special Provisions.

The contractor shall furnish the trainee a copy of the program he will follow in providing the training.

The contractor shall provide each trainee with a certification showing the type and length of training satisfactorily completed.

The contractor will provide for the maintenance of records and furnish periodic reports documenting his performance under this Training Special Provision.

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INTERMODAL SURFACE TRANSPORTATION EFFICIENCY ACT & TRANSPORTATION EQUITY ACT

Recipients of Federal-aid highway funds authorized under Titles I (other than Part B) and V of the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA), or Titles I, III, and V of the Transportation Equity Act for the 21st Century (TEA-21) are required to comply with the regulations of 49 Code of Federal Regulations (CFR) Part 26 - Participation by Disadvantaged Business Enterprises in Department of Transportation Financial Assistance Programs.

DISADVANTAGED BUSINESS ENTERPRISE (DBE) PROGRAM SPECIFICATION

The U.S. Department of Transportation (DOT) requires that the Delaware Department of Transportation continue the established Disadvantaged Business Enterprise (DBE) Program for participation in U.S. DOT programs and that the program follow the final rules as stated in 49 CFR Part 26 and the Department's approved DBE Program plan.

The following definitions apply to this subpart:

Disadvantaged Business Enterprise or DBE means a for-profit small business concern (1) that is at least 51 percent owned by one or more individuals who are both socially and economically disadvantaged or, in the case of a corporation, in which 51 percent of the stock is owned by one or more such individuals; and, (2) whose management and daily business operations are controlled by one or more of the socially and economically disadvantaged individuals who own it.

DOT-assisted contract means any contract between a recipient and a contractor (at any tier) funded in whole or in part with DOT financial assistance, including letters of credit or loan guarantees, except a contract solely for the purchase of land.

Good Faith Efforts means efforts to achieve a DBE goal or other requirement of this part which, by their scope, intensity, and appropriateness to the objective, can reasonably be expected to fulfill the program requirement.

Joint Venture means an association of a DBE firm and one or more other firms to carry out a single, for-profit business enterprise, for which the parties combine their property, capital, efforts, skills and knowledge, and in which the DBE is responsible for a distinct, clearly defined portion of the work of the contract and whose share in the capital contribution, control, management, risks, and profits of the joint venture are commensurate with its ownership interest.

Race-conscious measure or program is one that is focused specifically on assisting only DBEs, including women-owned DBEs.

Race-neutral measure or program is one that is, or can be, used to assist all small businesses. For the purposes of this part, race-neutral includes gender neutrality.

Small Business concern means, with respect to firms seeking to participate as DBEs in DOT-assisted contracts, a small business concern as defined pursuant to section 3 of the Small Business Act and Small Business Administration regulations implementing it (13 CFR part 121) that also does not exceed the cap on average annual gross receipts specified in 49 CFR §26.65(b).

Socially and economically disadvantaged individuals means any individual who is a citizen (or lawfully admitted permanent resident) of the United States and who is - (1) any individual who a recipient finds to be a socially and economically disadvantaged individual on a case-by-case basis; (2) any individual in the following groups, members of which are rebuttably presumed to be socially and economically disadvantaged:

(i) Black Americans which includes persons having origins in any of the Black racial groups of Africa;
(ii) Hispanic Americans which includes persons of Mexican, Puerto Rican, Cuban, Dominican, Central or South American, or other Spanish or Portuguese culture or origin, regardless of race;
(iii) Native Americans which includes persons who are American Indians, Eskimos, Aluets, or Native Hawaiians;
(iv) Asian-Pacific Americans which includes persons whose origins are from Japan, China, Taiwan, Korea, Burma (Myanmar), Vietnam, Laos, Cambodia (Kampuchea), Thailand, Malaysia, Indonesia, the Philippines, Brunei, Samoa, Guam, the U.S. Trust Territories of the Pacific Islands (Republic of Palau), the Commonwealth of the Northern Marianas Islands, Macao, Fiji, Tonga, Kirbati, Juvalu, Nauru, Federated States of Micronesia, or Hong Kong;
(v) Subcontinent Asian Americans which includes persons whose origins are from India, Pakistan, Bangladesh, Bhutan, the Maldives Islands, Nepal or Sri Lanka;
(vi) Women;
(vii) Any additional groups whose members are designated as socially and economically disadvantaged by the SBA, at such time as the SBA designation becomes effective.

DelDOT will establish specific goals for each particular DOT-assisted project which will be expressed as a percentage of the total dollar amount of contract bid. The specific contract goals for this contract are:

Disadvantaged Business Enterprise 8 % Percent

DelDOT continues to reserve the right to approve DBE subcontractors and all substitutions of DBE subcontractors prior to award and during the time of the contract.

Bidders are required to submit with their bids the completed DBE Program Assurance portion of the Certification document which will state the bidders intent of meeting the goals established for this contract; or in the instance where a contractor cannot meet the assigned DBE Goals for this contract, he/she shall at the time of bid submit documentation required to verify that he/she has made a Good Faith Effort to meet the DBE Goals. Guidance for submitting a Good Faith Effort is identified in the next section and in the DBE Program Plan. Further, the apparent low bidder must submit to DelDOT within seven (7) calendar days after

the bid opening, executed originals of each and every DBE subcontract to satisfy contract goals consistent with the DBE Program Assurance submitted as part of the bid package.

No contract work shall be performed by a DBE subcontractor until the executed DBE subcontract is approved in writing by DelDOT and the Department has issued the required Notice to Proceed. Any DBE subcontract relating to work to be performed pursuant to this contract, which is submitted to DelDOT for approval, must contain all DBE subcontractor information, the requirements contained in this contract, and must be fully executed by the contractor and DBE subcontractor.

Each contract between the prime contractor and each DBE subcontractor shall at the minimum include the following:

1. All pertinent provisions and requirements of the prime contract.
2. Description of the work to be performed by the DBE subcontractor.
3. The dollar value of each item of work to be completed by the DBE subcontractor and the bid price of each item of work to be completed by the DBE subcontractor.

* * * * *

CRITICAL DBE REQUIREMENTS

A bid may be held to be non-responsive and not considered if the required DBE information is not provided. In addition, the bidder may lose its bidding capability on Department projects and such other sanctions as the Department may impose. It is critical that the bidder understands:

1. In the event that the bidder cannot meet the DBE goal as set forth in this specification, he/she shall at the time of bid submit to the Department that percentage of the DBE Goal that will be met, if any, on the written and notarized assurance made a part of this contract. The contractor shall also at the time of bid submit all documentation that the contractor wishes to have the Department consider in determining that the contractor made a Good Faith Effort to meet contract DBE Goals. The Department will not accept Good Faith Effort documentation other than on the scheduled date and time of the bid opening. However, the Department may ask for clarification of information submitted should the need arise.
2. A bid which does not contain either a completely executed DBE Program Assurance and/or Good Faith Effort documentation, where appropriate, shall be declared non-responsive and shall not be considered by the Department.
3. Failure of the apparent low bidder to present originals of all DBE subcontracts to substantiate the volume of work to be performed by DBE's as indicated in the bid within seven (7) calendar days after the bid opening shall create a rebuttable presumption that the bid is not responsive.
4. Bidders are advised that failure to meet DBE Goals during the term of the contract may subject them to Department sanctions as identified in the DBE Program Plan.
5. In the execution of this contract, the successful bidder agrees to comply with the following contract clauses:

   Prompt Payment: The prime contractor/consultant receiving payments shall, within 30 days of receipt of any payment, file a statement with the Department on a form to be determined by the Department that all subcontractors furnishing labor or material have been paid the full sum due them at the stage of the contract, except any funds withheld under the terms of the contract as required by Chapter 8, Title 17 of the Delaware Code, annotated and as amended. Any delay or postponement of payment from the above referenced time frame may occur only for good cause following written approval of DelDOT. This clause applies to both DBE and non-DBE subcontractors.

   Retainage: The prime contractor agrees to return retainage to each subcontractor within 15 calendar days after the subcontractor's work is satisfactorily completed. Any delay or postponement of payment from the above referenced time frame may occur only for good cause following written approval of DelDOT. This clause covers both DBE and non-DBE subcontractors. As guidance, once a subcontractor has satisfactorily completed the physical work, and has given to the prime contractor a certified statement that all laborers, lower tier contractors, and materialmen who have furnished labor and materials to the subcontractor have been paid all monies due them, the prime contractor shall return retainage to the subcontractor within 15 calendar days.
6. In the execution of this contract, the successful bidder agrees to comply with the following contract assurance and will include this same language in each subcontractor contract:

   "The contractor or subcontractor shall not discriminate on the basis of race, color, national origin, or sex

in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such remedy as the recipient deems appropriate." 49 CFR Section 26.13

7. In addition to this specification, bidders must comply with all provisions of the rules and regulations adopted by the U.S. Department of Transportation for DBE participation in U.S. DOT and DelDOT Programs (49 CFR Part 26) and the Delaware Department of Transportation Disadvantaged Business Enterprise Program Plan; each of which is hereby incorporated and made part of this specification. Bidders are also reminded that they must be responsible and responsive bidders in all other aspects aside from the DBE Program in order to be awarded the contract.

8. In accordance with 49 CFR 26.53(f)(1), DelDOT requires that a prime contractor not terminate a DBE subcontractor without prior written consent from the DelDOT Civil Rights Office. This includes, but is not limited to, instances in which a prime contractor seeks to perform work originally designated for a DBE subcontractor with its own forces or those of an affiliate, a non-DBE firm, or with another DBE firm.

* * * * *

GUIDANCE FOR GOOD FAITH EFFORT

When the DBE Goals established for a contract by DelDOT are not met, the contractor shall demonstrate good faith efforts to meet the DBE contract goals. The contractor shall demonstrate that the efforts made were those that a contractor actively and aggressively seeking to meet the goals established by DelDOT would make, given all relevant circumstances. Evidence of this good faith effort will be submitted with the bid at the time of the bid opening.

The contractor is expected to demonstrate good faith efforts by actively and aggressively seeking out DBE participation in the project to the maximum extent, given all relevant circumstances. Following are the kinds of efforts that may be taken but are not deemed to be exclusive or exhaustive and DelDOT will consider other factors and types of efforts that may be relevant:

1. Efforts made to select portions of the work proposed to be performed by DBEs in order to increase the likelihood of achieving the stated goal. Selection of portions of work are required to at least equal the goal for DBE utilization specified in this contract.

2. Written notification at least ten (10) calendar days prior to the opening of a bid soliciting DBE interest in participating in the contract as a subcontractor or supplier and for specific items of work.

3. Efforts made to obtain and negotiate with DBE firms for specific items of work:
   a. Description of the means by which firms were solicited (i.e. by telephone, e-mail, written notice, advertisement).
   b. The names, addresses, telephone numbers of DBE's contacted, the dates of initial contact; and whether initial solicitations of interest were followed-up by contacting the DBEs to determine with certainty whether the DBEs were interested.
   c. A description of the information provided to DBE firms regarding the plans, specifications and estimated quantities for portions of the work to be performed.
   d. A statement of why additional agreements with DBE's were not reached in order to meet the projected goal.
   e. Listing of each DBE contacted but not contracted and the reasons for not entering a contract.

4. Efforts made to assist DBEs that need assistance in obtaining bonding, insurance, or lines of credit required by the contractor.

5. Reasons why certified DBEs are not available or not interested.

6. Efforts to effectively use the services of available disadvantaged community organizations; disadvantaged contractor's groups; local, state and federal DBE assistance offices; and other organizations that provide assistance in recruitment and placement of DBEs.

The following are examples of actions that may not be used as justification by the contractor for failure to meet DBE contract goals:

1. Failure to contract with a DBE solely because the DBE was unable to provide performance and/or payment bonds.

2. Rejection of a DBE bid or quotation based on price alone.

3. Rejection of a DBE because of its union or non-union status.

4. Failure to contract with a DBE because the contractor normally would perform all or most of the work in the contract.

Administrative reconsideration:

Within five (5) days of being informed by DelDOT that it is not responsive because it has not documented sufficient good faith efforts, a bidder may request administrative reconsideration. Bidder should make this request in writing to the following reconsideration official: Director of Administration, DelDOT, P. O. Box 778, Dover, Delaware 19903. The reconsideration official will not have played any role in the original determination that the bidder did not document sufficient good faith efforts.

As part of this reconsideration, the bidder will have the opportunity to provide written documentation or argument concerning the issue of whether it met the goal or made adequate good faith efforts to do so. The bidder will have the opportunity to meet in person with the reconsideration official, explaining the basis for finding that the bidder did or did not meet the goal or make adequate good faith efforts to do so. The final decision made by the reconsideration official will be communicated to the bidder in writing. The result of the reconsideration process is not administratively appealable to the U.S. Department of Transportation.

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REQUIRED CONTRACT PROVISIONS - FEDERAL-AID CONSTRUCTION CONTRACTS
(Exclusive of Appalachian Contracts)

FHWA-1273 -- Revised May 1, 2012 http://www.fhwa.dot.gov/programadmin/contracts/1273/1273.docx

I. General
II. Nondiscrimination
III. Nonsegregated Facilities
IV. Davis-Bacon and Related Act Provisions
V. Contract Work Hours and Safety Standards Act Provisions
VI. Subletting or Assigning the Contract
VII. Safety: Accident Prevention
VIII. False Statements Concerning Highway Projects
IX. Implementation of Clean Air Act and Federal Water Pollution Control Act
X. Compliance with Governmentwide Suspension and Debarment Requirements
XI. Certification Regarding Use of Contract Funds for Lobbying

I. GENERAL

1. Form FHWA-1273 must be physically incorporated in each construction contract funded under Title 23 (excluding emergency contracts solely intended for debris removal). The contractor (or subcontractor) must insert this form in each subcontract and further require its inclusion in all lower tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services).

   The applicable requirements of Form FHWA-1273 are incorporated by reference for work done under any purchase order, rental agreement or agreement for other services. The prime contractor shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

   Form FHWA-1273 must be included in all Federal-aid design-build contracts, in all subcontracts and in lower tier subcontracts (excluding subcontracts for design services, purchase orders, rental agreements and other agreements for supplies or services). The design-builder shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

   Contracting agencies may reference Form FHWA-1273 in bid proposal or request for proposal documents, however, the Form FHWA-1273 must be physically incorporated (not referenced) in all contracts, subcontracts and lower-tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services related to a construction contract).

2. Subject to the applicability criteria noted in the following sections, these contract provisions shall apply to all work performed on the contract by the contractor's own organization and with the assistance of workers under the contractor's immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract.

3. A breach of any of the stipulations contained in these Required Contract Provisions may be sufficient grounds for withholding of progress payments, withholding of final payment, termination of the contract, suspension / debarment or any other action determined to be appropriate by the contracting agency and FHWA.

4. Selection of Labor: During the performance of this contract, the contractor shall not use convict labor for any purpose within the limits of a construction project on a Federal-aid highway unless it is labor performed by convicts who are on parole, supervised release, or probation. The term Federal-aid highway does not include roadways functionally classified as local roads or rural minor collectors.

II. NONDISCRIMINATION

The provisions of this section related to 23 CFR Part 230 are applicable to all Federal-aid construction contracts and to all related construction subcontracts of $10,000 or more. The provisions of 23 CFR Part 230 are not applicable to material supply, engineering, or architectural service contracts.

In addition, the contractor and all subcontractors must comply with the following policies: Executive Order 11246, 41 CFR 60, 29 CFR 1625-1627, Title 23 USC Section 140, the Rehabilitation Act of 1973, as

amended (29 USC 794), Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

The contractor and all subcontractors must comply with: the requirements of the Equal Opportunity Clause in 41 CFR 60-1.4(b) and, for all construction contracts exceeding $10,000, the Standard Federal Equal Employment Opportunity Construction Contract Specifications in 41 CFR 60-4.3.

Note: The U.S. Department of Labor has exclusive authority to determine compliance with Executive Order 11246 and the policies of the Secretary of Labor including 41 CFR 60, and 29 CFR 1625-1627. The contracting agency and the FHWA have the authority and the responsibility to ensure compliance with Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), and Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

The following provision is adopted from 23 CFR 230, Appendix A, with appropriate revisions to conform to the U.S. Department of Labor (US DOL) and FHWA requirements.

1. Equal Employment Opportunity: Equal employment opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (28 CFR 35, 29 CFR 1630, 29 CFR 1625-1627, 41 CFR 60 and 49 CFR 27) and orders of the Secretary of Labor as modified by the provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140 shall constitute the EEO and specific affirmative action standards for the contractor's project activities under this contract. The provisions of the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR 35 and 29 CFR 1630 are incorporated by reference in this contract. In the execution of this contract, the contractor agrees to comply with the following minimum specific requirement activities of EEO:

    a. The contractor will work with the contracting agency and the Federal Government to ensure that it has made every good faith effort to provide equal opportunity with respect to all of its terms and conditions of employment and in their review of activities under the contract.

    b. The contractor will accept as its operating policy the following statement:
    "It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, color, national origin, age or disability. Such action shall include: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, pre-apprenticeship, and/or on-the-job training."

2. EEO Officer: The contractor will designate and make known to the contracting officers an EEO Officer who will have the responsibility for and must be capable of effectively administering and promoting an active EEO program and who must be assigned adequate authority and responsibility to do so.

3. Dissemination of Policy: All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action, or who are substantially involved in such action, will be made fully cognizant of, and will implement, the contractor's EEO policy and contractual responsibilities to provide EEO in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum:

    a. Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the contractor's EEO policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer.

    b. All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer, covering all major aspects of the contractor's EEO obligations within thirty days following their reporting for duty with the contractor.

    c. All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer in the contractor's procedures for locating and hiring minorities and women.

d. Notices and posters setting forth the contractor's EEO policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.

e. The contractor's EEO policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.

4. Recruitment: When advertising for employees, the contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer." All such advertisements will be placed in publications having a large circulation among minorities and women in the area from which the project work force would normally be derived.

   a. The contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minorities and women. To meet this requirement, the contractor will identify sources of potential minority group employees, and establish with such identified sources procedures whereby minority and women applicants may be referred to the contractor for employment consideration.

   b. In the event the contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, the contractor is expected to observe the provisions of that agreement to the extent that the system meets the contractor's compliance with EEO contract provisions. Where implementation of such an agreement has the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Federal nondiscrimination provisions.

   c. The contractor will encourage its present employees to refer minorities and women as applicants for employment. Information and procedures with regard to referring such applicants will be discussed with employees.

5. Personnel Actions: Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, national origin, age or disability. The following procedures shall be followed:

   a. The contractor will conduct periodic inspections of project sites to insure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.
   b. The contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.

   c. The contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.

   d. The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with its obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of their avenues of appeal.

6. Training and Promotion:

   a. The contractor will assist in locating, qualifying, and increasing the skills of minorities and women who are applicants for employment or current employees. Such efforts should be aimed at developing full journey level status employees in the type of trade or job classification involved.

   b. Consistent with the contractor's work force requirements and as permissible under Federal and State regulations, the contractor shall make full use of training programs, i.e., apprenticeship, and on-the-job training programs for the geographical area of contract performance. In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision. The contracting agency may reserve training positions for persons who receive welfare assistance in accordance with 23 U.S.C. 140(a).

c. The contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.

d. The contractor will periodically review the training and promotion potential of employees who are minorities and women and will encourage eligible employees to apply for such training and promotion.

7. Unions: If the contractor relies in whole or in part upon unions as a source of employees, the contractor will use good faith efforts to obtain the cooperation of such unions to increase opportunities for minorities and women. Actions by the contractor, either directly or through a contractor's association acting as agent, will include the procedures set forth below:

   a. The contractor will use good faith efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minorities and women for membership in the unions and increasing the skills of minorities and women so that they may qualify for higher paying employment.

   b. The contractor will use good faith efforts to incorporate an EEO clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, national origin, age or disability.

   c. The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to the contracting agency and shall set forth what efforts have been made to obtain such information.

   d. In the event the union is unable to provide the contractor with a reasonable flow of referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, national origin, age or disability; making full efforts to obtain qualified and/or qualifiable minorities and women. The failure of a union to provide sufficient referrals (even though it is obligated to provide exclusive referrals under the terms of a collective bargaining agreement) does not relieve the contractor from the requirements of this paragraph. In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the contracting agency.

8. Reasonable Accommodation for Applicants / Employees with Disabilities: The contractor must be familiar with the requirements for and comply with the Americans with Disabilities Act and all rules and regulations established there under. Employers must provide reasonable accommodation in all employment activities unless to do so would cause an undue hardship.

9. Selection of Subcontractors, Procurement of Materials and Leasing of Equipment: The contractor shall not discriminate on the grounds of race, color, religion, sex, national origin, age or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment. The contractor shall take all necessary and reasonable steps to ensure nondiscrimination in the administration of this contract.

   a. The contractor shall notify all potential subcontractors and suppliers and lessors of their EEO obligations under this contract.

   b. The contractor will use good faith efforts to ensure subcontractor compliance with their EEO obligations.

10. Assurance Required by 49 CFR 26.13(b):

    a. The requirements of 49 CFR Part 26 and the State DOT's U.S. DOT-approved DBE program are incorporated by reference.

    b. The contractor or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the contracting agency deems appropriate.

11. Records and Reports: The contractor shall keep such records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years following the date of the final payment to the contractor for all contract work and shall be available at reasonable times and places for inspection by authorized representatives of the contracting agency and the FHWA.

    a. The records kept by the contractor shall document the following:

        (1) The number and work hours of minority and non-minority group members and women employed in each work classification on the project;

        (2) The progress and efforts being made in cooperation with unions, when applicable, to increase employment opportunities for minorities and women; and

        (3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minorities and women;

    b. The contractors and subcontractors will submit an annual report to the contracting agency each July for the duration of the project, indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on Form FHWA-1391. The staffing data should represent the project work force on board in all or any part of the last payroll period preceding the end of July. If on-the-job training is being required by special provision, the contractor will be required to collect and report training data. The employment data should reflect the work force on board during all or any part of the last payroll period preceding the end of July.

III. NONSEGREGATED FACILITIES

This provision is applicable to all Federal-aid construction contracts and to all related construction subcontracts of $10,000 or more.

The contractor must ensure that facilities provided for employees are provided in such a manner that segregation on the basis of race, color, religion, sex, or national origin cannot result. The contractor may neither require such segregated use by written or oral policies nor tolerate such use by employee custom. The contractor's obligation extends further to ensure that its employees are not assigned to perform their services at any location, under the contractor's control, where the facilities are segregated. The term "facilities" includes waiting rooms, work areas, restaurants and other eating areas, time clocks, restrooms, washrooms, locker rooms, and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing provided for employees. The contractor shall provide separate or single-user restrooms and necessary dressing or sleeping areas to assure privacy between sexes.

IV. DAVIS-BACON AND RELATED ACT PROVISIONS

This section is applicable to all Federal-aid construction projects exceeding $2,000 and to all related subcontracts and lower-tier subcontracts (regardless of subcontract size). The requirements apply to all projects located within the right-of-way of a roadway that is functionally classified as Federal-aid highway. This excludes roadways functionally classified as local roads or rural minor collectors, which are exempt. Contracting agencies may elect to apply these requirements to other projects.

The following provisions are from the U.S. Department of Labor regulations in 29 CFR 5.5 “Contract provisions and related matters” with minor revisions to conform to the FHWA-1273 format and FHWA program requirements.

1. Minimum wages

    a. All laborers and mechanics employed or working upon the site of the work, will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph 1.d. of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph 1.b. of this section) and the Davis-Bacon poster (WH–1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

b. (1) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

   (i) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

   (ii) The classification is utilized in the area by the construction industry; and

   (iii) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

   (2) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

   (3) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Wage and Hour Administrator for determination. The Wage and Hour Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

   (4) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs 1.b.(2) or 1.b.(3) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

c. Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

d. If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

2. Withholding

The contracting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor under this contract, or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the contracting agency may, after written notice to the contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

3. Payrolls and basic records

a. Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

b. (1) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the contracting agency. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g. , the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH–347 is available for this purpose from the Wage and Hour Division Web site at http://www.dol.gov/esa/whd/forms/wh347instr.htm or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the contracting agency for transmission to the State DOT, the FHWA or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the contracting agency.

(2) Each payroll submitted shall be accompanied by a “Statement of Compliance,” signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(i) That the payroll for the payroll period contains the information required to be provided under §5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under §5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;

(ii) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without

rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;

(iii) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(3) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH–347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 3.b.(2) of this section.

(4) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

c. The contractor or subcontractor shall make the records required under paragraph 3.a. of this section available for inspection, copying, or transcription by authorized representatives of the contracting agency, the State DOT, the FHWA, or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the FHWA may, after written notice to the contractor, the contracting agency or the State DOT, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

4. Apprentices and trainees

a. Apprentices (programs of the USDOL).

Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice.

The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed.

Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination.

In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

b. Trainees (programs of the USDOL).

Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration.

Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed.

In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

c. Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.

d. Apprentices and Trainees (programs of the U.S. DOT).
Apprentices and trainees working under apprenticeship and skill training programs which have been certified by the Secretary of Transportation as promoting EEO in connection with Federal-aid highway construction programs are not subject to the requirements of paragraph 4 of this Section IV. The straight time hourly wage rates for apprentices and trainees under such programs will be established by the particular programs. The ratio of apprentices and trainees to journeymen shall not be greater than permitted by the terms of the particular program.

5. Compliance with Copeland Act requirements. The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.

6. Subcontracts. The contractor or subcontractor shall insert Form FHWA-1273 in any subcontracts and also require the subcontractors to include Form FHWA-1273 in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

7. Contract termination: debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

8. Compliance with Davis-Bacon and Related Act requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.

9. Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

10. Certification of eligibility.

    a. By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

    b. No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

    c. The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

V. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

The following clauses apply to any Federal-aid construction contract in an amount in excess of $100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by 29 CFR 5.5(a) or 29 CFR 4.6. As used in this paragraph, the terms laborers and mechanics include watchmen and guards.

1. Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

2. Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph (1.) of this section, the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (1.) of this section, in the sum of $10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (1.) of this section.

3. Withholding for unpaid wages and liquidated damages. The FHWA or the contacting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (2.) of this section.

4. Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (1.) through (4.) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (1.) through (4.) of this section.

VI. SUBLETTING OR ASSIGNING THE CONTRACT

This provision is applicable to all Federal-aid construction contracts on the National Highway System.

1. The contractor shall perform with its own organization contract work amounting to not less than 30 percent (or a greater percentage if specified elsewhere in the contract) of the total original contract price, excluding any specialty items designated by the contracting agency. Specialty items may be performed by subcontract and the amount of any such specialty items performed may be deducted from the total original contract price before computing the amount of work required to be performed by the contractor's own organization (23 CFR 635.116).

    a. The term “perform work with its own organization” refers to workers employed or leased by the prime

contractor, and equipment owned or rented by the prime contractor, with or without operators. Such term does not include employees or equipment of a subcontractor or lower tier subcontractor, agents of the prime contractor, or any other assignees. The term may include payments for the costs of hiring leased employees from an employee leasing firm meeting all relevant Federal and State regulatory requirements. Leased employees may only be included in this term if the prime contractor meets all of the following conditions:

(1) the prime contractor maintains control over the supervision of the day-to-day activities of the leased employees;

(2) the prime contractor remains responsible for the quality of the work of the leased employees;

(3) the prime contractor retains all power to accept or exclude individual employees from work on the project; and

(4) the prime contractor remains ultimately responsible for the payment of predetermined minimum wages, the submission of payrolls, statements of compliance and all other Federal regulatory requirements.

b. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or equipment not ordinarily available in the type of contracting organizations qualified and expected to bid or propose on the contract as a whole and in general are to be limited to minor components of the overall contract.

2. The contract amount upon which the requirements set forth in paragraph (1) of Section VI is computed includes the cost of material and manufactured products which are to be purchased or produced by the contractor under the contract provisions.

3. The contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work) and (b) such other of its own organizational resources (supervision, management, and engineering services) as the contracting officer determines is necessary to assure the performance of the contract.

4. No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the contracting officer, or authorized representative, and such consent when given shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract. Written consent will be given only after the contracting agency has assured that each subcontract is evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract.

5. The 30% self-performance requirement of paragraph (1) is not applicable to design-build contracts; however, contracting agencies may establish their own self-performance requirements.

VII. SAFETY: ACCIDENT PREVENTION

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

1. In the performance of this contract the contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23 CFR 635). The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as the contracting officer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract.

2. It is a condition of this contract, and shall be made a condition of each subcontract, which the contractor enters into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in surroundings or under conditions which are unsanitary, hazardous or dangerous to his/her health or safety, as determined under construction safety and health standards (29 CFR 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704).

3. Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance with the construction safety and health standards and to carry out the duties of the Secretary under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C.3704).

VIII. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

In order to assure high quality and durable construction in conformity with approved plans and specifications and a high degree of reliability on statements and representations made by engineers, contractors, suppliers, and workers on Federal-aid highway projects, it is essential that all persons concerned with the project perform their functions as carefully, thoroughly, and honestly as possible. Willful falsification, distortion, or misrepresentation with respect to any facts related to the project is a violation of Federal law. To prevent any misunderstanding regarding the seriousness of these and similar acts, Form FHWA-1022 shall be posted on each Federal-aid highway project (23 CFR 635) in one or more places where it is readily available to all persons concerned with the project:

18 U.S.C. 1020 reads as follows:

"Whoever, being an officer, agent, or employee of the United States, or of any State or Territory, or whoever, whether a person, association, firm, or corporation, knowingly makes any false statement, false representation, or false report as to the character, quality, quantity, or cost of the material used or to be used, or the quantity or quality of the work performed or to be performed, or the cost thereof in connection with the submission of plans, maps, specifications, contracts, or costs of construction on any highway or related project submitted for approval to the Secretary of Transportation; or

Whoever knowingly makes any false statement, false representation, false report or false claim with respect to the character, quality, quantity, or cost of any work performed or to be performed, or materials furnished or to be furnished, in connection with the construction of any highway or related project approved by the Secretary of Transportation; or

Whoever knowingly makes any false statement or false representation as to material fact in any statement, certificate, or report submitted pursuant to provisions of the Federal-aid Roads Act approved July 1, 1916, (39 Stat. 355), as amended and supplemented;

Shall be fined under this title or imprisoned not more than 5 years or both."

IX. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

By submission of this bid/proposal or the execution of this contract, or subcontract, as appropriate, the bidder, proposer, Federal-aid construction contractor, or subcontractor, as appropriate, will be deemed to have stipulated as follows:

1. That any person who is or will be utilized in the performance of this contract is not prohibited from receiving an award due to a violation of Section 508 of the Clean Water Act or Section 306 of the Clean Air Act.
2. That the contractor agrees to include or cause to be included the requirements of paragraph (1) of this Section X in every subcontract, and further agrees to take such action as the contracting agency may direct as a means of enforcing such requirements.

X. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION

This provision is applicable to all Federal-aid construction contracts, design-build contracts, subcontracts, lower-tier subcontracts, purchase orders, lease agreements, consultant contracts or any other covered transaction requiring FHWA approval or that is estimated to cost $25,000 or more – as defined in 2 CFR Parts 180 and 1200.

1. **Instructions for Certification – First Tier Participants:**

   a. By signing and submitting this proposal, the prospective first tier participant is providing the certification set out below.

   b. The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this covered transaction. The prospective first tier participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective first tier participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction.

   c. The certification in this clause is a material representation of fact upon which reliance was placed when the contracting agency determined to enter into this transaction. If it is later determined that the prospective participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the contracting agency may terminate this transaction for cause of default.

   d. The prospective first tier participant shall provide immediate written notice to the contracting agency to whom this proposal is submitted if any time the prospective first tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

   e. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. “First Tier Covered Transactions” refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). “Lower Tier Covered Transactions” refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). “First Tier Participant” refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). “Lower Tier Participant” refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

   f. The prospective first tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction.

   g. The prospective first tier participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transactions," provided by the department or contracting agency, entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the $25,000 threshold.

   h. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (https://www.epls.gov/), which is compiled by the General Services Administration.

   i. Nothing contained in the foregoing shall be construed to require the establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of the prospective participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

   j. Except for transactions authorized under paragraph (f) of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.

* * * * *

2. **Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion – First Tier Participants**:

   a. The prospective first tier participant certifies to the best of its knowledge and belief, that it and its principals:

      (1) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency;

      (2) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

      (3) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (a)(2) of this certification; and

      (4) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

   b. Where the prospective participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

   2. Instructions for Certification - Lower Tier Participants:

   (Applicable to all subcontracts, purchase orders and other lower tier transactions requiring prior FHWA approval or estimated to cost $25,000 or more - 2 CFR Parts 180 and 1200)

   a. By signing and submitting this proposal, the prospective lower tier is providing the certification set out below.

   b. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department, or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

   c. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous by reason of changed circumstances.

   d. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations. “First Tier Covered Transactions” refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). “Lower Tier Covered Transactions” refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). “First Tier Participant” refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). “Lower Tier Participant” refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

   e. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.

f. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the $25,000 threshold.

g. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (https://www.epls.gov/), which is compiled by the General Services Administration.

h. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

i. Except for transactions authorized under paragraph e of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

* * * * *

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Participants:

1. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency.

2. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

* * * * *

XI. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts which exceed $100,000 (49 CFR 20).

1. The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

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

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

2. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

3. The prospective participant also agrees by submitting its bid or proposal that the participant shall require that the language of this certification be included in all lower tier subcontracts, which exceed $100,000 and that all such recipients shall certify and disclose accordingly.

* * * * *

APPENDICES TO THE TITLE VI ASSURANCE

APPENDIX A

During the performance of this contract, the contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the "contractor") agrees as follows:

1. Compliance with Regulations: The contractor (hereinafter includes consultants) will comply with the Acts and the Regulations relative to Non-discrimination in Federally-assisted programs of the U.S. Department of Transportation, (Federal Highway Administration (FHWA), or Federal Transit Authority (FTA), as they may be amended from time to time, which are herein incorporated by reference and made a part of this contract.
2. Non-discrimination: The contractor, with regard to the work performed by it during the contract, will not discriminate on the grounds of race, color, or national origin in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The contractor will not participate directly or indirectly in the discrimination prohibited by the Acts and the Regulations, including employment practices when the contract covers any activity, project, or program set forth in Appendix B of 49 CFR Part 21.
3. Solicitations for Subcontracts, Including Procurements of Materials and Equipment: In all solicitations, either by competitive bidding, or negotiation made by the contractor for work to be performed under a subcontract, including procurements of materials, or leases of equipment, each potential subcontractor or supplier will be notified by the contractor of the contractor's obligations under this contract and the Acts and the Regulations relative to Non-discrimination on the grounds of race, color, or national origin.
4. Information and Reports: The contractor will provide all information and reports required by the Acts and the Regulations, and will permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the Recipient or the Federal Highway Administration (FHWA), or Federal Transit Authority (FTA) to be pertinent to ascertain compliance with such Acts, Regulations, and instructions. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish the information, the contractor will so certify to the Recipient or the Federal Highway Administration (FHWA), or Federal Transit Authority (FTA), as appropriate, and will set forth what efforts ithas made to obtain the information.
5. Sanctions for Noncompliance: In the event of a contractor's noncompliance with the Non-discrimination provisions of this contract, the Recipient will impose such contract sanctions as it or the Federal Highway Administration (FHWA), or Federal Transit Authority (FTA) may determine to be appropriate, including, but not limited to:
   withholding payments to the contractor under the contract until the contractor complies;
   and/or cancelling, terminating, or suspending a contract, in whole or in part.
6. Incorporation of Provisions: The contractor will include the provisions of paragraphs one through five in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Acts and the Regulations . The contractor will take action with respect to any subcontract or procurement as the Recipient or the Federal Highway Administration (FHWA), or Federal Transit Authority (FTA) may direct as a means of enforcing such provisions including sanctions for noncompliance. Provided, that if the contractor becomes involved in, or is threatened with litigation by a subcontractor, or supplier because of such direction, the contractor may request the Recipient to enter into any litigation to protect the interests of the Recipient. In addition, the contractor may request the United States to enter into the litigation to protect the interests of the United States.

APPENDIX E

During the performance of this contract, the contractor or consultant, for itself, its assignees, and successors in interest (hereinafter referred to as the "contractor") agrees to comply with the following nondiscrimination statutes and authorities; including but not limited to:

Pertinent Non-Discrimination Authorities:

Title VI of the Civil Rights Act of 1964 (42 U.S.C. $ 2000d et seq., 78 stat. 252), (prohibits discrimination on the basis of race, color, national origin); and 49 CFR Part 21.

The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970,(42 U.S.C. $ 460 I), (prohibits unfair treatment of persons displaced or whose property has been acquired because of Federal or Federal-aid programs and projects);

Federal-Aid Highway Act of 1973, (23 U.S.C. $ 324 et seq.), (prohibits discrimination on the basis of sex);

Section 504 of the Rehabilitation Act of 1973, (29 U.S.C. $ 794 et seq.), as amended, (prohibits discrimination on the basis of disability); and 49 CFR Part27;

The Age Discrimination Act of 1975, as amended, (42 U.S.C. $ 6101 et seq.), (prohibits discrimination on the basis of age);

Airport and Airway Improvement Act of 1982,(49 USC $471, Section 47123), as amended, (prohibits discrimination based on race, creed, color, national origin, or sex);

The Civil Rights Restoration Act of 1987,(PL 100-209), (Broadened the scope, coverage and applicability of Title VI of the Civil Rights Act of l964,The AgeDiscrimination Act of 1975and Section 504 of the Rehabilitation Act of l973,by expanding the defrnition of the terms "programs or activities" to include all of the programs or activities of the Federal-aid recipients, sub-recipients and contractors, whether such programs or activities are Federally funded or not);

Titles II and III of the Americans with Disabilities Act, which prohibit discrimination on the basis of disability in the operation of public entities, public and private transportation systems, places of public accommodation, and certain testing entities (42 U.S.C. $$ 12131 - 12189) as implemented by Department of Transportation regulations at 49 C.F.R. parts 37 and 38;

The Federal Aviation Administration's Non-discrimination statute (49 U.S.C. S 41123) (prohibits discrimination on the basis of race, color, national origin, and sex);

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, which ensures nondiscrimination against minority populations by discouraging programs; policies, and activities with disproportionately high and adverse human health or environmental effects on minority and low-income populations;

Executive Order 13166, Improving Access to Services for Persons with Limited English Proficiency, and resulting agency guidance, national origin discrimination includes discrimination because of limited English proficiency (LEP). To ensure compliance with Title VI, you must take reasonable steps to ensure that LEP persons have meaningful access to your programs (70 Fed. Reg. at 74087 to 74100);

Title IX of the Education Amendments of 1972, as amended, which prohibits you from discriminating because of sex in education programs or activities (20 U.S.C. 1681 et seq).

PREVAILING WAGES

Included in this proposal are the minimum wages to be paid various classes of laborers and mechanics as determined by the Department of Labor of the State of Delaware in accordance with Title 29 Del.C. §6960, relating to wages and the regulations implementing that Section.

REQUIREMENT BY DEPARTMENT OF LABOR FOR SWORN PAYROLL INFORMATION

Title 29 Del.C. §6960 stipulates;

> (b) Every contract based upon these specifications shall contain a stipulation that the employer shall pay all mechanics and laborers employed directly upon the site of the work, unconditionally and not less often than once a week and without subsequent deduction or rebate on any account, the full amounts accrued at time of payment, computed at wage rates not less than those stated in the specifications, regardless of any contractual relationship which may be alleged to exist between the employer and such laborers and mechanics. The specifications shall further stipulate that the scale of wages to be paid shall be posted by the employer in a prominent and easily accessible place at the site of the work, and that there may be withheld from the employer so much of accrued payments as may be considered necessary by the Department of Labor to pay to laborers and mechanics employed by the employer the difference between the rates of wages required by the contract to be paid laborers and mechanics on the work and rates of wages received by such laborers and mechanics to be remitted to the Department of Labor for distribution upon resolution of any claims.
>
> (c) Every contract based upon these specifications shall contain a stipulation that sworn payroll information, as required by the Department of Labor, be furnished weekly. The Department of Labor shall keep and maintain the sworn payroll information for a period of 6 months from the last day of the work week covered by the payroll.

Bidders are specifically directed to note the Department of Labor's prevailing wage regulations implementing §6960 relating to the effective date of the wage rates, at Part VI., Section C., which in relevant part states:

> "Public agencies (covered by the provisions of 29 Del.C. §6960) are required to use the rates which are in effect on the date of the publication of specifications for a given project. In the event that a contract is not executed within one hundred twenty (120) days from the date the specifications were published, the rates in effect at the time of the execution of the contract shall be the applicable rates for the project."

PREVAILING WAGE REQUIREMENTS

It is DelDOT's understanding that the Davis-Bacon Act is not a preemptive statute in the broad sense, and does not preempt or displace State of Delaware prevailing wage requirements.

When a contract for a project contains both Federal Davis-Bacon and State of Delaware prevailing wage standards because of concurrent Federal and State coverage, the employer's minimum wage obligations are determined by whichever standards are higher.

STATE OF DELAWARE
DEPARTMENT OF LABOR
DIVISION OF INDUSTRIAL AFFAIRS
OFFICE OF LABOR LAW ENFORCEMENT
PHONE: (302) 451-3423

Mailing Address:
225 CORPORATE BOULEVARD
SUITE 104
NEWARK, DE 19702

Located at:
225 CORPORATE BOULEVARD
SUITE 104
NEWARK, DE 19702

PREVAILING WAGES FOR **HIGHWAY CONSTRUCTION** EFFECTIVE MARCH 13, 2015

CLASSIFICATION	NEW CASTLE	KENT	SUSSEX
BRICKLAYERS	49.39	49.39	14.51
CARPENTERS	42.55	51.86	41.22
CEMENT FINISHERS	31.06	30.92	19.65
ELECTRICAL LINE WORKERS	22.50	22.50	21.25
ELECTRICIANS	63.60	63.60	63.60
IRON WORKERS	42.20	23.87	25.35
LABORERS	31.10	34.12	37.75
MILLWRIGHTS	16.11	15.63	13.49
PAINTERS	48.84	48.84	48.84
PILEDRIVERS	66.42	23.75	26.95
POWER EQUIPMENT OPERATORS	39.15	32.92	29.04
SHEET METAL WORKERS	22.75	20.31	18.40
TRUCK DRIVERS	32.31	20.65	25.55

CERTIFIED: 3/31/15

BY: _____
ADMINISTRATOR, OFFICE OF LABOR LAW ENFORCEMENT

NOTE: THESE RATES ARE PROMULGATED AND ENFORCED PURSUANT TO THE PREVAILING WAGE REGULATIONS ADOPTED BY THE DEPARTMENT OF LABOR ON APRIL 3, 1992.

CLASSIFICATIONS OF WORKERS ARE DETERMINED BY THE DEPARTMENT OF LABOR. FOR ASSISTANCE IN CLASSIFYING WORKERS, OR FOR A COPY OF THE REGULATIONS OR CLASSIFICATIONS, PHONE (302) 451-3423.

NON-REGISTERED APPRENTICES MUST BE PAID THE MECHANIC'S RATE.

PROJECT: T200412202.01 Little Heaven Grade Separated Intersection, Kent County

GENERAL DECISION: DE150014 01/02/2015 DE14

State: DELAWARE

Construction Type: HIGHWAY

COUNTY: Kent County in Delaware

HIGHWAY CONSTRUCTION PROJECTS

Note: Executive Order (EO) 13658 establishes an hourly minimum wage of $10.10 for 2015 that applies to all contracts subject to the Davis-Bacon Act for which the solicitation is issued on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least $10.10 (or the applicable wage rates listed on this wage determination, if it is higher) for all hours spent performing on the contract. The EO minimum wage rate will be adjusted annually. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number: 0 Publication Date: 01/02/2015

SUDE2013-002 03/19/2014

	Rates	Fringes
Bricklayer	48.08	
Carpenter	50.91	
Cement Mason/Concrete Finisher	26.13	
ELECTRICIAN		
Electrician	62.10	
Line Workers	22.50	
Ironworker	23.87	
Laborer	38.68	
Millwright	15.63	
Painter	60.64	
Power Equipment Operator:		
Piledriver	23.75	
Power Equipment Operators	27.61	
Sheet Metal Worker	20.31	
Truck Driver	21.03	

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29 CFR 5.5(a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination.

The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than "SU" or "UAVG" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under an "SU" identifier indicated that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N. W.
Washington, D. C. 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N. W.
Washington, D. C. 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U. S. Department of Labor
200 Constitution Avenue, N. W.
Washington, D. C. 20210

4.) All decisions by the Administrative Review Board are final.

END OF GENERAL DECISION

APPLICABILITY OF DAVIS-BACON LABOR STANDARD PROVISIONS TO FLAGGERS

The U.S. Department of Labor has established that the duties of flaggers working on contracts covered by the Davis-Bacon Act, are manual and physical in nature. Accordingly, all employees performing the work of flaggers on Davis-Bacon covered contracts shall be entitled to receive applicable prevailing wage rates.

* * * * *

ALL AGENCY MEMORANDUM NO. 130
U.S. DEPARTMENT OF LABOR
EMPLOYMENT STANDARDS ADMINISTRATION
WAGE AND HOUR DIVISION
WASHINGTON, DC 20210

GUIDELINES

HIGHWAY CONSTRUCTION

Highway projects include the construction, alteration, or repair of roads, streets, highways, runways, taxiways, alleys, trails, paths, parking areas, and other similar projects not incidental to building or heavy construction.

EXAMPLES: Alleys, Base Courses, Bituminous treatments, Bridle Paths, Concrete pavement, Curbs, Excavation and embankment (for road construction), Fencing (highway), Grade crossing elimination (overpasses and underpasses), Guard rails on highway, Highway signs, Highway bridges (overpasses, underpasses, grade separation), Medians, Parking lots, Parkways, Resurfacing streets and highways, Roadbeds, Roadways, Runways, Shoulders, Stabilizing courses, Storm sewers incidental to road construction, Street paving, Surface courses, Taxiways, and Trails.

ANY QUESTIONS REGARDING THE APPLICATION OF THE GUIDELINES ABOVE TO A PARTICULAR PROJECT OR ANY DISPUTES REGARDING THE APPLICATION OF THE WAGE SCHEDULES ARE TO BE REFERRED TO THE WAGE AND HOUR DIVISION, U.S. DEPARTMENT OF LABOR FOR RESOLUTION, AND THE INSTRUCTIONS OF THE WAGE AND HOUR DIVISION ARE TO BE OBSERVED IN ALL INSTANCES.

* ALL AGENCY MEMORANDUM NO. 130
U.S. DEPARTMENT OF LABOR
EMPLOYMENT STANDARDS ADMINISTRATION
WAGE AND HOUR DIVISION
WASHINGTON, DC 20210

SUPPLEMENTAL SPECIFICATIONS
TO THE
AUGUST 2001
STANDARD SPECIFICATIONS

EFFECTIVE AS OF THE ADVERTISEMENT DATE OF THIS PROPOSAL AND INCLUDED BY REFERENCE

The Supplemental Specifications can be viewed and printed from the Department's Website.

To access the Website;
- in your internet browser, enter; http://www.deldot.gov
- on the left side of the page under 'INFORMATION', Click; 'Publications'
- scroll down under 'MANUALS' and Click; "Standard Specifications 2001"

The full Website Link is;
http://www.deldot.gov/information/pubs_forms/manuals/standard_specifications/index.shtml

Printed copies of the Supplemental Specifications are available upon request. A printed copy of the above referenced Supplemental Specifications will be included in the final contract documents upon award.

The Contractor shall make himself aware of these revisions and corrections (Supplemental Specifications), and apply them to the applicable item(s) of this contract.

SPECIAL PROVISIONS

CONSTRUCTION ITEM NUMBERS

All construction pay items are assigned a six (6) digit number, shown as Item Number on the Plans and/or in the Special Provisions, and shall be interpreted in accordance with the following:

Standard Item Number:

The first three digits of the construction item numbers indicates the Section number as described in the Standard Specifications, and all applicable requirements of the Section shall remain effective unless otherwise modified by the Special Provisions. The last three digits of the construction item identifies the item by sequential number under that Section. Sequential numbers for all items covered under Standard Specifications range from 000 to 499. A comprehensive list of construction item numbers begins on page 421 of the Standard Specifications. Additions to this list will be made as required.

Special Provisions Item Number:

The first three digits of the construction items, covered under Special Provisions, indicates the applicable Section number of the Standard Specifications, and shall be governed fully by the requirements of the Special Provisions. The last three digit of the items covered under Special Provisions identifies the item by sequential number. Sequential numbers for Special Provision items, range from 500 to 999.

Examples

Standard Item Number - 202000 Excavation and Embankment

202 Indicates Section Number

000 Indicates Sequential Number

Special Provision Item Number - 202500 Grading and Reshaping Roadway

202 Indicates Section Number

500 Indicates Sequential Number

NOTE:

PLEASE NOTE revised Supplemental Specifications to the August 2001 Standard Specifications were issued November 24, 2014 and apply to this project. They can be viewed here and at www.deldot.gov.

SPECIFICATIONS: The Department is currently updating the August 2001 Specifications for Road and Bridge Construction. Through this update, some Divisions were renumbered and some new ones were created and added.

401502 - ASPHALT CEMENT COST ADJUSTMENT

For Sections 304, 401, 402, 403, 404, and 405, payments to the Contractor shall be adjusted to reflect increases or decreases in the Delaware Posted Asphalt Cement Price when compared to the Project Asphalt Cement Base Price, as defined in these Special Provisions.

The Delaware Posted Asphalt Cement Price will be issued monthly by the Department and will be the industry posted price for Asphalt Cement, F.O.B. Philadelphia, Pennsylvania. The link for the posting is http://www.deldot.gov/information/business/bids/asphalt_cement_english.shtml.

The Project Asphalt Cement Base Price will be the Delaware Posted Asphalt Cement Price in effect on the date of advertisement.

All deviations of the Delaware Posted Asphalt Cement Price from the Project Asphalt Cement Base Price are eligible for cost adjustment. No minimum increases or decreases or corresponding percentages are required to qualify for cost adjustment.

Actual quantity of asphalt cement qualifying for any Asphalt Cement Cost Adjustment will be computed using the weight of eligible asphalt that is shown on the QA/QC pay sheets as a percentage for the delivered material.

If the mix was not inspected and no QA/QC pay sheet was generated, then the asphalt percentage will be obtained from the job mix formula for that mix ID.

The asphalt percentage eligible for cost adjustment shall only be the virgin asphalt cement added to the mix.

There shall be no separate payment per ton cost of asphalt cement. That cost shall be included in the various unit prices bid per ton for those bid items that contain asphalt cement (mentioned above).

The Asphalt cement cost adjustment will be calculated on grade PG 64-22 asphalt regardless of the actual grade of asphalt used. The Project Asphalt Cement Base Price per ton for the project will be the Delaware Posted Asphalt Cement Price in effect on the date of project advertisement.

If the Contractor exceeds the authorized allotted completion time, the price of asphalt cement on the last authorized allotted work day, shall be the prices used for cost adjustment during the time liquidated damages are assessed. However, if the industry posted price for asphalt cement goes down, the asphalt-cement cost shall be adjusted downward accordingly.

NOTE:

Application of Asphalt Cement Cost Adjustment requirements as indicated above shall apply only to those contracts involving items related to bituminous base and pavements, and with bitumen, having a total of 1,000 tons or more of hot-mix bid quantity in case of Sections 401, 402 and 403; and 15,000 gallons or more in case of Sections 304, 404 and 405.

5/05/15

202514 - PIEZOMETER

Description:

Piezometer installation shall include furnishing all materials and drilling a bore hole, fabricating and placing the piezometer stand pipe, filling the annular space with filter pack and grouting material, and developing the piezometer in reasonably close conformity to the locations and typical details shown on the plans.

Materials:

Piezometer Screen: The screen shall be composed of new material. The screen shall consist of schedule 40 machine slotted PVC and conform to ASTM D-1784 and ASTM F-480. 4-inch PVC pipe shall be used for piezometer installations. Each piezometer shall be constructed from a single length of pipe. The screen slot size shall be No. 10 (0.01 inches) or as specified by the Engineer, and retain at least 90% of the filter pack material. Slots shall extend from the bottom of the piezometer to a distance of 30-inches from the top of the piezometer. The bottom end of the screen shall be capped with a threaded PVC plug.

Filter Pack: Filter pack material shall be an artificial quartz gravel pack consisting of clean, well-rounded grains that are smooth and uniform. The uniformity coefficient of the filter pack shall not exceed 2.5 and shall have a grain size such that 90% of the material is retained by the No. 10 (0.01 inch) screen slot size or alternate slot size specified by the Engineer. Depending upon the actual soil conditions encountered, the gradation of the sand pack shall be modified as required.

Seal: The Piezometer casing shall be sealed immediately above the filter pack with 0.25-inch diameter bentonite pellets placed to a minimum depth of 6-inches and shall be activated with clean, potable water.

Construction Methods:

Each boring for piezometer installation shall have a minimum of 16-inch inner diameter. The preferred drilling methods shall be hollow stem augering or casing drilling. Any other drilling methods shall be subject to the approval of the Engineer.

Piezometers shall be installed and developed to the depths indicated by the Engineer. Each piezometer shall consist of 4-inch PVC slotted pipe complete with cap, bottom plug, seal, and filter pack in accordance with the requirements of these specifications.

Piezometers shall be developed soon after installation. This shall be accomplished by repeated surging and pumping of the well. The surging shall be performed by surge block approved by the Engineer. When surging in the screen, surging shall be started slowly just below the static water level and continued at a faster rate once free flow into the screen has occurred. Thereafter, the surge block can be lowered gradually into the screen area. Development shall continue until the Engineer decides that further development is unnecessary.

Method of Measurement:

The number of Piezometer installations shall be the number of completed and accepted piezometer.

Basis of Payment:

Piezometer installation shall be paid at the contract price bid per each piezometer, which price and payment shall constitute full compensation for furnishing all materials, drilling, fabricating, installing and developing piezometer, finishing in an acceptable manner, and for all labor, tools, equipment, and incidentals necessary to complete the work.

1/8/15

202560 - CONTAMINATED MATERIAL

Description:

Contaminated Material is defined as solids or liquids (including soil) potentially contaminated with a hazardous substance, requiring special handling and/or disposal per state or federal regulation.

This work describes the excavation, removal and treatment/disposal of contaminated materials resulting from project construction including utility and other types of excavation activities in accordance with the locations and notes on the Plans, and as directed by the Engineer or the Department's environmental representative. The Contractor will be notified of the Department's environmental representative at the pre-construction meeting.

Overview of Costs:

Potential contaminated solids may affect contractor's costs as follows;
Additional cost to normal excavation requirements:
-Cost of 8 mil plastic for placement under and over solid contaminated material,
-Maintaining the segregated contaminated solids staging area.

Reduced cost to normal excavation requirements:
-Not required to, or charged for, transport of contaminated material from site.
-Not required to, or charged for, disposal of contaminated soil.

Potential contaminated liquids will affect contractor’s cost as follows;
Additional cost to normal excavation requirements:
-None

Reduced cost to normal excavation requirements:
-None

Construction Methods and Responsibilities:

Contractor's Responsibilities for potential contaminated solids:

The Contractor shall be responsible for providing the appropriate equipment and personnel necessary to excavate, stage, and load contaminated material for off-site disposal, as identified from previous site environmental investigations or identified during construction activities. The work will be performed in accordance with the procedures described in the site specific "Contaminated Material and Water Removal Work Plan" prepared by the Department's environmental representative. The Department will provide a copy of this plan after the project is awarded and before any work begins. The Contractor shall adhere to applicable Occupational Safety and Health standards, Guidelines and/or Laws. This will include compliance with 29 CFR Part 1910.

After award of the Contract, the Contractor shall immediately be responsible for notifying the Department's HAZMAT Program Mananger’s office (760-2463) for scheduling coordination with the environmental representative. The contractor shall submit a proposed schedule of work to the Department for review and approval prior to any commencement of work on this site. The Contractor is required to perform to a high standard of workmanship to assure protection of workers, local water supplies, and the environment. The Contractor shall coordinate with the utility companies prior to excavation. The Department's environmental representative shall be present during all phases of work associated with the excavation and removal of potentially contaminated material. Payment will not be made for any work done when a Department approved Inspector or environmental representative is not present to provide environmental oversight.

Specific tasks to be performed by the Contractor will include excavating soil per the project specifications. The Contractor will segregate "contaminated" soil as designated by the Department or their environmental representative, from "clean" soil and place the "contaminated" soil in a designated on-site staging area constructed by the Contractor. At a minimum the staging area needs to be lined with 8-mil plastic and a berm

constructed to minimize storm water run-off. The "contaminated" soil will need to be covered by the Contractor at the end of each work day. The Contractor will be responsible for loading contaminated soil onto trucks arranged by the Department's environmental representative on the days the contaminated soil is shipped off-site to a licensed disposal/treatment facility. The Contractor will backfill and compact the excavated area(s) according to the project specifications and payment will be made under that item of the Contract.

Department's Responsibilities:

The Department is responsible for providing and paying; the environmental representative; the transportation of contaminated material for disposal; and the disposal of contaminated material.

The "Contaminated Material and Water Removal Work Plan" will identify; the procedures to be used to excavate and stage the contaminated material; the licensed treatment/disposal facility where the Department will ship the contaminated material; the method the material will be transported to the treatment/disposal facility; and any additional health and safety requirements for site personnel.

The Department's environmental representative will conduct a health and safety briefing prior to commencement of activities on the sites to insure an understanding of all applicable standards, guidelines, laws, procedures, etc. consistent with the successful completion of this type of activity. The Department's environmental representative will conduct air monitoring during any excavation activities at the site to identify and mitigate fire, explosion and vapor hazards.

The Department's environmental representative shall coordinate the excavation activities with all applicable local, state, and federal environmental regulatory agencies. The Department's environmental representative will also oversee the excavation, removal and treatment/disposal of the material in the designated area(s) and perform such tests as field screening for soil contamination utilizing vapor monitoring techniques and collect soil samples for laboratory analysis to meet the requirements of the treatment/disposal facility, DNREC and/or the USEPA. The Department's environmental representative's personnel will subcontract with the disposal/treatment facility to provide transportation and disposal/treatment of all contaminated materials to be removed as part of the project. The Department's environmental representative is responsible for measuring the quantity of contaminated material removed, via certified scale weights, for the Department's records.

Method of Measurement:

The quantity of contaminated material will not be measured. It will be included in the excavation quantity.

Basis of Payment:

No additional payment will be made for the handling of contaminated material included in the excavation quantities. Contractor's costs for handling contaminated material as described herein are to be included in the standard excavation pay items included in this contract, and will constitute full compensation for excavation, constructing and maintaining the segregated soil staging area, placement of the contaminated soil in the staging area, providing plastic and daily covering of the segregated soil staging area, and loading of contaminated soil for removal by the Department.

This item is a contingency item and the Department reserves the right to delete from the Contract. The Contractor shall make no claims for additional compensation because of deletion of the item.

04/04/2014

302514 - MILLED HOT-MIX BASE COURSE

Description:

It is the intent of this Special Provision to qualify the use of milled hot-mix asphalt pavement material in lieu of graded aggregate as a base course. All requirements of Section 302 shall remain in effect except as modified below:

Materials:

The material used to construct milled hot-mix asphalt pavement base courses shall be uniformly graded with a maximum size of 1 1/2 (38 mm).

Subgrade Preparation:

The subgrade shall be properly constructed in accordance with Subsection 202.06. No base course material shall be placed until the subgrade has been approved by the Engineer.

Placement:

a. *Equipment.* The milled material shall be spread uniformly by an approved spreading machine or box in such a manner that no segregation occurs. A conventional motor grader will not be approved for placement of milled material on mainline roadway sections.

   Where it is not possible to use a spreading machine or box in patching or other tight areas, other approved methods can be used only in such manner that no segregation occurs. Compaction shall be uniformly attained by approved rollers or compactors. No milled materials shall be placed until approved equipment is on the Project site and is operational.

b. *Spreading and Compacting*. Milled material shall be placed in successive layers. Each layer shall be placed in a level, uniform cross-section not to exceed 12 (300 mm) in depth, loose measurement, unless otherwise approved by the Engineer. The milled material shall be deposited and spread parallel to the centerline and the layer shall extend to the full width as shown on the Plans. The milled material shall be handled so that no segregation of fine or coarse particles occurs. No more than 1,000 (300 m) of material, as measured along the roadway centerline, shall be spread in advance of compaction operations. Each layer shall be properly compacted as specified, before starting the next layer.

   Compaction or rolling shall be performed parallel to the roadway centerline starting at the edges and progressing toward the center. It shall continue until each layer is thoroughly and uniformly compacted to the full width as shown on the Plans.

   The milled material shall be compacted by the following method: a sheepsfoot roller (minimal 50 ton static roller) shall make the required number of passes on the base material to achieve the target density followed by a back-drag by either a bulldozer or a motor grader. After the pavement base material has been placed, a 15 ton/1800 vpm (minimum) vibratory steel wheel roller shall compact the base material. Compaction will be measured per subsection *Performance* below. In small areas where the above noted equipment cannot be used, the contractor must request approval from the Department to place the millings with other equipment. The Department reserves the right to reject or approve the areas for placement of millings as determined by the Engineer.

   After compaction, all voids in the surface of each layer will be filled with millings and compacted (with the vibratory steel wheel roller) until the layer of base material is well bonded and firm, as determined by the Engineer.

   In no case shall vehicles be allowed to travel in a single track or to form ruts in the base course. If any sharp irregularities are formed int he subgrade or base course material, the affected area shall be scarified to a depth of 6 (150 mm) and compacted to conform to the requirements of Section 202 or this Section.

c. *Performance*. Compaction of milled hot-mix asphalt pavement base courses will be monitored by measuring the in-place density using a nuclear density gauge and comparing it to a control strip target density. The mean base compaction shall be at least 98% of the control strip target density and sufficiently uniform that individual test results are at least 96% of the control strip target density, the base course represented by the test will be considered defective and the Contractor shall further compact the area. After further compaction, the original test site and one other randomly selected site within the area will be tested. The average of two test results will be included in the mean density for that day's placement.

To determine the control strip target density, a control strip with a minimum length of 300 (90 m) shall be constructed at the beginning of work on each pavement base. Each control strip is to remain in place and become a section of the completed roadway. A control strip shall have an area of at least 400 yd² (325 m²). For small areas, the Contractor may request to have a test strip waived. This request shall be submitted to the Engineer for review.

Upon completion of the rolling, the mean density of the control strip will be determined by averaging the results of ten nuclear density tests taken at randomly selected sites within the control strip. The mean density of the control strip shall be the target density for the remainder of the pavement base course which it represents. Compaction shall be expressed as a percentage of the target density.

The finished surface of the graded aggregate base course shall not vary from that required on the Plans by more than 1/2 (13 mm) when tested with a 10 (3.048 m) straightedge applied to the surface parallel to the centerline of the pavement and when tested with a template cut to the cross-section of the pavement. The actual thickness of the graded aggregate base course shall not be more than 1/2 (13 mm) less than the thickness shown on Plans. Those portions of completed base course not meeting these performance requirements shall be completely removed and replaced with proper material placed in accordance with this Section.

A straightedge meeting the approval of the Engineer shall be supplied by the Contractor at each placement operation. The straightedge shall be constructed of rigid materials that resist warping and bending.

Method of Measurement:

The quantity of milled hot-mix base course will be measured by the cubic yard (cubic meter) and will be paid for under Item 302007 - Graded Aggregate Base Course. The volume of cubic yards (cubic meters) will be measured as the number of square yards (square meters) of surface area of milled hot-mix base course, placed and accepted, multiplied by the depths shown on the Plans.

If the depth of milled hot-mix base course, placed and accepted, is greater than the depth shown on the Plans, the Plan depth will be used to measure the quantity of payment.

If the limits of measurement for pay quantities for milled hot-mix base course are designated on the Plans, the quantity of milled hot-mix base course measured for payment will be the number of square yards (square meters) of surface area multiplied by the depth placed within the payment lines and grades shown on the Plans.

If the limits are not designated on the Plans, or have been changed by the Engineer, in-place dimensions of the accepted milled hot-mix base course will be established. The computation of quantity will be made from cross-sections taken after the completion of work under this Section.

Materials placed beyond the designated lines and grades as shown on the Plans or beyond the limits established by the Engineer will not be measured for payment.

There will be no separate payment made for filling voids with millings as required under Placement subsection (b) *Spreading and Compaction*.

Basis of Payment:

Millings used for Base Course will be paid at the unit bid price for Item 302007 - Graded Aggregate Base Course, Type B. All costs to bring the millings into compliance with the requirements of 302514 are incidental to Item 302007. No payment will be made under this item 302514.

Price and payment will constitute full compensation for hauling, stockpiling (includes any double handling of material), preparing the subgrade, placing and compacting the materials, and for all labor, equipment, tools and incidental required to complete the work.

No additional compensation will be made to the Contractor to crush, screen or otherwise modify the milled hot-mix base course to meet the necessary gradation.

No payment will be made for materials placed beyond the designated lines and grades as shown on the Plans or beyond the limits established by the Engineer.

10/31/05

401580 – RIDE QUALITY OF HOT-MIX PAVEMENT

Description:

The purpose of this Special Provision is to modify Standard Specification Section 401.13 to change the method of determining an acceptable riding surface. This Special Provision replaces the entire existing wording in Section 401.13.

The Contractor shall be responsible for providing smoothness characteristics that will meet the requirements of the Contract. The Contractor shall be responsible for providing equipment, maintenance of traffic (MOT) as required by the Delaware MUTCD, and performing testing in accordance to the processes and procedures set forth in this Special Provision. All costs for testing and MOT shall be incidental to this item. Both the International Roughness Index (IRI) and deviations located within a 10' straightedge are used to characterize smoothness in this Special Provision.

Definitions:

Class 1 Project - a project that is full depth construction based on contract documents and document modifications.

Class 2 Project - a project in which a minimum of two smoothness opportunities are performed based on contract documents and document modifications.

Class 3 Project - a project that only one smoothness opportunity is performed based on contract documents and document modifications.

Deviation – a hump or depression found to exceed the tolerances defined in this Special Provision within a 10' straightedge.

ERD File – a file storing numbers in tabular form for plotting and processing purposes. The ERD file format was developed by the Engineering Research Division of the University of Michigan Transportation Institute (UMTRI).

Full Depth Construction – a project that consists of a hot mix asphalt wearing surface placed on a hot-mix asphalt base / binder course or Portland cement concrete, on an aggregate or asphalt / cement stabilized base structure on existing or prepared subgrade materials or borrow.

Inertial Profiler – a high speed or lightweight device used to measure the pavement profile with an accelerometer to form an inertial reference and a height sensor to measure pavement height relative to that reference.

International Roughness Index (IRI) – a statistic, based on computations from a measured longitudinal profile using a quarter-car simulation, calculated to represent the amount of roughness in a pavement surface.

Rolling Ten Foot Straightedge - a rigid 10' straightedge mounted to measurement wheels and used to indicate both high and low deviations.

Smoothness Opportunity – a smoothness opportunity is roadway milling, placement of a leveling course, in place recycling, or placement of a lift of Hot Mix Asphalt. Full depth reclamation is not considered in this Special Provision as a smoothness opportunity. The final wearing surface is considered one smoothness opportunity.

Equipment:

The Contractor shall have available, at all times during paving operations, an approved 10' straightedge. The Contractor shall also have available a high speed or lightweight inertial profiling system meeting the standards set forth in AASHTO MP-11 that is capable of collecting data in both wheelpaths simultaneously. Data collected using the inertial profiling system shall be used to calculate both IRI and deviation locations using on-board computer software. Deviations, as defined in this Special Provision, shall be calculated using

a rolling 10' straight edge simulation program capable of isolating deviations greater than or equal to 0.25" in 10'. If software is not available to calculate the parameters for a rolling 10' straight edge simulation, the Contractor may be permitted to use, at the Engineer's discretion, a rolling 10' straightedge capable of isolating deviations greater than or equal to 0.25" in 10'.

Documentation Required

Prior to the start of corrective actions (milling, overlaying, recycling, etc.), the Contractor shall provide to the Engineer:
1. Manufacturer, Make, and Model of the test system,
2. Equipment Owner,
3. Relevant Certifications,
4. Manufacturer Calibration Procedures, and
5. Relevant Operator Training information.

Testing cannot take place until the Engineer has received this information and provided approval of the proposed test equipment and MOT plan.

Calibration

Prior to testing, the Contractor shall verify that the inertial profiling equipment is calibrated by following the manufacturer's calibration procedure in the presence of the Engineer. Vertical and longitudinal calibrations shall be performed. The Engineer will provide calibration blocks for the Contractor's use at the time of calibration. If the equipment does not pass the calibration procedure, it will not be permitted for use.

Testing:

Testing of the pavement surface includes measurement and calculation of the IRI parameters and deviations in the longitudinal direction. The Contractor shall notify the Engineer at least three (3) working days prior to data collection for both initial and final testing.

Transverse Deviations / Cross Slope

After final rolling and at the Engineer's discretion, the Contractor shall test the surface of each lift and the final wearing surface for deviations in the transverse direction. The Contractor shall have available at all times, and use appropriately, an approved 10' straightedge to be placed perpendicular to the centerline for checking cross slope. Deviations in the transverse direction shall not equal or exceed 0.25". The discount charge for deviations in the transverse direction is described in Section 'Acceptance and Payment' of this Special Provision. Deviations in the transverse direction shall require corrective actions or will be assessed a deviation discount charge at the discretion of the Engineer.

General Testing Requirements for IRI Data Collection

Data used for calculation of the IRI shall be measured in each wheel path using an approved inertial profiling system. Data collected for IRI calculation shall have longitudinal spacing no greater than 6 inches. Wavelengths exceeding 300 feet shall be removed using long wavelength filters. The International Roughness Index shall be calculated using this data and reported in 0.1 mile (528 foot) segments. Three (3) passes shall be made in each lane and direction requiring testing. The filename given to the data set shall include the contract number, the location number, the lane tested and direction tested. For example, the Eastbound left lane of Contract XX-XXX-XX, Location 1, run 3 shall be named:

XXXXXXXLoc1LEBr3

Testing shall be performed within seven (7) days of the completion of project paving operations.
Areas not subject to IRI testing for all Classes of projects include:

1. 50 feet before the first bridge deck expansion joint to 50 feet after the last expansion joint if the bridge deck is excluded from the HMA overlay.

2. 20 feet longitudinally from the center of an existing obstruction located and visible in the pavement surface such as a manhole or water main. Obstructions located within the test area shall be noted as an event on report printouts using an automated event marking system and should be removed from the calculations prior to report submission.
3. Shoulders, short acceleration and deceleration lanes, and turn lanes less than 1000 feet in length, and median crossovers.

Testing shall be performed in accordance to the following procedures.

1. Clean the roadway path to be measured of all debris and other loose material. Ensure that the roadway surface is dry and free of any standing water.
2. Locate the start of the project limits and mark them to enable automatic start sensors to be activated.
3. Locate the end of the project limits and mark them to enable automatic stop sensors to be activated.
4. Locate any obstructions in the wheelpath / test area and mark them with reflective tape to enable automatic event marking.
5. Establish a pre-test length (150' or the manufacturer's recommended pre-test length, whichever is greater) prior to the start of the project limits.
6. Position the left wheelpath sensor three feet (3') from the left edge marking of each lane tested.
7. Attain a test speed that is within the manufacturers recommendations for the equipment and maintain that test speed throughout the test.

Provide the Department the plot of one profile trace per tested lane and a summary report containing IRI values for each of the three test runs performed in each direction.

Initial Testing, IRI

The original surface for Class 3 projects shall be tested at no cost to the Department prior to performance of any smoothness opportunities in accordance to the methods and parameters in Section 'General Testing Requirements for IRI Data Collection'. Class 1 and Class 2 projects do not require initial testing. Results from initial testing for Class 3 projects shall be submitted to the Engineer within five (5) working days of test completion in the format specified by the Engineer. Results not received within the allotted time frame will be assessed a charge of $1,000.00 per day at the Engineer's discretion. Three (3) measurements shall be taken for each lane required to meet this Special Provision. No paving shall be permitted until the Contractor has performed initial testing to the satisfaction of the Engineer.

Final Testing

The final surface, after all smoothness operations have been completed, shall be tested in accordance to Section 'General Testing Requirements for IRI Data Collection'. Results of final testing for all projects shall be submitted to the Engineer within five (5) working days of test completion in the format specified by the Engineer. Results not received within the allotted time frame will be assessed a charge of $1,000.00 per day at the Engineer's discretion. Three measurements shall be taken for each lane to meet the requirements of this Special Provision.

Final Testing for Excessive Deviations

All paved areas, whether subject to IRI testing or not, must be tested to locate deviations in each wheelpath in the longitudinal direction and in the transverse direction. A deviation is considered to be a hump or depression greater than or equal to 0.25" within 10'. Longitudinal deviations shall be located using data collected by an inertial profiling system and processed through a rolling 10'- straightedge simulation, a rolling 10' straightedge, or a rigid 10' straightedge. Transverse deviations shall be located using a rigid 10' straightedge at the discretion of the Engineer. Testing shall be performed within seven (7) days of the completion of paving.

Quality Assurance Testing:

If the Engineer chooses to perform comparison testing, the Contractor shall provide a lane closure at no cost to the Engineer. The length of the lane closure shall be determined for each project location based on site conditions. The minimum closure shall be 0.25 mile and the maximum closure shall be 1 mile. The lane closure shall be at either end of the project limits and will be determined on a project basis at the Engineer's discretion.

If comparison testing indicates a difference greater than 6 in/mi in IRI measurements per 0.1-mile section, the Contractor and Engineer shall work to resolve the differences. If the differences cannot be resolved the equipment will be rejected for use on the project and all data collected to that point will be deemed invalid for that contract. At that point, the Contractor shall propose an alternative piece of testing equipment for use.

Data Reporting:

Test results shall be provided to the Department within five (5) working days of the completion of testing. Results not received within the allotted time frame will be assessed a charge of $1,000.00 per day at the discretion of the Engineer.

The Department recognizes that inertial profiler manufacturers use different formats for reporting capabilities. Printouts on 8 ½" by 11" paper or strip charts are acceptable.

Data collected using the inertial profiling system shall be provided to the Engineer with the following information clearly displayed on the printout:

1. Profiling Company Name
2. Date of Paving
3. Date of Test
4. Parameters used in the calculation
5. Data file name
6. Testing Personnel

A printout of the pavement profile is required for one (1) of the three (3) runs for each lane and direction tested. A summary chart may be submitted for the remaining test runs. If excessive deviations are calculated using inertial profiling data runs submitted for IRI analysis a summary chart shall be submitted as well. The summary chart shall include the station and wheelpath for deviation reporting. If excessive deviations are manually determined (using a rolling ten-foot straightedge or rigid 10' straightedge), the Engineer will be present during testing and will record the data on site.

Inertial profiling systems have the capability of producing ERD files. An ERD file is requested for each run performed and can be submitted electronically (via email) or on external media (CD). More information about the format of ERD files can be obtained through the Engineer.

Acceptance and Payment:

Acceptance of the final pavement will be based on the results of IRI values and the number of deviations. A section that has an IRI value greater than 100.0 in/mi will require corrective actions. Deviations equal to or in excess of 0.25" in 10' shall be corrected at no expense to the Engineer or have a discount charge of $200.00 per deviation assessed at the discretion of the Engineer.

An IRI number in inches per mile will be used for each 0.1-mile (528 foot) section as the basis for payment of the surface courses designated by each contract. The average value of the three test runs will be used as the IRI value for payment. Payments for each section will be based on estimated tonnage calculated from plan thickness and widths using the average maximum specific gravity ("Rice") value for all surface mix used at that location. If the plan does not indicate the travel lane width, a default value of 12' will be used. The formula used for tonnage estimation is:

$$\text{Estimated Tonnage} = [(L * W * T) * \text{Rice} * 62.4\ (\text{lb/ft}^3) * (0.0005\ \text{tons}/12\ \text{in})]$$

where: L = Length Segment (ft.)
W = Width Lane (ft.)
T = Plan Thickness (in.)

The percentage of improvement for Class 3 projects will be calculated using the following equation:

$$\%\ \text{Improvement} = [(\text{Initial IRI} - \text{Final IRI}) / \text{Initial IRI}] * 100$$

The applicable pay adjustments for IRI will be taken from Table A (Class 1 and 2 Projects) and Table B (Class 3 Projects)

$$IRI\ Bonus\ /\ Penalty = Estimated\ Tonnage * UP * (PA - 100)\ /\ 100$$

where: UP = Contract Hot Mix Unit Price (Dollars)
PA = Pay Adjustment (Percent)

The total pay adjustment for paving work performed on each location will be:

$$(\sum IRI\ Adj\ for\ each\ section) - Total\ Deviations * 200$$

It will be possible to receive bonus for IRI measurements and a discount charge for excessive deviations on the same project. If a 528' section has an IRI value resulting in a deduction of at least 30% of the section pay (i.e. IRI >100 in/mi), the deviation discount charge for that section is disregarded and the IRI discount charge is the only action taken for that section.

Table A: Payment Adjustments for Class 1 and Class 2 Projects

	Payment Adjustments	
IRI per 0.1 mile Section (in./mi.)	**Class 1**	**Class 2**
40.0 and under	103	104
40.1 - 55.0	101	102
55.1 – 65.0	100	101
65.1 – 75.0	99	100
75.1 – 100.0	96	97
>100	70	70

Class 3 projects will be paid based on the percent improvement for each 528' section from the average of the three initial profile traces taken prior to any work action as shown in the Table B.

Table B: Payment Adjustments for Class 3 projects

Percent Improvement from Initial test	**Payment Adjustments for Class 3 Projects**
> 60.0%	103
45.1 – 60.0%	102
25.1 – 45.0%	101
0 – 25.0%	100
<0%	70

Corrections to the paving surface, such as diamond grinding with approved equipment, patching, or other measures may be taken at the Contractor's expense and at the Engineer's discretion to correct pavement surfaces assessed a discount charge. Areas corrected using these methods will not be eligible for bonus payment, but may be assessed a charge based on the resulting surface after correction. The Engineer reserves the right to require corrective actions such as remove & replace or diamond grinding if the must correct discount charge exceeds 50% of the cost of materials or the IRI exceeds 100 in/mi. The Engineer may also require corrective actions if the deviations are at a height or depth which will create a safety concern on the roadway.

3/9/09

401699 - QUALITY CONTROL/QUALITY ASSURANCE OF BITUMINOUS CONCRETE

.01 Description

This item shall govern the Quality Assurance Testing for supplying bituminous asphalt plant materials and constructing bituminous asphalt pavements and the calculation for incentives and disincentives for materials and construction. The Engineer will evaluate all materials and construction for acceptance. The procedures for acceptance are described in this Section. Include the costs for all materials, labor, equipment, tools, and incidentals necessary to meet the requirements of this specification in the bid price per ton for the bituminous asphalt. Payment to the Contractor for the bituminous asphalt item(s) will be based on the Contract price per ton and the pay adjustments described in this specification.

.02 Bituminous Concrete Production – Quality Acceptance

(a) Material Production - Tests and Evaluations.

All acceptance tests shall be performed by qualified technicians at qualified laboratories following AASHTO or DelDOT procedures, and shall be evaluated using Quality Level Analysis. The Engineer will conduct acceptance tests. The Engineer will directly base acceptance on the acceptance test results, the asphalt cement quality, the Contractor's QC Plan work, and the comparisons of the acceptance test results to the QC test results. The Engineer may elect to utilize test results of the Contractor in some situations toward judging acceptance.

Supply and capture samples, as directed by the Engineer under the purview of the Engineer from delivery trucks before the trucks leave the production plant. Hand samples to the Engineer to be marked accordingly. The sample shall represent the material produced by the Contractor, and shall be of sufficient size to allow the Engineer to complete all required acceptance tests. The Engineer will direct the Contractor when to capture these samples, on a statistically random, unbiased basis, established before production begins each day based upon the anticipated production tonnage. The captured sample shall be from the Engineer specified delivery truck. The Contractor may visually inspect the specified delivery load during sampling and elect to reject the load. If the contractor elects to reject the specified delivery truck, each subsequent load will be inspected until a visually acceptable load is produced for acceptance testing. All visually rejected loads shall not be sent to a Department project.

The first sample of the production day will be randomly generated by the Engineer between loads 0 and 12 (0-250 tons). Subsequent samples will be randomly generated by the Engineer on 500-ton sub-lots for the production day. Samples not retrieved in accordance with the Contractor's QC plan will be deemed unacceptable and may be a basis for rejection of material produced. Parallel tests or dispute resolution tests will only be performed on material captured at the same time and location as the acceptance test sample. Parallel test samples or Dispute Resolution samples will be created by splitting a large sample or obtaining multiple samples that equally represent the material. The Engineer will perform all splitting and handling of material after it is obtained by the Contractor.

The Contractor may retain dispute resolution samples or perform parallel tests with the Engineer on any acceptance sample.

The Engineer will evaluate and accept the material on a lot basis. All the material within a lot shall have the same JMF (mixture ID). The lot size shall be targeted for 2000 tons or a maximum period of three days, whichever is reached first. If the 2000th ton target lot size is achieved during a production day, the lot size shall extend to the end of that production day. The Contractor may interrupt the production of one JMF in order to produce different material; this type of interruption will not alter the determination of the size or limits of material represented by a lot. The Engineer will evaluate each lot on a sublot basis. The size for each sublot shall be 100 to 500 tons and testing for the sub lots will be completed on a daily basis. For each sublot, the Engineer will evaluate one sample.

The target size of sub-lots within each lot, except for the first sample of the production day, is equal-sized 500 ton sub lots and will be based upon anticipated production, however, more or fewer sublots, with differing sizes, may result due to the production schedule and conditions. If the actual production is less than anticipated, and it's determined a sample will not be obtained (based upon the anticipated tonnage), a new sample location will be determined on a statistically random, unbiased basis based upon the new actual

production. If the actual production is going to be 50 tons or greater over the anticipated sub lot production, a new sample location will be determined on a statistically random, unbiased basis based upon the new actual production. The Engineer will combine the evaluation and test results for all of the applicable sublots in order to evaluate each individual lot.

If the Engineer is present, and the quantity exceeds 25 tons, a statistically random sample will be used for analysis. When the anticipated production is less than 100 tons and greater than 25 tons, and the Engineer is not present, the contractor shall randomly select a sample using the Engineer's random location program. The captured sample shall be placed in a suitable box, marked to the attention of the Engineer, and submitted to the Engineer for testing. A box sample shall also be obtained by the contractor at the same time and will be used as the Dispute Resolution sample if requested by the Engineer. The Contractor shall also obtain one liquid asphalt sample (1 pint) per grade of asphalt used per day and properly label it with all pertinent information.

The Engineer will conduct the following tests in order to characterize the material for the pavement compaction quality and to judge acceptance and the pay adjustment for the material:

- AASHTO T312 - Preparing and Determining the Density of Hot Mix Asphalt (HMA) Specimens by Means of the Superpave Gyratory Compactor
- AASHTO T166, Method C (Rapid Method) - Bulk Specific Gravity of Compacted Hot Mix Asphalt (HMA) Using Saturated Surface Dry Specimens
- AASHTO T308 - Determining the Asphalt Binder Content of Hot Mix Asphalt (HMA) by the Ignition Method
- AASHTO T30 - Mechanical Analysis of Extracted Aggregate
- AASHTO T209 - Theoretical Maximum Specific Gravity and Density of Hot Mix Asphalt (HMA)
- ASTM D7227 - Standard Practice for Rapid Drying of Compacted Asphalt Specimens using Vacuum Drying Apparatus

(b) Pavement Construction - Tests and Evaluations.

The Engineer will directly base acceptance on the compaction acceptance test results, and on the inspection of the construction, the Contractor's QC Plan work, ride smoothness as referenced in the contract documents, lift thickness as referenced in the contract documents, joint quality as referenced in the contract documents, surface texture as referenced in the contract documents, and possibly the comparisons of the acceptance test results to the independent test results. For the compaction acceptance testing, the Engineer will sample the work on a statistically random basis, and will test and evaluate the work based on daily production.

Notify the Engineer of any locations within that road segment that may not be suitable to achieve minimum (93%) compaction due to existing conditions prior to paving the road segment. Schedule and hold a meeting in the field with the Engineer in order to discuss all areas that may potentially be applicable to Table 5a before paving starts. Areas that will be considered for Table 5a will be investigated in accordance to the method described in Appendix B. If this meeting is not held prior to paving, no areas will be considered for Table 5a. Areas of allowable exemptions that will not be cored include the following: partial-depth patch areas, driveway entrances, paving locations of less than 100 tons, areas around manholes and driveway entrances, and areas of paving that are under 400 feet in continuous total length and/or 5 feet in width.

The exempt areas around manholes will be a maximum of 4 feet transversely on either side from the center of the manhole, and 20 feet longitudinally on either side from the center of the manhole. The exempt areas around driveway entrances shall be the entire width of the driveway, and 3 feet from the edge of the longitudinal joint next to the driveway. Areas of exemption that will be cored for informational purposes only include: areas where the mat thickness is less than three times the nominal maximum aggregate size as directed by the Engineer, violations of Section 401.08 in the Standard Specifications as directed by the Engineer, and areas shown to contain questionable subgrade properties as proven by substantial yielding under a fully legally loaded truck. Failure to obtain core samples in these areas will result in zero payment for compaction regardless of the exempt status. The Engineer will evaluate and accept the compaction work on a daily basis. Payment for the compaction will be calculated by using the material production lots as referenced in **.02 Acceptance Plan (a) Material Production - B Tests and Evaluation** and analyzing the compaction results over the individual days covered in the material production lot. The compaction results will be combined with the material results to obtain a payment for this item.

The minimum size of a compaction lot shall be 100 tons. If the compaction lot is between 101 and 1000 tons, the Engineer shall randomly determine four compaction acceptance test locations. If the compaction lot is between 1001 and 1500 tons, the Engineer shall randomly determine six compaction acceptance test locations. If the compaction lot is between 1501 and 2000 tons, the Engineer shall randomly determine eight compaction acceptance test locations. If the compaction lot is greater than 2000 tons, the Engineer shall randomly determine two compaction acceptance test locations per 500 tons.

If a randomly selected area falls within an Engineer approved exemption area, the Engineer will select one more randomly generated location to be tested per the requirements of this Specification. If that cannot be accomplished, or if an entire location has been declared exempt, the compaction testing shall be performed as per these Specifications but a note will be added to the results that the location was an Engineer approved exempt location.

Testing locations will be a minimum of 1.0 feet from the newly placed longitudinal joint and 50 feet from a new transverse joint.

Cut one six (6) inch diameter core through the full lift depth at the exact location marked by the Engineer. Cores submitted that are not from the location designated by the Engineer will not be tested and will be paid at zero pay.

Notify the Engineer prior to starting paving operations with approximate tonnage to be placed. The Contractor is then responsible for notifying the appropriate Engineer test personnel within 12 hours of material placement. The Engineer will mark core locations within 24 hours of notification. After determination of locations, the Contractor shall complete testing within two operational days of the locations being marked. If the cores are not cut within two operational days, the area in question will be paid at zero pay for compaction testing.

Provide any traffic control required for the structural number investigation, sampling, and testing work at no additional cost to the Department.

Commence coring of the pavement after the pavement has cooled to a temperature of 140°F or less. Cut each core with care in order to prevent damaging the core. Damaged cores will not be tested. Label each core with contract number, date of construction, and number XX of XX upon removal from the roadway Place cores in a 6-inch diameter plastic concrete cylinder mold or approved substitute for protection. Separate cores in the same cylinder mold with paper. Attach a completed QC test record for the represented area with the corresponding cores. The Engineer will also complete a test record for areas tested for the QA report and provide to Materials & Research. Deliver the cores to the Engineer for testing, processing, and report distribution at the end of each production day.

Repair core holes per Appendix A, Repairing Core Holes in Bituminous Asphalt Pavements. Core holes shall be filled immediately. Failure to repair core holes at the time of coring will result in zero pay for compaction testing for the area in question.

The Engineer will conduct the following tests on the applicable portion of the cores in order to evaluate their quality:

- AASHTO T166, Method C (Rapid Method) – Bulk Specific Gravity of Compacted Hot Mix Asphalt (HMA) Using Saturated Surface Dry Specimens
- AASHTO T209 - Theoretical Maximum Specific Gravity and Density of Hot Mix Asphalt
- ASTM D7227 - Standard Practice for Rapid Drying of Compacted Asphalt Specimens using Vacuum Drying Apparatus

The Engineer will use the average of the last five test values of the same JMF (mixture ID) material at the production plant in order to calculate the average theoretical maximum specific gravity of the cores. The average will be based on the production days test results and as many test results needed from previous days production to have an average of five samples. If there are less than five values available, the Engineer will use the JMF design value in addition to the available values to calculate the average theoretical maximum specific gravity.

.03 Payment and Pay Adjustment Factors.

The Engineer will determine pay adjustments for the bituminous asphalt item(s) in accordance with this specification. The Engineer will determine a pay adjustment factor for the material produced and a pay adjustment factor for the pavement construction. Pay adjustments for material and construction will be calculated independently. When the pay adjustment calculation for either material or construction falls to zero payment per tables 4, 5, or 5a, the maximum pay adjustment for the other factor will not exceed 100.

Pay Adjustment factors will only be calculated on in place material. Removed material will not be used in payment adjustment calculations.

Material Production Pay Adjustments will be calculated based upon 70% of the contract unit price and calculated according to section .03(a) of this specification. Pavement construction Pay Adjustments will be calculated based upon 30% of the contract unit price and calculated according to section .03(b) of this specification.

(a) Material Production - Pay Adjustment.

Calculate the material pay adjustment by evaluating the production material based on the following parameters:

Table 2 - Material Parameter Weight Factors

Material Parameter	Single Test Tolerance (+/-)	Weight Factor
Asphalt Content	0.4	0.30
#8 Sieve (>=19.0 mm)	7.0	0.30
#8 Sieve (<=12.5 mm)	5.0	0.30
#200 Sieve (0.075mm Sieve)	2.0	0.30
Air Voids (4.0% Target)	2.0	0.10

Using the JMF target value, the single test tolerance (from Table 2), and the test values, the Engineer will use the following steps to determine the material pay adjustment factor for each lot of material:

1. For each parameter, calculate the mean value and the standard deviation of the test values for the lot to the nearest 0.1 unit.
2. For each parameter, calculate the Upper Quality Index (QU):
   QU = ((JMF target) + (single test tolerance) - (mean value)) / (standard deviation).
3. For each parameter, calculate the Lower Quality Index (QL):
   QL = ((mean value) - (JMF target) + (single test tolerance)) / (standard deviation).
4. For each parameter, locate the values for the Upper Payment Limit (PU) and the Lower Payment Limit (PL) from Table 3 - Quality Level Analysis by the Standard Deviation Method. (Use the column for "n" representing the number of sublots in the lot. Use the closest value on the table when the exact value is not listed).
5. Calculate the PWL for each parameter from the values located in the previous step:
   PWL = PU + PL - 100.
6. Calculate each parameter's contribution to the payment adjustment by multiplying its PWL by the weight factor shown in Table 2 for that parameter.
7. Add the calculated adjustments of all the parameters together to determine the Composite PWL for the lot.
8. From Table 4, locate the value of the Pay Adjustment Factor corresponding to the calculated PWL. When all properties of a single test are within the single test tolerance of Table 2, Pay Adjustment factors shall be determined by Column B. When any property of a single test is outside of the Single Test Tolerance parameters defined in Table 2, the Material Pay Adjustment factor shall be determined by Column C.

9. For each lot, determine the final material price adjustment:

Final Material Pay Adjustment =
(Lot Quantity) x (Item Bid Price) x (Pay Adjustment Factor) x 70%. This final pay calculation will be paid to the cent.

In lieu of being assessed a pay adjustment penalty, the Contractor may choose to remove and replace the material at no additional cost to the Department. When the PWL of any material parameter in Table 2 is below 60, the Engineer may require the removal and replacement of the material at no additional cost to the Department. Test results on removed material shall not be used in calculation of future PWL calculations for Mixture ID.

The test results from the Engineer on production that is less than 100 tons will be combined with the two most recently completed Engineer tests with the same Mixture ID to calculate payment for the lot encompassing the single test. If that cannot be accomplished, the approved JMF will be used to calculate payment for the lot encompassing the single test. Payment for previously closed lots will not be affected by the analysis.

When a sample is outside of the allowable single test tolerance for any Materials criteria in Table 2, that sample will be isolated. For payment purposes, the test result of the out of acceptable tolerance sample will be combined with the two previous acceptable samples of the same JMF and analyzed per this specification. The material that is considered out of the acceptable tolerance will only include the material within the represented sub-lot (i.e., a maximum of 500 tons). If the previous acceptable test result is from the previous production day, only the material produced on the second production day will be considered out of tolerance. All future sub lots will not include the isolated test. The pay factors for the out of tolerance sample lot will be calculated using column C of table 4.

If, during production, a QA sample test result does not meet the acceptable tolerances and the Contractors QC sample duplicates the QA sample test result, the Contractor can make an appropriate change to the mixture (within the JMF boundaries), and request to have that sample further isolated. After the Contractor has made appropriate changes, the Contractor will visually inspect each produced load. The first visually acceptable load will be sampled and tested. If that sample test result shows compliance with the specifications, the material that is considered out of the acceptable tolerance will include the material from the previous acceptable test result to the third load after the initially sampled and tested sample. If the sample does not meet the specification requirements, the Engineer will no longer accept material. Production may resume when changes have been made and an acceptable sample and test result is obtained.

Table 3 – Quality Level Analysis by the Standard Deviation Method

PU or PL	QU and QL for "n" Samples						
	n = 3	n = 4	n = 5	n = 6	n = 7	n = 8	n = 9
100	1.16	1.50	1.79	2.03	2.23	2.39	2.53
99	-	1.47	1.67	1.80	1.89	1.95	2.00
98	1.15	1.44	1.60	1.70	1.76	1.81	1.84
97	-	1.41	1.54	1.62	1.67	1.70	1.72
96	1.14	1.38	1.49	1.55	1.59	1.61	1.63
95	-	1.35	1.44	1.49	1.52	1.54	1.55
94	1.13	1.32	1.39	1.43	1.46	1.47	1.48
93	-	1.29	1.35	1.38	1.40	1.41	1.42
92	1.12	1.26	1.31	1.33	1.35	1.36	1.36
91	1.11	1.23	1.27	1.29	1.30	1.30	1.31
90	1.10	1.20	1.23	1.24	1.25	1.25	1.26
89	1.09	1.17	1.19	1.20	1.20	1.21	1.21
88	1.07	1.14	1.15	1.16	1.16	1.16	1.17
87	1.06	1.11	1.12	1.12	1.12	1.12	1.12

86	1.04	1.08	1.08	1.08	1.08	1.08	1.08
85	1.03	1.05	1.05	1.04	1.04	1.04	1.04
84	1.01	1.02	1.01	1.01	1.00	1.00	1.00
83	1.00	0.99	0.98	0.97	0.97	0.96	0.96
82	0.97	0.96	0.95	0.94	0.93	0.93	0.93
81	0.96	0.93	0.91	0.90	0.90	0.89	0.89
80	0.93	0.90	0.88	0.87	0.86	0.86	0.86
79	0.91	0.87	0.85	0.84	0.83	0.82	0.82
78	0.89	0.84	0.82	0.80	0.80	0.79	0.79
77	0.87	0.81	0.78	0.77	0.76	0.76	0.76
76	0.84	0.78	0.75	0.74	0.73	0.73	0.72
75	0.82	0.75	0.72	0.71	0.70	0.70	0.69
74	0.79	0.72	0.69	0.68	0.67	0.66	0.66
73	0.75	0.69	0.66	0.65	0.64	0.63	0.63
72	0.74	0.66	0.63	0.62	0.61	0.60	0.60
71	0.71	0.63	0.60	0.59	0.58	0.57	0.57
70	0.68	0.60	0.57	0.56	0.55	0.55	0.54
69	0.65	0.57	0.54	0.53	0.52	0.52	0.51
68	0.62	0.54	0.51	0.50	0.49	0.49	0.48
67	0.59	0.51	0.47	0.47	0.46	0.46	0.46
66	0.56	0.48	0.45	0.44	0.44	0.43	0.43
65	0.52	0.45	0.43	0.41	0.41	0.40	0.40
64	0.49	0.42	0.40	0.39	0.38	0.38	0.37
63	0.46	0.39	0.37	0.36	0.35	0.35	0.35
62	0.43	0.36	0.34	0.33	0.32	0.32	0.32

Table 3 – Quality Level Analysis by the Standard Deviation Method

PU or PL	QU and QL for "n" Samples						
	n = 3	n = 4	n = 5	n = 6	n = 7	n = 8	n = 9
61	0.39	0.33	0.31	0.30	0.30	0.29	0.29
60	0.36	0.30	0.28	0.27	0.27	0.27	0.26
59	0.32	0.27	0.25	0.25	0.24	0.24	0.24

Table 4 - PWL Pay Adjustment Factors

PWL	Pay Adjustment Factor (%) Column B	Pay Adjustment Factor (%) Column C
100	+5	0
99	+4	-1
98	+3	-2
97	+2	-3
96	+1	-4
95	0	-5

94	-1	-6
93	-2	-7
92	-3	-8
91	-4	-9
PWL<91	PWL - 100	PWL - 100

(b) Pavement Construction - Pay Adjustments.

The Engineer will determine the pavement construction pay adjustment by evaluating the construction of the pavement, based on the following parameter:

- Degree of compaction of the in-place material

Using the test values for the cores, the Engineer will use the following steps to determine the pavement construction pay adjustment for each lot of work. .

1. Calculate the core bulk specific gravity values from the sublot tests values, to the nearest 0.001 unit. Obtain the Theoretical maximum Specific Gravity values from the corresponding laboratory sublot tests.
2. Calculate the Degree of Compaction:
   Degree of Compaction =
   ((Core Bulk Specific Gravity) / (Theoretical Maximum Specific Gravity)) x 100% recorded to the nearest 0.1%.
3. The average compaction for the sublots shall be averaged together for the compaction level of the lot. The lots compaction test level shall be averaged and recorded to the nearest whole percent.
4. Locate the value of the Payment Adjustment Factor corresponding to the calculated degree of compaction from Table 5 or Table 5a.
5. Determine the pavement construction price adjustment by using the following formula:
   Construction Pay adjustment = (Lot Quantity) x (Bid Price) x (Pay Adjustment Factor) x 30%.

Table 5: Compaction Price Adjustment Highway Locations

Degree of Compaction (%)	Range	Pay Adjustment Factor (%)
>= 97.0	>= 96.75	-100*
96.5	96.26 – 96.74	-5
96.0	95.75 – 96.25	-3
95.5	95.26 – 95.74	-2
95.0	94.75 – 95.25	0
94.5	94.26 – 94.74	0
94.0	93.75 – 94.25	1
93.5	93.26 – 93.74	3
93.0	92.75 – 93.25	5

92.5	92.26 – 92.74	3
92.0	91.75 – 92.25	0
91.5	91.26 – 91.74	0
91.0	90.75 – 91.25	-5
90.5	90.26 – 90.74	-15
90.0	89.75 – 90.25	-20
89.5	89.26 – 89.74	-25
89.0	88.75 – 89.25	-30
88.5	88.26 – 88.74	-50
=<88.0	=<88.25	-100*

* or remove and replace it at Engineer's discretion

Table 5A: Compaction Price Adjustment Other[1] Locations		
Degree of Compaction	Range	Pay Adjustment Factor (%)
>= 97.0	>= 96.75	-100*
96.5	96.26 – 96.74	-5
96.0	95.75 – 96.25	-3
95.5	95.26 – 95.74	-2
95.0	94.75 – 95.25	0
94.5	94.26 – 94.74	0
94.0	93.75 – 94.25	0
93.5	93.26 – 93.74	1
93.0	92.75 – 93.25	3
92.5	92.26 – 92.74	1
92.0	91.75 – 92.25	0
91.5	91.26 – 91.74	0
91.0	90.75 – 91.25	0
90.5	90.26 – 90.74	0
90.0	89.75 – 90.25	0
89.5	89.26 – 89.74	0
89.0	88.75 – 89.25	-1
88.5	88.26 – 88.74	-3
88.0	87.75 – 88.25	-5
87.5	87.26 – 87.74	-10

87.0	86.75 – 87.25	-15
86.5	86.26 – 86.74	-20
86.0	85.75 – 86.25	-25
85.5	85.26 – 85.74	-30
85.0	84.75 – 85.25	-40
84.5	84.26 – 84.74	-50
=< 84.0	=<84.25	-100*

* or remove and replace at Engineer's discretion

[1] This chart is to be used for areas where the structural value of the area to be paved is less than 1.75 as determined by the Engineer. See Appendix B - Method for Obtaining Cores for Determination of Roadway Structure. This chart is applicable to rehabilitation work only; full depth construction will not be considered for Table 5a.

.04 Dispute Resolution.

Disputes or questions about any test result shall be brought to the attention of the Contractor and the Engineer within two operational days of reported test results. The following dispute resolution procedures will be used.

The Engineer and the Contractor will review the sample quality, the test method, the laboratory equipment, and the laboratory technician. If these factors are not the cause of the dispute, a third party dispute resolution will be used.

Third party resolution testing can be performed at either another Contractor's laboratory, the Engineer's laboratory, or an independent accredited laboratory. Unless otherwise mutually agreed upon by DAPA and the Engineer, the Engineer's qualified laboratory in Dover and qualified personnel shall conduct the necessary testing for third party Dispute Resolution after the Engineer has provided reasonable notice to allow the Contractor to witness this testing.

When disputes over production testing occur, the samples used for Dispute Resolution testing will be those samples the properly captured, labeled, and stored, as described in the second paragraph of the section of these specifications titled **.02 Acceptance Plan, (a) Material Production - Tests and Evaluations**. If no samples are available, the original testing results will be used for payment calculations.

Dispute Resolution samples for air void content will be heated by a microwave oven.

If there is a discrepancy between the Engineer's acceptance test result and the Contractor's test result, the Contractor may ask for the Dispute Resolution sample to be tested. The Contractor may request up to two dispute resolution samples be tested per calendar year without charge. Any additional Dispute Resolution samples run at the Contractors request where the results substantiate the acceptance test result will be assessed a fee of $125. Any additional Dispute Resolution samples that substantiate the Contractors test result will not be assessed the fee. When disputes over compaction core test results occur, the Engineer's acceptance core will be used for the dispute resolution sample. The Contractor will be advised on when the testing will occur as referenced above to witness the testing.

The results of the dispute resolution testing shall replace all of the applicable disputed test results for payment purposes.

Appendix A - Repairing Core Holes in Bituminous Asphalt Pavement

Description.

This appendix describes the procedure required to repair core holes in a bituminous concrete pavement.

Materials and Equipment.

The following material shall be available to complete this work:

- Patch Material - DelDOT approved High Performance Cold Patch material shall be used.

The following equipment shall be available to complete this work:

- Sponge or other absorbent material - Used to extract water from the hole.
- Compaction Hammer - mechanical (electrical, pneumatic, or gasoline driven) tamping device with a flat, circular tamping face smaller than 6 inches in diameter. .

Construction Method.

After core removal from the hole, remove all excess water from within the hole, and prevent water from re-entering the hole.

Place the patch material in lifts no greater than 3 inches and compact with mechanical tamping device. If the hole is deeper than 3 inches, use two lifts of approximately equal depths so that optimum compaction is achieved. Make sure that the patch surface matches the grade of the existing roadway. Make every effort to achieve the greatest possible compaction

Performance Requirements.

The Engineer will judge the patch on the following basis:

- The patch shall be well compacted
- The patch surface shall match the grade of the surrounding roadway surface.

Basis of Payment.

No measurement or payment will be made for the patching work. The Contractor must gain the Engineer's acceptance of the patching work before the Engineer will accept the material represented by the core.

Appenidx B - Method for Obtaining Cores for Determination of Roadway Structure

The Contractor is responsible for obtaining cores in areas that they propose are eligible for compaction price adjustments according to Table 5a in this specification. Table 5a is not applicable for new full-depth pavement box construction. Cores submitted for this process shall be obtained according to the following process.

1. Contact Materials & Research (M&R) personnel to determine if information about the area is already available. If M&R has already obtained cores in the location that is being investigated, the contractor may opt to use the laboratory information for the investigation and not core the area on their own.

2. If M&R does not have information concerning the section of the roadway, the contractor needs to contact M&R to arrange for verification of coring operations. Arrangements shall be made to allow for an individual from M&R to be on the site when the cores are obtained. Cores will be turned over to M&R for evaluation.

3. The Contractor is responsible for providing all traffic control and repairing core holes in accordance to 401699 Appendix A - Repairing Core Holes in Bituminous Asphalt Pavements.

4. Cores are to be taken throughout the entire project for the area in question. Cores will be spaced, from the start of the project in increments determined based on field and project specifics. Cores will be evenly distributed throughout the project location. The cores will be taken in the center of the lane in question.

5. Additional cores may be taken at other locations, if surface conditions indicate that there may be a substantial difference in the underlying section. The location of these cores should be documented and submitted to M&R.

6. Cores shall be full depth and include underlying materials. If there is a stone base included in the pavement section, at a minimum 1 core must have information concerning the thickness of the base. This is determined by augering to the subgrade surface.

7. The calculations used to determine the structural capacity of the roadway is as follows. If the contractor finds, upon starting the coring process, that the areas are of greater thickness than applicable to Table 5a, they may terminate the coring process on their own and retract the request.

Structural Number Calculations

Each pavement box material is assigned a structural coefficient based upon AASHTO design guides. The structural coefficient is used to determine the total strength of the pavement section.

Materials used in older pavement sections are assigned lower structural coefficients to compensate for aging of the materials. The coefficients used to determine the structural number of an existing pavement are:

Existing Material	Structural Coefficient
HMA	0.32
Asphalt Treated Base	0.26
Soil Cement	0.16
Surface Treatment (Tar & Chip)	0.10
GABC	0.14
Concrete	0 - 0.7*

* The Structural Coefficient of Concrete is dependent upon the condition of the concrete. Compressive strengths & ASR analysis are used to determine condition - contact the Engineer if this situation arises.

Newly placed materials use a different set of structural coefficients. They are as follows:

New Material	Structural Coefficient
HMA	0.40
Asphalt Treated Base (BCBC)	0.32
Soil Cement	0.20
GABC	0.14

Example:

Location includes placement of a 1.25" Type C overlay on 2.25" Type B. Existing roadway is cored and is shown to consist of 2" HMA on 7" GABC.

Calculation:

For the Type B lift the calculation would be:

Existing HMA	2 * 0.32 = 0.64
GABC	7 * 0.14 = 0.98
	1.62

For the Type C lift the calculation would be:

Newly Placed B	2.25 * 0.4 = 0.90
Existing HMA	2 * 0.32 = 0.64
GABC	7* 0.14 = 0.98
	2.52

11/3/14

401752 – SAFETY EDGE FOR ROADWAY PAVEMENT

Description:

This work consists of the construction of safety edge(s) along bituminous concrete pavement or P.C.C. pavement in accordance with the details and notes on the Plans and as directed by the Engineer.

Construction Methods:

The safety edge shall not be constructed adjacent to curb or in front of guardrail sections.

In bituminous concrete pavement sections, prior to the construction of the safety edge, the fill or in situ material at the edge of pavement shall be compacted so that it is level with the top of the pavement, prior to the final surface overlay.

In bituminous concrete pavement sections, the contractor shall attach a device to the screed of the paver unit that confines the material at the end of the gate and extrudes the asphalt material in such a way that results in a compacted wedge shape pavement edge of 32 degrees (+/- 2 degrees). Contact shall be maintained between the device and the road shoulder surface. The device shall be manufactured so that it can be easily adjusted to transition at cross roads, driveways and obstructions without stopping the paver unit. The device's shape shall constrain the asphalt and cause compaction, as well as increase the density of the extruded profile.

In bituminous concrete pavement sections, the Transtech Shoulder Wedge Maker, Carlson Safety Edge End Gate or an approved equal shall be used to produce the safety edge. Contact information for these wedge shape compaction devices is listed below:

Transtech Systems, Inc.
1594 State Street
Schenectady, NY 12304
1-800-724-6306
www.transtechsys.com

or

Carlson Paving Products
18425 50th Ave. E
Tacoma, WA 98446
1-253-278-9426
www.carlsonpavingproducts.com

or an approved equal.

In P.C.C. pavement sections, the paver screed shall be modified to provide a chamfer at the end of the P.C.C. pavement in accordance with the details and notes on the Plans, or as directed by the Engineer.

Method of Measurement:

Safety Edge will not be measured for payment.

Basis of Payment:

The cost associated with the construction of safety edge(s), including but not limited to the wedge device, preparation and compaction of the fill or in situ material, and placement of the safety edge in accordance with the Plans and Details shall be incidental to the bituminous concrete pavement or P.C.C. pavement item being placed.

10/15/2013

401800 - BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 115 GYRATIONS, PG 64-22 (CARBONATE STONE)
401801 - BITUMINOUS CONCRETE, TYPE C, 160 GYRATIONS, PG 64-22 (CARBONATE STONE)
401802 - BITUMINOUS CONCRETE, TYPE C, 205 GYRATIONS, PG 64-22 (CARBONATE STONE)

401803 - BITUMINOUS CONCRETE, TYPE C, 115 GYRATIONS, PG 70-22 (CARBONATE STONE)
401804 - BITUMINOUS CONCRETE, TYPE C, 160 GYRATIONS, PG 70-22 (CARBONATE STONE)
401805 - BITUMINOUS CONCRETE, TYPE C, 205 GYRATIONS, PG 70-22 (CARBONATE STONE)

401806 - BITUMINOUS CONCRETE, TYPE C, 115 GYRATIONS, PG 76-22 (CARBONATE STONE)
401807 - BITUMINOUS CONCRETE, TYPE C, 160 GYRATIONS, PG 76-22 (CARBONATE STONE)
401808 - BITUMINOUS CONCRETE, TYPE C, 205 GYRATIONS, PG 76-22 (CARBONATE STONE)

401809 - BITUMINOUS CONCRETE, SUPERPAVE, TYPE B, 115 GYRATIONS, PG 64-22
401810 - BITUMINOUS CONCRETE, SUPERPAVE, TYPE B, 160 GYRATIONS, PG 64-22
401811 - BITUMINOUS CONCRETE, SUPERPAVE, TYPE B, 205 GYRATIONS, PG 64-22

401812 - BITUMINOUS CONCRETE, SUPERPAVE, TYPE B, 115 GYRATIONS, PG 70-22
401813 - BITUMINOUS CONCRETE, SUPERPAVE, TYPE B, 160 GYRATIONS, PG 70-22
401814 - BITUMINOUS CONCRETE, SUPERPAVE, TYPE B, 205 GYRATIONS, PG 70-22

401815 - BITUMINOUS CONCRETE, SUPERPAVE, TYPE B, 115 GYRATIONS, PG 76-22
401816 - BITUMINOUS CONCRETE, SUPERPAVE, TYPE B, 160 GYRATIONS, PG 76-22
401817 - BITUMINOUS CONCRETE, SUPERPAVE, TYPE B, 205 GYRATIONS, PG 76-22

401818 - BITUMINOUS CONCRETE, SUPERPAVE, BITUMINOUS CONCRETE BASE COURSE, 115 GYRATIONS, PG 64-22
401819 - BITUMINOUS CONCRETE, SUPERPAVE, BITUMINOUS CONCRETE BASE COURSE, 160 GYRATIONS, PG 64-22
401820 - BITUMINOUS CONCRETE, SUPERPAVE, BITUMINOUS CONCRETE BASE COURSE, 205 GYRATIONS, PG 64-22

401821 - BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 160 GYRATIONS, PG 64-22, PATCHING
401822 - BITUMINOUS CONCRETE, SUPERPAVE, TYPE B, 160 GYRATIONS, PG 64-22, PATCHING
401823 - BITUMINOUS CONCRETE, SUPERPAVE, BITUMINOUS CONCRETE BASE COURSE, 160 GYRATIONS, PG 64-22, PATCHING
401824 - BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 160 GYRATIONS, PG-64-22, WEDGE
401825 - BITUMINOUS CONCRETE, SUPERPAVE, TYPE B, 160 GYRATIONS, PG-64-22, WEDGE

401826 - BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 115 GYRATIONS, PG 64-22, (NON-CARBONATE STONE)
401827 -BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 160 GYRATIONS, PG 64-22, (NON-CARBONATE STONE)
401828 - BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 205 GYRATIONS, PG 64-22, (NON-CARBONATE STONE)

401829 - BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 115 GYRATIONS, PG 70-22, (NON-CARBONATE STONE)
401830 - BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 160 GYRATIONS, PG 70-22, (NON-CARBONATE STONE)
401831 - BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 205 GYRATIONS, PG 70-22, (NON-CARBONATE STONE)

401832 - BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 115 GYRATIONS, PG 76-22, (NON-CARBONATE STONE)
401833 -BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 160 GYRATIONS, PG 76-22, (NON-CARBONATE STONE)
401834 - BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 205 GYRATIONS, PG 76-22, (NON-CARBONATE STONE)

401835 - THIN BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 115 GYRATIONS, PG 64-22
401836 - THIN BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 160 GYRATIONS, PG 64-22
401837 - THIN BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 115 GYRATIONS, PG 70-22
401838 - THIN BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 160 GYRATIONS, PG 70-22
401839 - THIN BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 115 GYRATIONS, PG 76-22
401840 - THIN BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 160 GYRATIONS, PG 76-22

.01 Description:

This specification shall govern the production and construction of bituminous concrete pavement. The following Subsections of the Standard Specifications shall be applicable: 401.01, 401.03 - 401.10, 401.12, and 401.13. All other subsections have been modified herein.

Payment for bituminous concrete shall be in accordance with item 401699. The Contractor shall read and thoroughly understand the requirements of the QA/QC specification as defined in item 401699. It is the responsibility of the Contractor to determine all costs associated with meeting these requirements and to include them in the per ton bids for the various Superpave bituminous concrete items. Payment adjustment factors will be calculated in accordance with the latest version of item 401699.

Bituminous concrete may be produced by one or a combination of several technologies involving asphalt foaming processes and equipment or additives that facilitate the reduction of the temperature at which the mix can be placed and satisfactorily compacted thereby permitting the mix to be produced at reduced temperatures.

.02 Materials:

Use materials conforming to standard specifications 823.

Materials for bituminous concrete shall conform to the requirements of Subsections 823.01, 823.05-823.17, and 823.25 - 823.28 of the Standard Specifications and the following. If the Contractor proposes to use a combination of materials that are not covered by this Specification, the mix design shall be submitted and reviewed by the Engineer 30 calendar days prior to use.

a) **Asphalt Binder:**

Meet the requirements of Superpave performance-grade asphalt binder, as referenced in the Plans, according to M 320 [1], Table 1 and tested according to AASHTO R29 with the following test ranges:

TEST Procedure	AASHTO REFERENCE	SPECIFICATION LIMITS
Temperature, °C	M 320	Per Grade
Original DSR, G*/sin (δ)	T 315	1.00 - 2.20 kPa[1]
RTFO DSR, G*/sin (δ)	T 315	>/= 2.20 kPa

TEST Procedure	AASHTO REFERENCE	SPECIFICATION LIMITS
PAV DSR, G*/ sin (δ)	T 315	</=5000 kPa
BBR Creep Stiffness, S	T 313	</= 300.0 kPa
BBR m-value	T 313	>/=0.300

Note 1: The exception to M 320 is that the original DSR shall be 1.00 to 2.20 kPa

Substitution of a higher temperature grade will require prior approval by the Engineer.

The highest low temperature grade virgin binder to be used is -22.

Depending on the level of Recycled materials used, the low temperature properties, per T 313, may be different than stated in M 320 or the previous table.

b) **Recycled Materials:**

RAP (Recycled Asphalt Pavement): Bituminous concrete pavement mechanically processed to a homogenous consistency to be recycled through the production plant for use in a new bituminous concrete mixture.

The percentage allowance of recycled materials (recycled asphalt pavement and/or shingles) shall be controlled through the use of the Materials & Research recycled mixture program available through the Materials & Research Section. The program can be used by the Contractor to determine which materials and combinations of materials can be used to meet the specified material on the contract.

If the Contractor proposes to use a combination of materials that are not covered by this program, the mix design shall be submitted and reviewed by the Engineer.

c) **Shingles:**

RAS (Recycled Asphalt Shingles): Materials reclaimed from the shingle manufacturing process such as tabs, punch-outs, and damaged new shingles mechanically broken down with 100% passing the ½ in (12.5 mm) sieve. Shipping, handling, and shredding costs are incidental to the price of Superpave item.

Post-consumer shingles or used shingles are not acceptable. Fiberglass-backed and organic felt-backed shingles shall be kept separate. Both materials shall not be used in the same mixture at the same time. All shingles shall be free of all foreign material and moisture.

The use of Recycled Asphalt Shingles will be considered for 115 gyration mix designs upon demonstration by the producer of adequate blending of the binder verified by laboratory testing on plant produced material.

d) Mineral Aggregate:

Conform to Section 805 and the following criteria. These criteria apply to the combined aggregate blend.

DESIGN ESAL'S (MILLIONS)	COARSE AGGREGATE ANGULARITY[1] (% MIN)		FINE AGGREGATE ANGULARITY[2] (% MIN)		CLAY CONTENT[3] (% - MIN)	FLAT AND ELONGATED [4] (% - MAX)
	≤ 100 MM	> 100 MM	≤ 100 MM	> 100 MM		
< 0.3	55/-	-/-	-	-	40	-
0.3 to < 3	75/-	50/-	40	40	40	-
3 to <10	85/80[5]	60/-	45	40	45	-
10 < 30	95/90	80/75	45	40	45	-
30	100/100	100/100	45	45	50	10

[1]Coarse Aggregate Angularity is tested according to ASTM D5821.
[2]Fine Aggregate Angularity is tested according to AASHTO TP-33.
[3]Clay Content is tested according to AASHTO T176.
[4]Flat and Elongated is tested according to ASTM 4791 with a 5:1 aspect ratio.
[5] 85/80 denotes that 85% of the coarse aggregate has one fractured face and 80% has two or more fractured faces.

The following source properties apply to the individual aggregates in the aggregate blend for the proposed JMF.

TEST METHOD	SPECIFICATION LIMITS
Toughness, AASHTO T96 Percent Loss, Maximum	40
Soundness, AASHTO T104 Percent Loss, Maximum for five cycles	20
Deleterious Materials, AASHTO T112 Percent, Maximum	10
Moisture Sensitivity, AASHTO T283 Percent, Minimum	80

For any roadway with a minimum average daily traffic volume (ADT) of 8000 vehicles and a posted speed of 35 mph (60 kph) or greater, the polish value of the composite aggregate blend shall be greater than 8.0 when tested according to Maryland State Highway Administration MSMT 411 B ALaboratory Method of Predicting Frictional Resistance of Polished Aggregates and Pavement Surfaces.@ RAP shall be assigned a value of 5.0. The Contractor shall supply all polish values to the Engineer upon request.

e) **Mineral Filler:**

Conform to AASHTO M17.

f) **Warm Mix Additives:**

For any WMA technology requiring addition of any material by the producer during production, the following information will be submitted with the proposed JMF for review and approval at least 30 calendar days prior to production:

1. WMA technology and/or additive information.
2. WMA technology manufacturer's recommendation for usage.
3. WMA technology target dosage rate and tolerance envelope. Support tolerance envelope with test data demonstrating acceptable mix production properties conforming to all sections of this specification.
4. WMA technology manufacturer's material safety data sheets (MSDS).
5. Documentation of past WMA technology field application including points of contact.
6. Temperature ranges for mixing and compacting.
7. Laboratory test data, samples, and sources of all mix components, and asphalt binder viscosity-temperature relationships.

Follow the manufacturer's recommendation for incorporating additives and WMA technologies into the mix. Comply with the manufacturer's recommendation regarding receiving, storage, and delivery of additives.

If the producer performs blending of the WMA technology in their tank, a separate Quality Control plan shall be submitted by the producer to the Department for review and approval at least 30 calendar days prior to production.

g) **Anti-stripping additives**

Conform to standard specifications Section 829 and blend with the asphalt cement in accordance with this specification. Incorporate anti-stripping additives when the Tensile Strength Ratio (TSR) as determined in accordance with AASHTO T283 is less than 80 or when specified for use by the Engineer.

.03 Bituminous Concrete Production – Quality Control

(a) Process Control - Material Production Quality Control.

Submit through electronic mail a QC Plan from each proposed production plant to the Engineer; no hot-mix asphalt material will be accepted until the Engineer approves the QC Plan. This plan must be submitted to the Engineer on an annual basis for review and approval prior to material production. The Engineer will send a signed copy back to the Contractor stating that it is approved. The approved QC Plan shall govern contractor operations.

The QC Plan shall include actions that will assure all materials and products will conform to the specifications, whether manufactured or processed by the Contractor, or procured from suppliers, subcontractors, or vendors. The Contractor shall perform the inspection and tests required to substantiate product conformance to contract requirements. The Contractor shall document QC inspections and tests, and provide copies to the Engineer when requested. The Contractor shall maintain records of all inspections and tests for at least one year. The records shall include the date, time, and nature of deficiency or deficiencies found; the quantities of material involved until the deficiency was corrected; and the date, time, and nature of corrective actions taken.

In the QC Plan shall detail the type and frequency of inspection, sampling, and testing deemed necessary to measure and control the various properties of material and construction governed by the Specifications. The QC Plan shall include the following elements as a minimum:

- Production Plant - make, type, capacity, and location.
- Production Plant Calibration - components and schedule; address documentation.
- Personnel - include name and telephone number for the following individuals:
- Person responsible for quality control.
- Qualified technician(s) responsible for performing the inspection, sampling, and testing.
- Person who has the authority to make corrective actions on behalf of the Contractor.
- Testing Laboratory - state the frequency of accuracy checks and calibrations of the equipment used for testing; address documentation.
- Load number of QC samples (1-10 if QA sample is not within trucks 1-10)
- Locations where samples will be obtained and the sampling techniques for each test
- Tests to be performed and their normal frequency; the following, at a minimum, shall be conducted:
  - Mixture Temperature: each of the first five trucks, and each load that is sampled for QC or acceptance testing.
  - Gradation analysis of aggregate (and RAP) stockpiles - one washed gradations per week for each aggregate stockpile; RAP: five gradations and asphalt cement contents for dedicated stockpiles

where new material is not being added; one gradation and asphalt cement content test per week for stockpiles where material is continually being added to the stockpile.
  - Gradation analysis of non-payment sieves
  - Dust to effective asphalt calculation
  - Moisture content analysis of aggregates - daily.
  - Gradation analysis of the combined aggregate cold feed - one per year per mixture.
  - Bulk specific gravity and absorption of blended material - one per year per mixture.
  - Ignition Oven calibration - one per year per mixture.
  - Hot-Bins: one per year per mixture.
  - Others, as appropriate.
- Procedures for reporting the results of inspection and tests (include schedule).
- Procedures for dealing with non-compliant material or work.
- Presentation of control charts. The contractor shall plot the results of testing on individual control charts for each characteristic. The control charts shall be updated within on working day as test results for each sublot become available. The control charts shall be easily and readily accessible at the plant laboratory. The following parameters shall be plotted from the testing:
  - Asphalt cement content.
  - Volumetrics (air voids, voids in mineral aggregates [VMA])
  - Gradation values for the following sieves:
    - 4.75 mm (#4).
    - 2.36 mm (#8).
    - 0.075 mm (#200).
    - Operational guidelines (trigger points) to address times when the following actions would be considered:
      - Increased frequency of sampling and testing.
      - Plant control/settings/operations change.
      - JMF adjustment.
      - JMF change (See 401644 Section .04(a)(1)).
      - Change in the source of the component materials.
      - Calibration of material production equipment (asphalt pump, belt feeders, etc.).
      - Rejection of material.

When any point of non-compliance with the QC plan, or material not meeting the Specifications, comes to the attention of either the Contractor or the Engineer, the other party shall be notified immediately, and the Contractor shall take appropriate corrective actions. Failure to take corrective actions immediately shall be cause for rejection of material or work by the Engineer.

The following are considered significant violations to the Contractor's QC Plan:

- Using testing equipment that is knowingly out of calibration or is not working properly.
- Reporting false information such as test data, JMF information, or any info requested by DelDOT
- Failure to perform materials testing per their approved QC Plan
- Deviating from AASHTO or DelDOT testing procedures.
- Use of any material or the use of a JMF component in a proportion that exceeds the allowable tolerance as specified in section 04(a)(1) of this specification not listed in the JMF.
- Use of the wrong PG graded asphalt.
- Failure to take corrective action per action points in the Contractors approved QC plan.

The following steps will be taken for violations listed above:

1. First offence: Written notice of violation to the Contractor

2. Second offence: Written notice of violation and forfeiture of any bonus (material production or pavement construction) payment eligibility under 401699 section .03 for that production shift.

3. Third offence: Written notice of violation, forfeiture of bonus payment eligibility, and a 5% deduction of payment based upon contract unit price in addition to any calculated pay adjustment factors per 401699 Section 03.

4. Fourth offence: Written notice of violation, forfeiture of bonus payment eligibility, 50% deduction of payment based upon contract unit price in addition to any calculated payment adjustment factor per

401699 Section 03, and immediate suspension of the Contractor until corrective actions are taken. Corrective actions shall be submitted in writing to the Engineer for approval. The Engineer may request a meeting with the Contractor to discuss proposed changes prior to lifting suspension.

Violations of Contractor QC plans shall be kept on record for a period of 1 year from the date of violation at the Central Lab.

(b) Material Production Test Equipment.

Establish, maintain, and operate a qualified testing laboratory at the production plant site of sufficient size and layout that will accommodate the testing operations of both the Contractor and the Engineer.

Facilities for the use of the Engineer and inspectors shall be a minimum of 600 square feet of floor space conditioned to maintain constant temperature of 77F with two windows and a door equipped with functional locks and latches, located such that plant activities are plainly visible from one window of the building. Work space shall be furnished with illumination, tables, chairs, desks, telephone, and water including drinking water, sanitary facilities, fuel, and power necessary to conduct all necessary tests.

Maintain all the equipment used for handling, preparing, and testing materials in proper operating condition. For any laboratory equipment malfunction, the Contractor shall remedy the situation within one working day or the Engineer may suspend production. In the case of an equipment malfunction, the Engineer may elect to test the material at another qualified testing laboratory while waiting for repairs to equipment.

Maintain minimum calibration records for the referenced equipment:
- SUPERPAVE^{R} Gyratory Compactor: once every year; verified once every month by the Engineer.
- Ovens: once every three months, verified once every month.
- Vacuum Container and Gauge (Rice Bowls): once every three months, verified once every month.
- Balances and Scales: once every year, verified once every month.
- Thermometers: once a year; verified once every month.
- Gyratory Compactor molds and base plates: once every year
- Mechanical Shakers: once every year
- Sieve Verifications: once every year

All calibrations shall be documented and on file for review by the Engineer at any time.

(c) Material Production Test Methods

- AASHTO T312 - Preparing and Determining the Density of Hot Mix Asphalt (HMA) Specimens by Means of the Superpave Gyratory Compactor
- AASHTO T166, Method C (Rapid Method) - Bulk Specific Gravity of Compacted Hot Mix Asphalt (HMA) Using Saturated Surface Dry Specimens
- AASHTO T308 - Determining the Asphalt Binder Content of Hot Mix Asphalt (HMA) by the Ignition Method
- AASHTO T30 - Mechanical Analysis of Extracted Aggregate
- AASHTO T209 - Theoretical Maximum Specific Gravity and Density of Hot Mix Asphalt (HMA)
- ASTM D7227 - Standard Practice for Rapid Drying of Compacted Asphalt Specimens using Vacuum Drying Apparatus

.04 Job Mix Formula (JMF)

Mix Design. Develop and submit a job mix formula for each mixture according to AASHTO R35. Each mix design shall be capable of being produced, placed, and compacted as specified. Assign a unique identification number to each JMF.

a) Development of JMF

Gradation: Use the FHWA Superpave 0.45 Power Chart to define permissible gradations for the specified mixture. Type C shall be either a No.4 (4.75 mm), 3/8" (9.5 mm), or 1/2" (12.5 mm) Nominal Maximum Aggregate Size bituminous concrete. Unless otherwise noted in the Plans, the Type C shall meet the 3/8" (9.5 mm) Nominal Maximum Aggregate Size. Type B bituminous concrete shall be the 3/4" (19.0 mm) Nominal Maximum Aggregate Size and the Bituminous Concrete Base Course (BCBC) shall be the 1" (25.0 mm)

Nominal Maximum Aggregate Size. Target values for percent passing each standard sieve for the design aggregate structure shall comply with the Superpave control points and should avoid the restricted zone. Percentages shall be based on the washed gradation of the aggregate according to AASHTO T11.

In addition to the results of the material requirements specified above, the following material properties shall be provided by the contractor: bulk specific gravity Gsb, apparent specific gravity Gsa, and the absorption of the individual aggregate stockpiles to be used, tested according to AASHTO T84 and AASHTO T85 and reported to three decimal places along with the specific gravity of the mineral filler to be used, tested according to AASHTO T100 and reported to three decimal places.

Superpave Gyratory Compactive (SGC) Effort:

The Superpave Gyratory Compaction effort employed throughout mixture design, field quality control, or field quality assurance shall be as indicated below. All mixture specimens tested in the SGC shall be compacted to N_M Height data provided by the SGC shall be employed to calculate volumetric properties at N_I, N_D, and N_M

Superpave Gyratory Compactive (SGC) Effort:

DESIGN TRAFFIC LEVEL (MILLION ESAL'S)	$N_{INITIAL}$	N_{DESIGN}	$N_{MAXIMUM}$
0.3 to < 3	7	75	115
3 to < 30	8	100	160
≥30	9	125	205

Volumetric Design Parameters. The design aggregate structure at the target asphalt cement content shall satisfy the volumetric criteria below:

DESIGN ESAL'S (MILLION)	REQUIRED DENSITY (% OF THEORETICAL MAXIMUM SPECIFIC GRAVITY)			VOIDS-IN-MINERAL AGGREGATE (% - MINIMUM) NOMINAL MAX. AGGREGATE (MM)					VOIDS FILLED WITH ASPHALT (%)
	$N_{INITIAL}$	N_{DESIGN}	N_{MAX}	25.0	19.0	9.5	12.5	4.75	
0.3 to < 3	≤ 90.5	-	-	-	-	-	-	-	65.0 - 78.0
3 to < 10	-	-	-	-	-	-	-	-	-
10 < 30	-	-	-	-	-	-	-	-	-
≤ 30	≤ 89.0	96.0	≤ 98.0	12.5	13.5	15.5	14.5	16.5	65.0 - 75.0[1]

Air voids (V_a) at N_{design} shall be 4.0% for all ESAL designs. Air voids (V_a) at N_{max} shall be a minimum of 2.0% for all ESAL designs

The dust to binder ratio for the mix having aggregate gradations above the Primary Control Sieve (PCS) Control Points shall be 0.6-1.2. For aggregate gradations below the PCS Control Points, the dust to binder ratio shall be 0.8-1.6. For the No. 4 (4.75 mm) mix, the dust to binder ratio shall be 0.9-2.0 whether above or below the PCS Control Points.

For 3/8@ (9.5 mm) Nominal Maximum Aggregate Size mixtures, the specified VFA range shall be 73.0% to 76.0% and for 4.75 mm Nominal Maximum Size mixtures, the range shall be 75 % to 78% for design traffic levels $3 million ESALs.

Gradation Control Points:

The combined aggregates shall conform to the gradation requirement specified in the following table when tested according to T-11 and T-27.
TABLE 1

Nominal Maximum Aggregates Size Control Points, Percent Passing										
	25.0 MM		19.0 MM		12.5 MM		9.5 MM		4.75 MM	
SIEVE SIZE	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
37.5 MM	100	-	-	-	-	-	-	-	-	-
25.0 MM	90	100	100	-	-	-	-	-	-	-
19.0 MM	-	90	90	100	100	-	-	-	-	-
12.5 MM	-	-	-	90	90	100	100	-	100	-
9.5 MM	-	-	-	-	-	90	90	100	95	100
4.75 MM	-	-	-	-	-	-	-	90	90	100
2.36 MM	19	45	23	49	28	58	32	67	-	-
1.18 MM	-	-	-	-	-	-	-	-	30	60
0.075 MM	1	7	2	8	2	10	2	10	6	12

Note: The aggregate's gradation for each sieve must fall within the minimum and maximum limits.

Gradation Classification

The Primary Control Sieve (PCS) defines the break point of fine and coarse mixtures. The combined aggregates shall be classified as coarse graded when it passes below the Primary Control Sieve (PCS) control point as defined below. All other gradations shall be classified as fine graded.

PCS CONTROL POINT FOR MIXTURE NOMINAL MAXIMUM AGGREGATES SIZE (% PASSING)					
Nominal Maximum Aggregates Size	25.0 mm	19.0 mm	12.5 mm	9.5 mm	4.5 mm
Primary Control Sieve	4.75 mm	4.75 mm	2.36 mm	2.36 mm	1.18 mm
PCS Control Point	40	47	39	47	30-60

Plant Production Tolerances:

Volumeric Property	Superpave Criteria
Air Voids (V_a) at (%) N_m	2.0 (min)
Air Voids (V_a) at N_{design} (%)	6.0 (max)
Voids in Mineral Aggregate (VMA) at N_{design}	
25.0 mm Bituminous Concrete Base Course	-1.5
19.0 mm Type B Hot-Mix	+2.0
12.5 mm Type C Hot-Mix	
9.5 mm Type C Hot-Mix	
4.5 mm Type C Hot-Mix	

The proposed JMF shall include the following:

Submit for approval to the Engineer the following documentation on Pinepave mixture design software prior to starting production of a new mixture:

1. Job mix formula (JMF) design of the component materials and target characteristic values for each mixture proposed for use. The component materials design shall include designating the source and the expected proportion (within 1 percent for the aggregate components and within 0.1 percent for the other components) of each component to be used in order to produce workable bituminous concrete meeting the specified properties. Recycled Asphalt Pavement (RAP) is one individual aggregate component regardless of fractionation size. Recycled Asphalt Shingles (RAS) is a separate component from RAP.

2. The JMF target characteristic values include the mixing temperature range, core temperature range for gyration, the percentage of the asphalt cement component (both total and virgin), and the percentages of the aggregate amounts retained on the sieves to be addressed by the JMF as shown in Table 1.

3. Plot of the design aggregate structure on the FHWA Superpave 0.45 power chart showing the maximum density line and Superpave control points.

4. Plot of the three trial asphalt binder contents at +/- 0.5% gyratory compaction curves where the percent of maximum specific gravity (% of G_{mm}) is plotted against the log base ten of the number of gyrations (log (N)) showing the applicable criteria for N_i, N_d, and N_m.

5. Plot of the percent asphalt binder by total weight of the mix (P_b) versus the following:

   % of G_{mm} at N_d, VMA at N_d, VFA at N_d, Fines to effective asphalt binder (P_{be}) ratio, and unit weight (kg/m²) at both N_d and N_m.

6. Summary of the consensus property standards test results for the design aggregate structure, summary of the source property standards test results for the individual aggregates in the design aggregate structure, target value of the asphalt binder content, and a table of G_{mm} of the asphalt mixture for the four trial asphalt binder contents determined according to AASHTO T209.

7. Test data with each JMF and tests performed by a Qualified Laboratory on representative materials, verifying the adequacy of the design. Refer to the specifications for each mix type in order to determine the design requirements. The JMF sieve percentage values shall conform to the ranges shown in Table 1.

   For any mixture that has a 20% or greater failure rate on any combined volumetric criteria, the JMF will not be approved for use on Department contracts.

8. Provide raw material of each JMF so NCAT Ignition Oven calibration correction numbers can be established for the Engineers and Contractors ovens. The Engineer shall provide an ignition oven correction number for each JMF.

.05 Approval of JMF

The Engineer will have up to three weeks once the JMF is submitted to review the submitted information.

All submitted JMF's shall correspond to the Pinepave mixture design software. The Engineer, for evaluation of the submitted JMF, will use the first three test samples. These test results acquired during production shall be within the following range compared to the submitted JMF on the Pinepave mixture design software: Gmm: + / -0.030 and Gmb: + / - 0.040

a) **<u>Design Evaluation:</u>**

The Engineer may elect to evaluate the proposed JMF and suitability of all materials through laboratory trial batches. All materials requested by the Engineer shall be provided at the contractor's expense

to the Central Laboratory in Dover in a timely manner upon request. To verify the complete mixture design and evaluate the suitability of all materials, the following approximate quantities are required:

5.25 gal (20 liters) of the asphalt binder;
0.13 gal (0.5 liters) sample of liquid heat-stable anti-strip additive;
254 lb. (115 kg) of each coarse aggregate;
154 lb. (70 kg) of each intermediate and fine aggregate;
22 lb. (10 kg) of mineral filler; and
254 lb. (115 kg) of RAP, when applicable.

For more expeditious approval, the Contractor may undertake the following steps:

1. Submit the proper documentation on Pinepave mixture design software.
2. Produce the new mixture for a non-Department project. The Engineer will test the material, by taking three series per section 401800 03(c). The mixture will be approved by the Engineer for Department projects if the test results are within the specifications.

A new JMF is required when any of the following conditions occur:

- A change in the source of any of the aggregate component materials
- A change in the proportion of any aggregate component by more than 5.0%
- A change in the aggregate components resulting in a change in percent passing any sieve as identified in Table 1 by more than 5% of the JMF target.
- A change in the target AC content by more than 0.20% from the JMF target to maintain other Volumetric properties of the approved JMF.
- For any mixture that has a 20% or greater failure rate on any combined volumetric criteria.

Although a new JMF is not required, the Contractor shall inform the Engineer of any proposed changes to an existing JMF. The Contractor shall notify the Engineer by electronic mail of the proposed changes. This notification shall include the total change made from the approved JMF proportions, and the effective time of the change. The Engineer will reply to the proposed changes within one operational day and notify the Contractor of the effective date of the changes.

.06 Construction.

(a) Pavement Construction Test Equipment.

The Contractor shall furnish and use in-place density gauges, and/or coring equipment to meet the requirements of these Specifications.

Weather Limitations.

Place mix only on dry, unfrozen surfaces and only when weather conditions allow for proper production, placement, handling, and compacting. The following table of ambient temperatures for various binder grades and lift thicknesses for placement with the following parameters:

Lift Thickness (in)	PG Binder		
	76-22	70-22	64-22
1.50	50 F	45 F	40 F
2.00	40 F	38 F	35 F
3.00	32 F	32 F	32 F

- Minimum surface temperature of 32 F and
- Minimum production temperature of 275 F and
- Maximum wind speed of 8 miles per hour

Construction outside of these conditions with WMA technology will be at the discretion of the Engineer.

Compaction:

(b) Pavement Construction - Process Control.

Perform Quality Control of pavement compaction by testing in-place pavement density by the following methods.

- ASTM D2950 Standard Test Method for Density of Bituminous Concrete in Place by Nuclear Methods; the use of other density gauges shall be as per the manufacturer's recommendations.
- AASHTO T166, Method C (Rapid Method) Bulk Specific Gravity of Compacted Hot Mix Asphalt (HMA) Using Saturated Surface Dry Specimens
- ASTM D7227 - Standard Practice for Rapid Drying of Compacted Asphalt Specimens using Vacuum Drying Apparatus

Cores may be cut on the first day of paving or once after the change of a JMF for gauge calibration. The number of cores obtained for calibration purposes shall not exceed the number of QA samples obtained by the Department for payment. The Contractor may use any method to select locations for the Quality Control calibration cores.

Repair all core holes in accordance with 401699 Appendix A.

Method of Measurement:

Method of Measurement will be in accordance with Subsections 401.14 and 401.15 of the Standard Specifications.

Basis of Payment:

All work completed under this item shall be considered for full payment and subsequently modified in accordance with the procedures enumerated under 401699.

Material production quality shall be evaluated per item 401699 - Quality Control/Quality Assurance of Bituminous Concrete .03 (a) Material Production - Tests and Evaluations.

Compaction quality shall be evaluated per Item 401699 - Quality Assurance of Bituminous Concrete .03 (b) Pavement Construction - Tests and Evaluations.

10/29/2014

503001 - PATCHING P.C.C. PAVEMENT, 6' TO 15', TYPE A
503002 - PATCHING P.C.C. PAVEMENT, GREATER THAN 15' TO 100', TYPE B
503006 - DOWEL BARS

Section 503 of the Standard Specification is replaced with the following:

503.01 Description. This work consists of removing and disposing of existing Portland cement concrete pavement and replacing it with new Portland cement concrete pavement. The Engineer will designate the boundaries of each repair. This work is not intended for repairing newly constructed Portland cement concrete pavement or for repairing continuously reinforced concrete pavement. This work shall be completed after any planned partial depth patching. It shall also be completed before any diamond grinding, and before any overlay.

Materials

503.02 Portland Cement Concrete. Portland cement concrete shall conform to Class A, Section 812 and have a minimum compressive strength of 2000 psi in six hours as measured by Sure-Cure Mold test cylinders. The Sure-Cure Mold test cylinders and all associated equipment shall be provided by the Contractor. The concrete will be sampled and tested by the Engineer. The Engineer may also use the concrete maturity meter in accordance with AASHTO T325 to determine compressive strength.

This concrete shall also have material present in the mixture to mitigate alkali-silica reactivity (ASR) as per Section 812. The following parameters shall be adhered to by the contractor-submitted mix design for the Portland cement concrete:

CONCRETE PROPERTY	SPECIFICATION
Water/Cementitious Material Ratio	0.40 (Max.)
Air Content (%)	4 - 7
Slump*	2 - 5"
Synthetic Fibers **	1.5 lb/yd^3 min. or as per manufacturer's recommendation

*Slump may be increased up to 8" if a Type F Admixture is utilized. All admixtures utilized in the mixture shall be non-chloride based materials.

** Synthetic fibers shall be alkali resistant polypropylene, polyethylene, or nylon fibers with a minimum length of ½" and meet the requirements of ASTM C1116, Type III.

The Contractor, in order to accomplish 2000 psi compressive strength in six hours, shall establish actual combination of weights and proportion of admixtures as required by the field conditions, ambient temperature, humidity, and wind conditions. If the Contractor, due to unfavorable conditions, is unable to accomplish the desired strength in six hours, they may reschedule to the proper timing for performing the patching work.

503.03 Load Transfer Device. Dowel bars shall conform to AASHTO M 227/M 227M grade 65 (grade 450). The entire length of the dowel shall be pre-coated to conform to AASHTO M254. If the slab is less than 10" thick, the dowels shall be 18" long with a diameter of 1 ¼". If the slab is greater than or equal to 10" thick, the dowels shall be 20" long, with a diameter of 1 ½".

Load transfer assemblies shall be fabricated from corrosion-resistant, coated dowel bars conforming to AASHTO M254. Dowel support baskets shall conform to the requirements of Standard Construction Details or details in the Plans.

503.04 Grout. Epoxy grout, when used for anchoring the dowels in place, shall conform to AASHTO M235. Concrete grout, when used for anchoring the dowels in place, shall be non-shrink grout conforming to the Corps of Engineers "Specification for Non-Shrink Grout," CRD-C621. The maximum allowable expansion

shall be 0.4 percent. The grout shall have a compressive strength no less than 3000 psi at 24 hours when tested according to ASTM C109. The initial set shall be less than 60 minutes when tested under the Corps of Engineers "Method of Test for Time of Setting of Grout Mixtures," CRD-C82.

503.05 Joint Sealants. Hot-poured joint sealant shall conform to the requirements of AASHTO M301 or AASHTO M282.

503.06 Curing Materials. Curing materials shall be as follows:

(1) *Liquid Membrane Compounds.* The material shall conform to the requirements of AASHTO M 148, for Type 2, Class A or B white-pigmented liquid curing compound.
(2) *Polyethylene Sheeting.* Polyethylene sheeting shall conform to the requirements of AASHTO M 171.
(3) *Waterproof Paper.* Waterproof paper shall conform to the requirements of AASHTO M 171.
(4) *Water Cure.* The water shall conform to Section 803.

503.07 Insulating Blankets. Insulation blankets shall be a minimum of 2" thick of fiberglass, rock wool, or other approved commercial insulation material.

CONSTRUCTION METHODS

503.08 Patching Limits. The areas of old pavement to be patched will be indicated on the Plans, or identified by the Engineer.

The limits of the area where the pavement is to be removed and patched will be painted on the existing pavement by the Engineer.

Patches can be either Type 'A' or Type 'B'. A Type 'A' patch is 15' or less in length. A Type 'B' patch is greater than 15' and less than 100' in length and contains load transfer assemblies spaced at a maximum of 15'.

Pavement replacement greater than 100' in length shall be constructed under **Section 501 Portland Cement Concrete Pavement**.

503.09 Patching Pavement. The Engineer will designate the boundaries of the concrete patch. The ends of the patch shall either match or offset by at least 2' the existing joints, any cracks, or patch ends in the immediate adjacent lanes. Transverse boundaries of the concrete patch shall be at least 2' from the existing joint line.

Patch lengths shall be at least 6' and no more than 15' without a load-transfer device. The patch shall be the full width of the existing slab or as noted on the Plans. The patch depth shall be no less than the existing slab.

The entire perimeter of the patch that is adjacent to concrete shall be sawed full depth by a concrete saw equipped with a diamond blade or approved equal of sufficient size to cut the concrete slabs to the required depth along straight and plumb lines. All perimeter cuts shall be plumb and parallel to or normal to the centerline of the roadway. Cutting, removing, and replacing existing hot-mix overlays up to 8" on the concrete shall be considered incidental to this item. Any over cut into the remaining slabs shall be kept to a minimum and shall be sealed (incidental to the sealing of the patch if not overlaid; if overlay is planned, no sealing will be required.). Any existing tie-steel across the patch perimeter line shall be cut. The Contractor may make additional cuts (such as diagonal and slanted cuts) to facilitate the removal of the concrete within the patch boundaries. The additional cuts to facilitate removal shall be incidental to the saw cutting item and will not be measured or paid. Cutting shall not precede the removal operations by more than two days.

The concrete in the repair area shall be removed by the lift-out technique without damaging the remaining concrete slabs or disturbing the base and subgrade. The lift out technique involves drilling holes into the patch to insert lifting hooks, pins, or chains. Improper actions (such as dropping the removed slab on adjacent concrete pavement, damaging the pavement edge due to Contractors methods, or other actions deemed damaging by the Engineer) leading to slab damage, shall be repaired by the Contractor, by an approved method, at no cost to the Department.

When the lift-out technique is not feasible, concrete in the patch area shall be broken by an approved mechanical pavement breaker or jackhammers and removed. The removal of the existing concrete and hot-mix overlay shall be executed with minimal disturbance to the remaining concrete or foundation. Any damage beyond the limits of the patch, caused by the improper actions of the Contractor shall be repaired to the satisfaction of the Engineer at no cost to the Department.

Where the patch is next to the shoulder and removal of the concrete results in a clean, uniform shoulder edge, the Engineer may allow the Contractor to use the shoulder edge as the form for the new concrete. Any portion of the shoulder pavement structure removed or disturbed by the patching operation shall be repaired in kind by the Contractor and the cost shall be incidental to the patching item(s). Saw cutting the joint between the concrete pavement and shoulder may assist in maintaining a clean, uniform shoulder edge. If the adjacent shoulder is concrete, the saw cut will be measured and paid for. If the adjacent shoulder is hot-mix asphalt, no measurement or payment will be made.

503.10 Patch Preparation. After removal of the concrete, the repair area shall be cleaned out with hand tools. Particular attention shall be given to existing longitudinal joint areas due to the possibility of loose concrete where the joint cracked away from the plumb line during the original construction. All vertical faces shall be cleaned of loose and deleterious material, prior to the placement of concrete.

Any base or subgrade that is unstable shall be removed to a maximum depth of 6" as directed by the Engineer. No new base material shall be placed; the excavated area will be filled with the concrete when the patch concrete is placed. The excavation is to be paid for under Item 212001 - Undercut, Excavation, Patching, with the replacement material to be concrete SY-IN paid for under Item 503503 - Patching Concrete.

After the old concrete is removed, the patch areas shall be protected from water intrusion when precipitation is forecast.

Dowels shall be placed to provide load transfer at mid-depth ± 1" of the ends of the patch along the transverse joint at 12" ± 1" on-center spacing, at least 6" from the slab edge. The dowel holes shall be drilled parallel to the profile and centerline of the pavement to an embedment depth of half the dowel bar length. The equipment for drilling holes in the face of the remaining concrete slabs must be capable of producing holes of proper size, depth, and angle. The drill must not crack or spall the remaining concrete. A drill support system shall be used to ensure proper hole alignment.

Dowel holes shall be drilled to a diameter of 1 3/4 for cementitious grout and 1 9/16" for epoxy grout. If the existing concrete breaks during drilling, cut away more concrete or relocate the hole to provide a solid support for the dowel. Fill any unused hole with cement grout or epoxy grout. Any damage caused by the Contractor's technique shall be repaired at no added cost to the Department.

The holes shall be blown clean with compressed air prior to placing the anchoring epoxy or grout material. The anchoring material shall be injected into the back of the hole to provide complete coverage around the dowels without any voids. The dowels, each with a grout retention disk, shall be inserted into the holes with a twisting motion and seated into place by tapping. The disk shall be flush to the face of the existing concrete. The dowels shall be solidly held in proper alignment before placement of the patch concrete.

Dowel placement and joint construction details for contraction joints within the patch area shall conform to the requirements of Standard Construction Details or details in the Plans.

The following are the allowable dowel translations and rotations: Vertical rotation - the difference in depth (vertical position) between the midpoint and the exposed end of the dowel; the allowable tolerance is ¼" of vertical deviation from the true longitudinal axis of the pavement. Horizontal rotation - the difference in lateral position between the midpoint and the exposed end of the dowel; the allowable tolerance is ¼" of horizontal deviation from the true longitudinal axis of the pavement. Longitudinal translation - the longitudinal distance between the exposed end of the dowel and the edge of the patch is 10" with an allowable tolerance of ± 1" .

The dowels at the end of each patch will be paid for under Item 503006-Dowels.

Side forms may be required when the patch is adjacent to a hot mix shoulder and the shoulder is damaged during concrete removal. Bonding of the transverse and longitudinal sides of the patch to the adjacent concrete slabs shall be prevented by an approved bond-breaking material such as a sheet of plastic over the vertical face or a light coating of a wax based curing compound covering the vertical face.

For existing composite pavements (hot-mix over concrete) that will not be overlaid, a 2" lift of hot-mix shall be placed over the concrete after the concrete has reached strength sufficient to allow opening to traffic.

503.11 Placing Concrete. Portland cement concrete shall be placed according to the requirements of Subsection 501.07. The concrete shall be deposited directly on the foundation and shall be uniformly distributed and spread over the entire foundation. Each patch area shall be cast in one continuous operation.

503.12 Consolidating and Finishing Concrete. The concrete shall be consolidated with an internal vibrator, particularly near the edges, corners, and around the dowels. The vibrator must be capable of visibly affecting the concrete from a distance of 1' from the vibrator head.

Except when a hot-mix surface is required or when an overlay will be placed, the surface of the patch concrete shall be struck off flush with the existing pavement. For patches up to 10' long, the screed shall be placed parallel to the centerline of the roadway. For longer patches, the screed may be placed perpendicular to the centerline of the roadway. The surface of the concrete patch shall be textured to match the surrounding pavement (tining, grooves, etc.), except when an overlay will be placed or diamond grinding will be performed.

The riding surface texture, profile, and cross section of the concrete patches shall meet the following requirements:

When the patch surface will be overlaid with Hot-Mix Asphalt as part of this Contract, the patch shall be broom finished or tined, with the texture applied in a direction perpendicular to the traffic flow. The profile and cross slope shall match the adjacent pavement surface. If the profile in the finished patch area contains excessive surface deviations, the patch is unacceptable. Excessive deviations are surface deviations greater than 1/8" from a reference line between points not greater than 10' apart along the direction of traffic.

When the patch surface will be part of the final surface of the roadway, the patch surface shall be finished to match the texture of the adjacent pavement. The patch surface cross section shall match the preceding and following pavement surfaces. The Engineer may test for excessive deviations with a straightedge, a California-type profilometer, or other surface measuring devices. When tested with a straightedge, excessive deviations are surface deviations greater than 1/8" from a reference line between points not greater than 10' apart along the direction of traffic. When tested with a profilograph, excessive deviations are surface deviations greater than 0.3" above or below a reference line between points not greater than 25' apart along the direction of traffic, when the pavement will not be diamond ground end-to-end after patching. When the pavement will be diamond ground end-to-end after patching, excessive deviations are defined as surface deviations greater than 0.4" above or below a reference line between points not greater than 25' apart along the direction of traffic and less than 0.3" after grinding. The Contractor shall correct unacceptable deviations in the patch areas before starting the end-to-end grinding.

503.13 Curing and Protecting. Curing shall conform to the requirements of Subsections 501.11 and 501.12 and the following:

The patch shall be cured and protected with either a liquid membrane curing compound and polyethylene sheeting or wet burlap and polyethylene sheeting.

When liquid membrane curing compound is used, it shall be applied uniformly upon completion of the patch texturing at a rate of 150 ft^2/gallon and then covered with polyethylene sheeting.

When burlap/polyethylene sheeting is used, the patch shall be covered with a layer of wet burlap immediately after the concrete has achieved initial set, and the wet burlap shall be covered with a polyethylene sheet. After the curing compound/polyethylene sheeting or burlap/polyethylene sheeting is applied, the patch shall be covered with an approved insulation blanket, and it shall remain in place until the concrete has achieved the design strength. Edges and seams in the insulation shall be secured to prevent penetration of the wind.

503.14 Joints. The transverse and longitudinal joints shall be formed or sawed as shown on the Standard Construction Details Transverse joints within the patch area shall be sawed at the proper time to assure proper cracking at the transverse crack. Cleaning and sealing of the joints with hot poured sealant material shall be completed within 5 days after concrete placement if no overlay is planned. The non-repaired transverse joints on each side of the patched area shall also be cleaned and resealed. Joints shall be cleaned by mechanical wire brushing or by light sandblasting. Immediately prior to resealing, the joint groove shall receive a final cleaning with compressed air having a minimum pressure of 90 psi . Repairs to damaged concrete or hot-mix shoulder shall be completed before the patch area is subjected to any traffic loading.

503.15 Defective Work. Concrete which fails to reach the full design strength in the specified 6-hours may be considered defective concrete based upon its structural adequacy.

If the concrete is determined to not be structurally adequate by the Engineer, it is considered defective and it shall be removed and replaced at no additional cost to the Department. If the concrete is determined to be structurally adequate by the Engineer and the concrete can remain in place, the Contractor may accept a prorated payment for the below-specified concrete as referenced below. If the Contractor does not wish to accept the prorated payment, the below-specified concrete shall be removed and replaced at no cost to the Department.

503.16 Method of Measurement. The quantity of Portland cement concrete pavement patch will be measured as the actual number of square yards of concrete patch placed and accepted. The width of measurement will be the full width from outside of the completed patches as constructed, measured parallel to the transverse saw cuts. The length will be the actual length measured parallel to the centerline of the pavement. The quantity of dowel bars will be measured as the actual number of dowel bars installed and accepted at the ends of each patch. Dowel bars and support assemblies (load transfer assemblies) installed at internal joints in Type B Patches will not be measured but will be considered as incidental to the Contract price per square yard for Item 503002 - Patching P.C.C. Pavement, greater than 15’ to 100', Type B.

503.17 Basis of Payment. The quantity of Portland cement concrete pavement patch will be paid for at the Contract unit price per square yard . Price and payment will constitute full compensation for furnishing, hauling, and placing all materials, including high-early strength concrete; load transfer assembly, and joint filler (where applicable).; for removing, and disposing of existing concrete; for preparing the foundation; for tooling, finishing, curing, sealing of over cuts in non-overlay areas, and protecting the new concrete; for disposing of excess material; and for all labor, equipment, tools, and incidentals required to complete the work. In addition, the price and applicable payment(s) will be based on Type A or Type B Patches.

Price Adjustment for Low Strength Concrete. Prorated payment for concrete as specified in Subsection 503.15 shall be calculated as shown in the following equation:

$$\textit{Prorated Payment} = \frac{\textit{Actual 6-hour Compressive Strength}}{\textit{Specified 6-hour Compressive Strength}} \times (\textit{Quantity of Concrete}^{*}) \times (\textit{Bid Price}^{**})$$

* The quantity for which the low compressive strength results represent.
** Item bid price; not material cost.

NOTE:
If the Engineer directs the Contractor (in writing) to place Portland cement concrete which is in violation to any applicable Specifications, or if any other Department Specification is violated, this Prorated Payment will not be enforced.

The quantity of dowel bars will be paid for at the Contract unit price per each. Price and payment will constitute full compensation for drilling holes, furnishing and installing grout and dowel bars with grout retention disk and for all labor, equipment, tools, and incidentals required to complete the work. Saw cutting the perimeter of the patch that is adjacent to concrete (including shoulder if applicable) will be measured and paid for under item 762002 - Saw Cutting, Concrete, Full Depth. All other saw cutting, including the joint between the concrete and hot-mix asphalt shoulder, will be incidental to the patching item(s).

Hot-pour sealant, if applicable, will be measure and paid for under item 503501. Any damage caused by the lift-out technique of the Contractor, shall be repaired by the Contractor at no cost to the Department.

602506 - PRECAST CONCRETE CULVERT (L.S.)
602522 - PRECAST CONCRETE CULVERT (L.F.)

Description:

This work consists of furnishing, fabricating, and constructing complete in place the precast reinforced concrete culvert(s) and other associated precast structures (footings, wingwalls, parapets, etc.) as specified on the Plans, as described herein and as directed by the Engineer.

Materials:

1. Concrete

   Concrete shall conform to Section 812 of the Standard Specifications except as amended herein. Minimum 28 days strength for precast concrete shall be 5000 psi (35 MPa). The Contractor shall develop his own concrete mix design, according to ACI 211.1-81, Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete, which shall be submitted to the Engineer for approval. The cement content shall not be less than 700 lb. per cubic yard (415 kg per cubic meter). Portland Cement shall be Type I or Type II (ASTM C 150). In a salt water environmental Type II Cement shall be used.

2. Reinforcing Steel

   Reinforcing steel for the wingwalls shall meet the requirements of AASHTO M 31/M 31M, Grade 60 (Grade 400) (AASHTO M 31) and the requirements of Section 603 of the Standard Specifications.

   Reinforcing steel in the culvert shall be as per ASTM C1577 - Standard Specification for Precast Reinforced Concrete Monolithic Box Sections for Culverts, Storm Drains, and Sewers Designed According to AASHTO LRFD.

3. Backfill

   Borrow Type "B" and/or Borrow Type "C" as required by the plans shall conform to Section 209 of the Standard Specifications.

Design:

The precast concrete culvert shall be constructed in accordance with the notes in the plans and the details provided in ASTM C1577 - Standard Specification for Precast Reinforced Concrete Monolithic Box Sections for Culverts, Storm Drains, and Sewers Designed According to AASHTO LRFD. The precast concrete wingwalls shall be constructed in accordance with the details in the plans.

If the structural details for the culvert and wing walls differ from those in ASTM C1577 and the plans, the Contractor shall submit design calculations and load ratings (culvert only) for the changed design; and shop drawings showing all pertinent dimensions or reinforcement, reinforcement size and location to the Engineer for approval.

The design shall be in accordance with the AASHTO LRFD Bridge Design Specifications, latest edition. The calculations shall be certified by a registered Professional Engineer in the State of Delaware.

Fabrication Plant:

The fabrication plant for precast concrete culvert shall be a National Precast Concrete Association (NPCA) certified plant and pre-approved from the Department.

Fabrication:

1. General

All materials, equipment, processes of manufacture, and the finished sections, including handling, storage, and transportation, shall be subject to inspection and approval. Any defective construction, which may adversely affect the strength or performance of a section, shall be cause for rejection. Rejected sections shall be replaced at no expense to the Department.

2. Forms

The forms used shall be sufficiently rigid and accurate to maintain the culvert dimensions within the tolerances hereinafter specified. The culverts forms shall be matched so that the internal dimensions from one precast section to the next adjacent section shall not vary by more than 1/2" (13 mm). They shall be well constructed, carefully aligned, substantial and firm, securely braced and fastened together, sufficiently tight to prevent leakage of mortar, and strong enough to withstand the action of mechanical vibrators. All the casting surfaces shall be of a smooth material.

Form ties shall be either the threaded type or the snap-off type, so that no form wires or metal pieces will be left at the surface of the finished concrete. Corners and angles shall be mitered or rounded.

Joints between panel forms shall be made smooth and tight.

3. Curing

The culvert shall be cured for a sufficient length of time so that the concrete will develop the specified compressive strength in 28 days or less. Any one of the following methods of curing or combinations thereof shall be used for culvert sections:

Steam Curing - The culvert sections may be low pressure, steam-cured by a system that will maintain a moist atmosphere.

Water Curing - The culvert sections may be water cured by any method that will keep the sections moist.

Forms Left in Place - An accelerated overnight cure accomplished through the use of an external heat source may be used, provided moisture loss from exposed surfaces is minimized.

The maximum temperature increase or decrease shall be 40° F (22° C) per hour. The initial application of the heat shall be two hours after the final placement of concrete to allow the initial set to take place.

4. Testing Requirements

Test Specimen - Concrete compressive strength shall be determined from compression tests made on cylinders. Acceptance of the concrete culvert sections with respect to compressive strength will be determined on a basis of production lots. A production lot is defined as a group of culvert sections representing 10 culvert sections or a single day's production, whichever is less.

During the production of the culvert sections, the manufacturer shall randomly sample the concrete in accordance with AASHTO T 141. A single compressive strength sample shall consist of a minimum of 4 cylinders randomly selected for every production lot. Cylinders for compressive strength tests shall be 4" x 8" or as specified by the Engineer prepared and tested in accordance with AASHTO T 23 and T 22, respectively. For every compressive strength sample, a minimum of 2 cylinders shall be cured in the same manner as the culvert sections and tested at approximately 7 days. The average compressive strength of these cylinders will determine the initial strength of the concrete. In addition, 2 cylinders shall be cured in accordance with AASHTO T 23 and tested at 28 days. The average compressive strength of these two cylinders will determine the compressive strength of the production lot.

Acceptability by Cylinder Tests - The compressive strength of the concrete for each production lot as previously defined is acceptable when the compressive strength is equal to or greater than the design concrete strength.

When the compressive strength of any production lot is less than the design concrete strength, the production lot shall be rejected. The rejection shall prevail unless the manufacturer, at his/her own expense, obtains and submits evidence of a type acceptable to the Engineer that the strength and quality of the concrete placed within the culvert sections of the production lot are acceptable. If the evidence consists of tests made on cores taken from the culvert sections within the production lot, the cores shall be obtained and tested in accordance with the requirements of AASHTO T 24. The core holes shall be plugged and sealed by the manufacturer in a manner such that the culvert section will meet all of the test requirements of this Special Provision. Culvert sections so sealed shall be considered satisfactory for use.

5. Tolerances

Internal Dimensions - The internal dimension shall vary not more than -0"/+1/4" (-0 mm/+25 mm) from the design dimensions.

Top Slab and Wall Thickness - The top slab and wall thickness shall not be less than the design dimensions by more than 5 percent. A thickness more than that required shall not be cause for rejection.

Length of Opposite Surfaces - Variations in laying lengths of two opposite surfaces of the culvert sections shall not be more than 1/8"/foot (10 mm/m) of internal span, with a maximum of 5/8" (16 mm) for all sizes through 7' (2100 mm) internal span, and a maximum of 3/4" (19 mm) for internal spans greater than 7' (2100 mm).

Length of Section - The under run in length shall not be more than 1/8"/foot (10 mm/m) of length with a maximum of 1/2" (13 mm) in any box section.

Position of Reinforcement - The maximum variation in the position of the reinforcement shall be ±3/8" (± 10 mm), except the minimum cover over the reinforcement for any surface of the box culvert shall not be less than 1" (25 mm). The above tolerances or cover requirements do not apply to mating surfaces of the joint. The minimum cover over the reinforcement for any surface of the wing walls shall not be less than 2" (50 mm).

Area of Reinforcement - The areas of steel reinforcement shall be the design steel areas per linear foot (linear meter). Steel areas greater than those required shall not be cause for rejection. The permissible variation in diameter of any reinforcement shall conform to the tolerances prescribed in the ASTM specification for that type of reinforcement.

Construction Methods:

The foundation on which the footings are to be placed shall be a layer of the type of coarse aggregate as specified on the Plans. The bedding areas on which the coarse aggregate will be placed shall be approved by the Engineer. Coarse aggregate shall be carefully placed and tamped to form a solid, unyielding mass with the exposed surface conforming to the form and dimensions shown on the Plans.

Precast sections shall be assembled in accordance with the recommendations of the manufacturer and as approved by the Engineer in the field. The culvert sections shall be so formed that when they are laid together they will make a continuous line of culverts with a smooth interior free of appreciable irregularities, and compatible with the permissible tolerances of this Special Provision.

Care shall be exercised to insure proper matching and aligning of joints of adjacent sections. The joints shall consist of mortar filled shear keyways. The keyway surfaces shall be given a medium abrasive grit blast, 2000 psi (14 MPa) waterblast or a thorough wire brushing at the plant within four days prior to leaving the plant. Mortar for the keyway shall be a non-shrinking, non-metallic mortar having a minimum compressive strength at 28 days of 5000 psi (35 MPa). Before applying the mortar, the surfaces shall be clean of all dirt, dust, and other foreign matter. The surfaces shall be wetted, but no free water shall be allowed to remain in the keyway. The mortar shall be prepared, placed, and cured in accordance with the manufacturers

recommendations. The joint exterior shall be covered with a minimum of a 9" (225 mm) wide wrap centered on the joint. The external wrap shall be as per ASTM C-877. Care shall be exercised to keep the joint wrap in its proper location during backfilling.

The section length shall not exceed that which permits lifting, moving, and placing of the section without any bending, distortion, or stress being induced therein. Devices or holes shall be permitted in each culvert section for the purpose of handling. However, not more than four holes may be cast or drilled in each section. The holes shall be tapered unless drilled, and before backfilling, the tapered holes shall be filled with portland cement mortar, or with precast concrete plugs which shall be secured with portland cement mortar or other approved adhesive. Drilled holes shall be filled with portland cement mortar. Holes shall be covered on the exterior with the joint wrap material previously specified. This wrap shall have a minimum length and width of 9" (225 mm).

No construction equipment except for compaction shall be permitted to pass over the culvert until the fill height has reached the bottom of the pavement subbase. Hauling of materials over the culvert shall be limited as directed, and in no case shall legal load limits specified in Section 105.12 of the Standard Specifications be exceeded unless permitted in writing.

Method of Measurement:

The quantity of item 602506 - Precast Concrete Culvert will not be measured.

The quantity of item 602522 - Precast Concrete Culvert will be measured as the number of linear feet (linear meters) of Precast Concrete Culvert installed and accepted.

Basis of Payment:

The quantity of Precast Concrete Culvert will be paid for at the Contract lump sum price for item 602506 and/or at the Contract unit price per linear foot (linear meter) for item 602522. Price and payment will constitute full compensation for furnishing all materials related to the precast units, designing, fabricating and installing the units on site for all labor, tools, equipment and necessary incidentals to complete the work. Price and payment will also constitute full compensation for all materials, labor, tools, equipment and incidentals necessary to construct structures associated with the culvert (footings, wingwalls, parapets, etc.) as specified on the Plans. Excavation, backfill, backfilling, and coarse aggregate will be paid separately under their respective bid items of this contract.

3/21/11

602553 - MECHANICALLY STABILIZED EARTH WALLS, TYPE 1

Description:

The item shall consist of furnishing all materials, fabricating, and constructing mechanically stabilized earth walls to the lines and grades as shown on the Plans and as directed by the Engineer.

It is the intent of these specifications to provide a guide in the acceptance of a proprietary mechanically stabilized earth wall system. Acceptance of a proprietary mechanically stabilized earth wall system will be based on review and approval of design and specifications submitted by the Contractor for his chosen system. Deviations from these specifications must be approved by the Engineer.

The Contractor shall be required to submit Shop Drawings in accordance with the requirements of Section 105 of the Standard Specifications.

Materials:

1. Backfill Material

   A. The material shall have magnesium sulfate soundness loss of less than 30% after 4 cycles as determined by AASHTO T104.

   B. All backfill material shall be reasonably free from organic and deleterious materials. Do not use metallurgical slag.

   C. Granular backfill shall meet gradation limits of AASHTO T 27, as outlined below:

Sieve Size	Percent Passing
4 inches	100
No. 40 mesh sieve	0 - 60
No. 200 mesh sieve	0 - 10

   D. The plasticity index (P.I.) as determined by AASHTO T 90 shall not exceed 6.

   E. The fraction finer than 15 microns as determined by AASHTO T 88 shall not exceed 10 percent.

   F. The material shall exhibit an angle of internal friction of not less than 34 degree as determined by the standard direct shear test in accordance with AASHTO T 236, on the portion finer than the #10 sieve and compacted to 95 percent of AASHTO T 99, method C or D (with oversize correction, as outlined in Note 7, AASHTO T 99) at optimum moisture content.

   G. Resistivity greater than 3000 ohm-cm.

   H. ph range between 5.0 and 10.0.

   I. Chlorides less than 100 ppm.

   J. Sulfates less than 200 ppm.

   K. Sulfides less than 300 ppm.

Backfill not conforming to this specification shall not be used without the written consent of the Engineer.

The Contractor, or the supplier as his agent, shall furnish the Engineer a Certificate of Compliance certifying that the above materials comply with the applicable contract specifications. A copy of all test results performed by the Contractor or his supplier necessary to assure contract compliance shall also be

furnished to the Engineer. The frequency of sampling of select granular backfill necessary to assure gradation control throughout construction shall be as directed by the Engineer.

2. Concrete - Concrete shall be in accordance with Section 602 of the Delaware Standard Specifications.

   A. Cast-in-place concrete above footing - DelDOT Class A (f'c = 4500 psi).

   B. Leveling pad - DelDOT Class B (f'c = 3000 psi).

   C. Face panels - DelDOT Class A (f'c = 4500 psi).

3. Reinforcing Mesh - The reinforcing mesh shall meet the requirement of ASTM A 185 (AASHTO M 55).

   Galvanization - Galvanization shall meet the requirements of ASTM A 123.

4. Reinforcing Steel - Bar reinforcement shall be in accordance with Section 603 of the Delaware Standard Specifications and shall be ASTM A615 Grade 60 (AASHTO M31).

5. Embed loop - Embed loop shall be fabricated of cold drawn steel wire meeting the requirements of ASTM A 82 and welded in accordance with ASTM A 185. Loops shall be galvanized in accordance with ASTM 123.

6. Connector Bar - Connector Bar shall be fabricated of cold drawn steel wire meeting the requirements of ASTM A 82 and galvanized in accordance with ASTM 123.

7. Horizontal and Vertical/Inclined Joints - Geotextile filter fabric and adhesive for covering the rear side of the horizontal and vertical/inclined joints shall be approved by the Engineer.

8. Horizontal Joint - The material to be used in the horizontal joints between facing panels shall be polyethylene pads with a minimum density of 0.946 g/cm^3 in accordance with ASTM D 1505.

9. Alignment Pin - 5/8" min. diameter, mild steel, round, and smooth bar galvanized to meet the requirements of ASTM A 123.

10. Tie Strip - Shop fabricated of hot rolled steel meeting the requirement of ASTM A 570, Grade 50. Galvanization shall meet ASTM A 123.

11. Reinforcing Strip - Hot rolled from bars to the required shape and dimensions physical and mechanical properties shall meet ASTM A 572, Grade 65. Galvanization shall meet ASTM A 123.

12. Fasteners - Bolts and nuts shall be 1/2" diameter hexagonal cap screw, high strength meeting ASTM A 325 (AASHTO M 164), mechanically galvanized. The coating shall meet the thickness, adherence and quality requirements of ASTM A 153 (AASHTO M 232).

Concrete Face Panels:

1. Testing & Inspection - All precast units shall be acceptable when compression test results indicate strength will meet 28 day specifications. Panels utilizing Type I or II cement will be considered acceptable for placement in the wall when 7 day initial strengths exceed 85% of the 28 day requirements. Panels utilizing Type III cement will be considered acceptable for placement in the wall prior to 28 days only when compressive strength test results indicate that the strength meets the 28 day specification.

2. Casting - The panels shall be cast on a flat area, the front face of the panel at the bottom, the back face at the upper part. Coil loop inserts, rebar, PVC pipe and lifting devices shall be set in place to the dimensions and tolerances shown on the drawings prior to casting. The PVC pipe shall be placed in a manner as to insure that it is not bent or bowed. Coil loop inserts shall be

set on the rear face. The concrete in each unit shall be placed without interruption and shall be consolidated by the use of an approved vibrator, supplemented by hand tamping as may be necessary to force the concrete into the corners of the forms and prevent the formation of aggregate pockets, air bubbles or cleavage planes. Clear form oil of the same manufacturer shall be used throughout the casting operation.

All coil loop inserts shall be attached to the alignment templates using the bolts provided with the forms. The vertical and horizontal alignment of the coil loop inserts shall be 2 1/4" deep in the finished panel and be free of all concrete or debris, loose or otherwise. No concrete or other debris shall be on the interior surfaces of the coils of the coil loop inserts in the finished panels. Immediately after the alignment template is removed, duct tape shall be placed over the coil loop insert holes in order to prevent debris from entering the holes. This duct tape shall not be removed except by the crew that is assembling the wall. Care shall be taken to insure that the duct tape is not removed during shipping.

3. Curing - The units shall be cured for at least 72 hours. Any panel which does not reach specified strength within 28 days shall be rejected.

4. Removal of forms - The forms shall remain in place until they can be removed without damage to the unit.

5. Concrete Finish - Front - As specified on plans
   Rear - Unformed surface, roughly screeded to eliminate open pockets of aggregate and surface distortions in excess of 1/4".

6. Tolerances -

   A. Panel dimensions shall be within 3/16" except that the lateral position of tie strips shall be within 1".
   B. Panel squareness shall not exceed 1/2" as determined by the difference between the two diagonals.
   C. Panel surface defects on smooth formed surfaces shall not exceed 1/8" per 5 foot length. Surface defects on textured - finished surfaces shall not exceed 5/16" per 5 foot length.

7. Compressive strength - Acceptance of the concrete panels with respect to compressive strength will be determined on a basis of production lots. A production lot is defined as a group of panels representing 40 panels or a single day's production, whichever is less.

   During the production of the concrete panels, the manufacturer shall randomly sample the concrete in accordance with AASHTO T 141. A single compressive strength sample shall consist of a minimum of 4 cylinders randomly selected for every production lot. Cylinders for compressive strength tests shall be 6" x 12" prepared and tested in accordance with AASHTO T 23 and T 22, respectively. For every compressive strength sample, a minimum of 2 cylinders shall be cured in the same manner as the panels and tested at approximately 7 days. The average compressive strength of these cylinders, will determine the initial strength of the concrete. In addition, 2 cylinders shall be cured in accordance with AASHTO T 23 and tested at 28 days. The average compressive strength of these two cylinders, will determine the compressive strength of the production lot.

   If the initial strength test results indicate a compressive strength in excess of 4500 psi, then these test results will be utilized as the compressive strength test results for that production lot and the requirement for testing at 28 days will be waived for that particular production lot.

   Acceptance of a production lot will be made if the compressive strength test result is greater than or equal to 4500 pounds per square inch. If the compressive strength test result is less than 4500 pounds per square inch, the acceptance of the production lot will be based on its meeting the following acceptance criteria in its entirety:

   a. Ninety (90) percent of the compressive strength test results for the overall production shall exceed 4,670 pounds per square inch.

b. The average of any six (6) consecutive compressive strength test results shall exceed 4,750 pounds per square inch.

c. No individual compressive strength test result shall fall below 4,050 pounds per square inch.

If a production lot fails to meet the specified compressive strength requirements, the production lot shall be rejected. The rejection shall prevail unless the manufacturer, at his own expense, obtains and submits evidence of a type acceptable to the Engineer that the strength and quality of the concrete placed within the panels of the production lot are acceptable. If the evidence consists of tests made on cores taken from the panels within the production lot, the cores shall be obtained and tested in accordance with the requirements of AASHTO T 24.

8. Rejection

Units shall be subject to rejection because of failure to meet any of the requirements specified above. In addition, any or all of the following defects may be sufficient cause for rejection:

A. Defects that indicate imperfect molding.

B. Defects that indicate honeycombed or open texture concrete.

C. Defects in the physical characteristics of the concrete, such as broken or chipped concrete.

D. Stained form face, due to excessive form oil or others.

E. Signs of aggregate segregation.

F. Broken or cracked corners.

G. Tie strips bent or damaged.

H. Lifting inserts not usable.

I. Exposed reinforcing steel.

J. Cracks at the PVC pipe or pin.

K. Panel thickness varying in excess of ± 3/16" from that shown on the plans.

9. Marking - The date of manufacture, the production lot number and the piece-mark shall be clearly scribed or painted with waterproof paint on the rear face of each panel.

10. Handling, Storage & Shipping - All units shall be handled, stored and shipped in a manner as to eliminate the danger of chipping, discoloration, cracks, fractures and excessive bending stresses. Panels in storage shall be supported on firm blocking to protect the exposed exterior finish.

11. Joints - The minimum width of the fabric sheets shall be:

Vertical/Inclined Joints	18"
Horizontal Joints	18"
All Laps in Fabric	4"

Construction Requirements:

1. Excavation and Backfill

A. The foundation shall be graded level for a width equal to or exceeding the length of the reinforcing strips.

B. The foundation shall be compacted as directed by the Engineer prior to wall construction. Any foundation soils found to be unsuitable shall be removed and replaced, as directed by the Engineer.
C. The surrounding earth embankment shall be constructed simultaneously with the select granular backfill and compacted in lifts at the same elevation, meeting density requirements as stipulated in roadway special provisions.

2. Leveling Pad - At each panel foundation level, an unreinforced concrete leveling pad shall be provided as shown on the Plans. The leveling pad shall be cured a minimum of 12 hours before placement of wall panels. The concrete finish must be smooth and flat and not vary from the design elevation by more than 0.01"(+) and 0.02"(-).

3. Wall erection - Precast concrete panels shall be placed vertically with the aid of a light crane. Panels shall be handled by means of a lifting device set into the upper edge of the panels, and shall be placed in successive horizontal lifts in the sequence shown on the Plans as backfill placement proceeds. As backfill material is placed behind the panels, the panels shall be maintained in vertical position by means of temporary wooden wedges placed in the joint at the junction of the two adjacent panels on the external side of the wall. External bracing is required for the initial lift. Vertical plumbness tolerances and horizontal alignment tolerances shall not exceed 3/4" when measured along a 10' straight edge. The maximum allowable offset in any panel joint shall be 3/4". The overall vertical plumbness tolerance of the wall from top to bottom shall not exceed 1/2" per 10' of wall height.

   Installation of reinforcing mesh/strips shall take place after backfill compaction is complete. Reinforcing mesh/strips shall be placed normal to the face of the wall, unless otherwise shown on the Plans or as directed by the Engineer.

   Recesses at lifting devices in tops of topmost panels shall be grouted flush with an approved grout as directed by the Engineer except where there is a poured concrete coping or parapet.

4. Backfill Placement - Backfill Placement shall closely follow erection of each course of panels. Backfill shall be placed in such a manner as to avoid any damage or disturbance to the wall materials or misalignment of the facing panels. Any wall materials which become damaged or disturbed during backfill placement shall be either removed and replaced at the Contractor's expense or corrected, as directed by the Engineer. Any misalignment or distortion of the wall facing panels due to placement of backfill outside the limits of this specification shall be corrected, as directed by Engineer.

   Backfill shall be compacted to 95 percent of the maximum density as determined by AASHTO T 99 method C or D (with oversize correction, as outlined in Note 7, AASHTO T 99).

   The moisture content of the backfill material prior to and during compaction shall be uniformly distributed throughout each layer. Backfill material shall have a placement moisture content between optimum moisture content and two percentage points below optimum moisture content. Backfill material with a placement moisture content outside the range shall be removed and reworked until the moisture content is uniformly acceptable throughout the entire lift. The optimum moisture content shall be determined in accordance with AASHTO T 99 method C or D (with oversize correction, as outlined in Note 7, AASHTO T 99).

   The maximum lift thickness after compaction shall not exceed 8 inches. The contractor shall decrease this lift thickness, if necessary, to obtain the specified density.

   Compaction within 3'-0" of the backface of the wall facing shall be achieved by at least 3 passes of a lightweight mechanical tamper, roller or vibratory system. No soil density tests shall be taken within this area.

   At the end of each day's operation, the contractor shall slope the last level of backfill away from the wall facing to rapidly direct runoff of rainwater away from the wall face. In addition, the contractor shall not allow surface runoff from adjacent areas to enter the wall construction site.

5. Concrete Barrier - Parapet shall be provided per DelDOT criteria.

6. Internal drainage shall be provided to prevent saturation of the reinforced backfill.

Design Criteria:

1.	Factor of Safety - Overturning	=	2.0
2.	Factor of Safety - Sliding	=	1.5
3.	Weight of Fill	=	120 PCF
4.	Equivalent Hydrostatic Pressure	=	35 PSF

Method of Measurement:

The area of Mechanically Stabilized Earth Walls to be paid for under this item shall be the number of square feet of the finished front precast panel wall surface area actually constructed based on the approved shop drawings complete in place and accepted. Surfaces of footings, unfinished rear surface of the wall panels, leveling pads, coping, or any wall surfaces covered by the coping are incidental to the item and shall not be measured for payment. Measurements shall be taken prior to placing any backfill material that may cover the finished front wall surface area as these precast panel surfaces are to be included in the measurement for payment.

Basis of Payment:

The payment for the item shall be made as measured above at the contract unit price per Square Foot bid for "Mechanically Stabilized Earth Walls", which price and payment shall constitute full compensation for excavation and for furnishing and fabricating all materials for the walls including concrete facing panels, reinforcing strips or mesh, tie strips, geotextiles, adhesives, fasteners, joint materials and incidentals. Payment shall include furnishing and placement of backfill material, concrete leveling pad and coping, all labor and materials required to prepare wall foundation and/or footing, place the reinforcing strips or mesh, erect the concrete facing panels and construct the concrete coping to the lines and grades shown on the plans.

4/5/13

602615 - MODULAR BLOCK RETAINING WALL

Description:

This work consists of furnishing all materials and constructing a modular block retaining wall in accordance with the locations, notes, details on Plans and as directed by the Engineer.

Acceptable modular block retaining walls are:

1. "Allan Block Retaining Wall Systems" style AB Three as manufactured by Fizzano Bros., Inc., 1776 Chester Pike, Crum Lynne, PA 19022 (Telephone (610)833-1100).

2. "Keystone Retaining Wall Systems", standard unit as manufactured by Anchor Concrete Products, Inc., P. O. Box 601, Bridgeport, NJ 08014 (Telephone (609)241-1544).

3. Approved equal.

Working Drawings:

General - Submit an acceptable preliminary conceptual design at least 90 Calendar Days in advance of retaining wall construction. Furnish, at no expense to the Department, detailed design engineering calculations, construction drawings, and erection methods. Provide approved drawings using DelDOT drafting standards.

Include the following information on the drawings: type of wall, location, length, top elevations(s), proposed bottom of footing or leveling pad elevation(s), modular blocks, and cross sections including backfill material type and limits, and quantities. Also show, as required, any details for parapets, coping, barriers, conduit, or other attachments to the wall. Show complete layout plans and fabrication details, including reinforcement and attachments, for the modular blocks, footings or leveling pads, and step by step erection instructions.

Any fabrication done before acceptance of the drawings will be at the Contractor's risk.

All design information shown on the Contract Plans are conceptual. The proprietary wall vendor takes full responsibility for the engineering theory and calculations and ensuring that all design assumptions are presented in their drawings and specifications.

Any delay in submission and acceptance of a proposed design will not extend the Contract time.

Experimental or demonstration-type design concepts; or products, structures, or elements not preapproved by the Department for general usage, will not be permitted in the alternate design.

Show, on the design, the seal of a P.E. registered in the State of Delaware, a valid signature in ink, the date signed, a business name, and a business address.

Perform required design of the retaining wall in accordance with 1998 AASHTO LRFD Bridge Design Specifications with current interims, and the DelDOT Bridge Design Manual with current updates unless otherwise indicated or specified. Current design practice includes the use of all applicable codes and Department design specifications, publications, policies, and procedures in effect on the date bids are opened.

Submit shop drawings to the Department for review and acceptance. The Department will in no way be responsible for work done without approved shop drawings.

Design the retaining wall to be within the limits of allowable foundation bearing pressures as indicated for the conceptual design. Do not change the bottom of footing elevation, unless approved by the Department.

Materials and Construction Methods:

At the time of submitting the shop drawings, the Contractor shall also submit for approval the material requirements and construction methods for the modular block retaining wall.

Method of Measurement:

The quantity of modular block retaining wall will be measured as the actual number of square feet (square meters) of front face vertical wall surface, including the front face of the cap, (but not the top surface area), above the footer or foundation material.

Basis of Payment:

The quantity of modular block retaining wall will be paid for at the Contract unit price per square foot (square meter). Price and payment will constitute full compensation for furnishing all materials, excavation, footer if required, backfill, backfillings, hauling, fabrication and erection, for all labor, tools, equipment and incidentals necessary to complete the work. Rock, if encountered, shall be paid under Item 206000.

1/8/15

602646 - SILICONE ACRYLIC CONCRETE SEALER

Description:

This work consists of surface preparation, furnishing all materials, and application of a silicone acrylic concrete sealer to any concrete surface. The work shall be performed as indicated on the Plans, in accordance with these Specifications, and as directed by the Engineer.

Materials:

The concrete sealer shall consist of methyl methacrylate-ethyl acrylate copolymer resins and toning pigments suspended in solution of all times by a chemical suspension agent and solvent. Laminar silicates, titanium dioxides, and inorganic oxides may be used for toning pigments. Use of vegetable or marine oils, paraffin materials, stearates or organic pigments in the formulation shall not be permitted.

The Sealer shall be opaque, non-film forming, and penetrating silicone acrylic compound. The sealer shall pass NCHRP 244 Series-2, salt spray resistance requirements. The materials must be local OTC-VOC compliant.

The manufacturer shall supply a Materials Safety Data Sheet and a letter of certificate compliance of batch & lot of each shipment of the concrete sealer materials. The contractor shall also provide a manufacturer analysis report of the materials used with the specified batch shipped to the job site.

The color of the compound shall be off white (Federal Color #37925 of FED-STD-595B) or as specified on the plans.

Surface Preparation:

All new concrete surfaces, texturing, saw cutting, repointing and grooving shall be completed before the surface is prepared for sealer. All concrete that is to be sealed shall be cured for at least 28 days after casting or for the length of time specified in the manufacturer's instruction, which ever is longer. After 28 days, concrete surface shall be lightly sand or shot blasted, followed by vacuum cleaning in accordance with ASTM D 4258 & SSPC-SP-13 requirement to completely remove any applied curing compound, and to make surface lightly rough for penetration of sealer.

For existing concrete, all previous sealers and paints, all salt, efflorescence, laitance, and other foreign matter, and all loose material shall be completely removed using one or a combination of different preparation methods as specified in ASTM D-4258 and SSPC-SP 13.

In addition, both new and existing concrete shall receive a high pressure (3000-5000 psi) water washing at a flow of more than 4 gallons per minute, with zero degree of rotary nozzle. The contractor shall also allow the surface to dry for a minimum of 24 hours prior to the coating application after high-pressure washing. All surface preparation work shall be completed and approved by the Engineer before sealer the application can commence.

Construction Methods:

The sealer shall be used as supplied by the manufacturers without thinning or alteration unless specifically required in the manufacturer's instructions and verified by Engineer.

The silicone acrylic concrete sealer shall be applied to all exposed concrete surfaces as shown on the plans.

Concrete curing compounds, form release agents, and concrete hardeners may not be compatible with recommended coatings. Check for compatibility by applying a test patch of the recommended coating system, covering at least 20 to 30 square feet.

The concrete sealer material shall be applied using coverage rate and equipment in accordance with the manufacturer's recommendations.

A minimum of two coats shall be applied; all applications shall be performed under dry conditions with application-spread rate as recommended by the manufacturers.

The sealer shall be applied within the ambient temperature range as recommended by the manufacturer, when no rain is expected within a minimum of 12 hours following the application, and there are no high winds that would cause an improper application. If rain has preceded the application, the surface shall be allowed to dry at least 24 hours before waterproofing application begins.

Follow manufacturers recommendation for coating thickness. No drips, runs, or sags will be allowed during application. Natural bristle brush, roller, or spray can be used to perform the application. Follow manufacturers recommendation during application. No thinning of materials is permitted; all application procedures, and drying time between coats must be as per manufacturers recommendations.

The Contractor shall perform surface preparation and application of the concrete sealer material so as not to endanger any private and/or public property, pedestrians, workmen, and vehicles on, beneath or adjacent to the structure.

Method of Measurement:

The quantity of "Silicone Acrylic Concrete Sealer" will be measured by the square feet of area treated and accepted.

Basis of Payment:

The quantity of "Silicone Acrylic Concrete Sealer" will be paid for at the Contract unit price per square foot. Price and payment will constitute full compensation for furnishing all materials, furnishing and removing scaffolding as required, surface preparation, application of the concrete sealer material, disposal of discarded materials, and for all labor, tools, equipment, and all necessary incidentals to complete the work.

1/8/15

605501 - GROUND MOUNT BREAKAWAY TYPE SIGN SUPPORTS AND FOUNDATION

Description:

This work consists of furnishing all materials and constructing ground mount breakaway type sign supports including foundations in conformance with the details and notes shown on the Plans, and as directed by the Engineer.

Materials:

Structural Steel shall meet the applicable requirements of Subsection 605.02 of the Standard Specifications and AASHTO M 270/M 270M, GR36 (GR250), GR50 (GR 345), or GR50W (GR 345W) as detailed on the plans. Steel posts shall be galvanized in accordance with the requirements of AASHTO M 111/M 111M.

Bar reinforcement shall conform to the requirements of Subsection 603.02 of the Standard Specifications.

Portland Cement Concrete shall be Class B and shall conform to the requirements of Section 812 of the Standard Specifications.

Breakaway Couplings shall be made from alloy steel which conforms to AISI 4340, 4130 or an equivalent material, and shall have minimum tensile yield stress of 175,000 psi (1200 MPa). The Rockwell C hardness shall be 26 minimum. The couplings shall have tensile breaking strength ranges as noted below; and shall be of the type as shown on the Plans:

Type A	17,000 - 21,000 lb (75 - 93 kN)
Type B	47,000 - 57,000 lb (209 - 253 kN)

This steel shall conform to the requirements of the current ASTM designation A-370.

The couplings shall be clean, dry and free from any foreign material and shall be primed and coated with a suitable paint which shall be baked or fused with a polyurethane additive. The color of the coating shall be as follows:

Type A	Yellow
Type B	Red

Chipped areas on the coating surface shall be repaired. All threaded surfaces, after coating, shall be cleaned to allow then to function properly.

Brackets shall be made from aluminum alloy 6061 T-6 or an equivalent material. Upper brackets shall incorporate the load concentrating member or boss which shall be made from the following materials:

Type A	Aluminum alloy 6061 T-6 or equivalent as part of brackets
Type B	Stainless steel 416 or equivalent ASTM A582-Rockwell C35-C45

The type of boss shall be as shown on the Plans.

Location holes for the breakaway coupling shall be accurately positioned relative to the load concentrating member in accordance with the Engineer's requirements. All Brackets shall be permanently labeled with bracket number to reflect the hole positioning.

Anchors shall be fabricated from 304 Stainless Steel for the threaded ferrule portion, and 1058 steel rod and coil for cage portion of anchor.

Hinge plates shall be made from alloy steel which conforms to AISI 4340, 4130 or an equivalent material and shall have a minimum tensile yield stress of 90,000 psi (620 MPa). The hinge plates shall have tensile breaking strength ranges as follows:

HI-10	11,450 - 13,900 lb (50.9 - 61.8 kN)
HI-1	16,400 - 19,700 lb (72.9 - 87.6 kN)
HI-2	6,700 - 8,100 lb (29.8 - 36.0 kN)

Nuts, Bolts and Cap Screws shall meet AASHTO M 164 (M 164M). All nuts, bolts and cap screws shall be within a hardness range of Rockwell C23 to C31 prior to hot dip galvanizing per AASHTO M 232/M 232M.

Construction Methods:

Shop Drawings. Shop drawings shall be submitted in accordance with Subsection 105.04 of the Standard Specifications. Minor variations in details may be permitted; however, any major departure from the design will not be accepted.

Fabrications. Loading, transporting, unloading and erection of structural materials shall be done so that the metal will be kept clean and free from injury in handling.

Structural materials shall be stored above the ground upon platforms, skids, or other supports and shall be kept free from accumulation of dirt, oil, acids or other foreign matter.

Structural material which has been deformed shall be straightened before being layed out, punched, drilled or otherwise worked upon in the shop. Sharp kinks or bends will be cause for rejection.

When sign support structures are subcontracted, the subcontract shall be in accordance with Subsection 108.01 of the Standard Specifications except that the value of the subcontract will be based on the value of the work for fabrication.

Repair Galvanizing. Galvanized areas damaged during shipping or erection shall be repaired by any of the three methods specified under ASTM A780. In all cases, the repair shall achieve the minimum coating thickness specified.

Erection. Material shall not be dropped, thrown or dragged over the ground. The Contractor shall supply detailed, written instructions and drawings for the erection of all sign structure components.

For constructing the concrete foundation, the excavation shall be done by augering of suitable diameter as detailed on the Plans. The excavated material shall be disposed of and the area shall be properly graded.

Anchor bolts shall be set to template for alignment and elevation and shall be secured in position to prevent displacement while concrete is being placed. The steel reinforcement and conduit elbows shall have been placed and secured before the placing of concrete.

Method of Measurement:

The quantity of ground mount breakaway type sign supports and foundations will not be measured.

Basis of Payment:

The quantity of ground mount breakaway sign supports and foundations will be paid for at the Contract lump sum. Price and payment will constitute full compensation for furnishing all materials and constructing the sign supports and foundations in accordance with the details and notes shown on the Plans, and as directed by the Engineer; and for all labor, equipment, tools and incidentals necessary to complete the work.

NOTE

On a breakout sheet found in the Proposal, the Contractor shall submit a price for each Sign Support Structure with foundation, when more then one structure is required. The Lump Sum bid price for the item shall be the sum of the prices for each Sign Support Structure listed.

The Department reserves the right to delete from the contract construction of one or more individual sign structure(s), and the Lump Sum price to be paid will be reduced in accordance with the Contractor's itemized price list for that individual sign structure. There shall be no extra compensation to the Contractor if such deletion is made.

10/23/01

605510 - PREFABRICATED EXPANSION JOINT SYSTEM 2"
605511 - PREFABRICATED EXPANSION JOINT SYSTEM 3"
605512 - PREFABRICATED EXPANSION JOINT SYSTEM 4"
605513 - PREFABRICATED EXPANSION JOINT SYSTEM 5"
605647 - PREFABRICATED EXPANSION JOINT SYSTEM 1 1/2"
605730 - PREFABRICATED EXPANSION JOINT SYSTEM, 1"

Description:

This work consists of furnishing of all materials and necessary labor to fabricate, assemble, construct and install prefabricated strip seal expansion joint systems of the size(s) specified on the Plans, including extrusions, neoprene strip seal, angles, studs, and sliding plates on roadway and/or sidewalks as specified on the Plans, in accordance with these Specifications.

Materials:

Steel members of the types, size and configurations shown on the plans shall conform to AASHTO M 270/M 270M Grade 36 (Grade 250) or Grade 50 (Grade 345) or Grade 50W (Grade 345W), unless specified otherwise on the Plans. All steel of the joint system shall be painted with the 3 coat urethane paint system with a minimum total thickness of 9 mils (225 µm), and all screws shall be stainless steel ASTM A276, Type 304.

The elastomeric material shall be 100% virgin Polychloroprene (Neoprene). The strip seal shall be an extruded neoprene material meeting the requirements of AASHTO M 220 modified to omit the recovery test. The elastomeric material shall have the following physical properties as determined by applicable ASTM tests:

ASTM Standard	Physical Properties	Performance Requirements
D2240 (Modified)	Hardness	60±7 points, Durometer (Type A)
D412	Tensile Strength	2000 psi (13.8 MPa), min.
	Ultimate Elongation	250%, min.
D395 (Method B)	Compressive Set 70 hr. @ 212 F (100 C).	40%, max.
D573	Compressive Set 212 F (100 C)	40%, max.
D1630	Abrasion Resistance	Index of 200 or greater Permissible
D1149	Oxone Resistance 20 percent strain 300 pphm in air, 70h @ 140 F (60 C) (wiped) with tolune to remove surface contamination)	No cracks
D471	Oil Swell, ASTM Oil #3, 70 h @ 212 F (100 C), Weight change	45%, max.
D2240	Low Temperature Stiffening max. 7 days @ 14 F (-10 C)	+15 points Durometer (Type A)

Construction Methods:

Installation of the prefabricated expansion joint system, to include strip seal, steel extrusion and application of adhesives, shall be in accordance with the manufacturer's written recommendations and instructions and as specified herein. Special tools for insertion of seals shall be provided by the manufacturer as may be required.

The Contractor shall make arrangements for a technical representative of the manufacturer to be available for advice and inspection during construction of strip seals to ensure satisfactory installation. The strip seal shall be furnished in one piece for the full length of the joint.

Welding shall conform to all applicable requirements of AWS D1.5, including qualifications of welders. Shop drawings and welding procedures must be submitted to the Bridge Engineer for approval prior to any fabrication. Welds at mitered joints in steel extrusions and between steel extrusions and plates and between studs and plates shall be tested by magnetic particle tests methods by a testing laboratory approved by the State. All welds, fabrication and testing will be visually inspected by the Department or its approved representative. The Contractor shall submit the manufacturer's certification for quality of materials and the result of welding inspection to the Engineer. Mill test reports must be supplied for all steel. Where, in the opinion of the Engineer, welds are defective, they shall be rewelded or repaired in a manner acceptable to the Engineer.

The installation procedure as described here, shall be adhered to unless modified by the Engineer.

The prefabricated sealing system shall be shop assembled as a unit including the neoprene strip seal, and preset prior to shipment, using prestressing bolts and adjustable temporary connections between positioning steel members. The opening of the joint shall be set at the width required for the seal at a temperature of 68 F (20 C).

The prefabricated joint assembly shall be positioned and attached to the structure by anchorages. Width adjustments shall be made at the discretion of the Engineer and manufacturer's representative. All movements due to shrinkage, creep, mid-slab deflections, and other factors shall be considered.

The prefabricated joint shall be set normal to the grade and the deck concrete slab graded to meet flush with the edge of the joint plates.

Before placing the deck slab, the anchorage attached to the abutment backwall, or adjacent steel or concrete stringers shall be released by loosening the bolts in the slotted anchorage connections. The prestressing bolts and adjustable temporary connections shall remain in place. After the deck slab has cured the width of joint shall be checked and again adjusted if necessary. The released anchorage shall be tightened, welded and the prestressing bolts and temporary connections removed. The backwall or deck on this side of the joint may then be poured after sealing the openings left by removal of prestressing bolts.

Method of Measurement:

The quantity of the specified size(s) prefabricated expansion joint system will be measured as the actual number of the linear feet (linear meters) furnished and installed, measured along the centerlines of the slab joints.

Basis of Payment:

The quantity of prefabricated expansion joint system will be paid for at the Contract price per linear foot (linear meter). Price and payment will constitute full compensation for fabricating, furnishing, and installing all materials, labor, equipment and all else necessary therefor and incidental thereto.

Payment for erection angles and other components not specifically part of the prefabricated strip seal joint system shall be included in Prefabricated Expansion Joint System.

10/29/01

605600 - BRIDGE MOUNTED SIGN SUPPORT

Description:

The item shall consist of furnishing all materials, fabricating, galvanizing, and attaching the sign support(s) to the bridge(s) in accordance with the locations and details shown on the plans as directed by the Engineer.

General:

The work to be performed under this item includes furnishing, fabricating, and erecting supports to attach signs to bridges, including welding, galvanizing, and all incidentals necessary to complete the work in accordance with the Plans and Specifications to the satisfaction of the Engineer.

Sign panels, electrification, and luminaires are not included under this item.

Shop Drawings:

The Contractor shall be required to prepare and submit detailed shop drawings for all bridge mounted sign supports to be constructed under this contract. The Contractor's attention is directed to Subsection 105.02 of the Standard Specifications.

The approval of detailed shop drawings shall not relieve the Contractor of his responsibility for the furnishing of all materials, and the performance of all work as required, for completion of this portion of the contract.

Materials:

Materials as shown on the plans for the metal structure shall meet the requirements of Section 605.05. Epoxy grout shall consist of clean sand and epoxy mixed in accordance with the manufacturer's recommendations. The grout shall be capable of developing a minimum compressive strength of 45 MPa within 72 hours. Sand for grout shall be tested in accordance with AASHTO T27. The grading shall yield 100 percent passing the 2.36 mm sieve and a maximum of 1 percent passing the 75 Fm sieve.

The structural steel for the sign support shall include the additional requirements for Charpy V-notch testing and meet the requirements of ASTM A709, Grade 250 or Grade 345 as required by the plans. When the existing structure consists of ASTM A709M, Grade 345W structural steel, the structural steel for the sign support shall meet the requirements of ASTM A709M, Grade 345W except that the vertical supports shall be made of steel meeting the requirements of ASTM A709M, Grade 250 or Grade 345. The fasteners shall meet the requirements of ASTM A 325M. Type 3 bolts shall be used when the structure consists of ASTM A 709M, Grade 345W structural steel except the fasteners in contact with the galvanized vertical supports shall be galvanized as specified below.

All members of sign supports shall be galvanized in accordance with ASTM A123. All bolts, nuts and similar fasteners shall be mechanically galvanized in accordance with ASTM B695.

Construction Methods:

Working drawings for structural steel shall be furnished by the Contractor in accordance with Section 105.02 of the Specifications.

Construction shall be in accordance with Section 605 of the Standard Specifications.

Anchor bolts shall be set in place in cored holes with epoxy grout.

For sign supports erected on bridges, the Contractor shall galvanize the entire sign support.

Method of Measurement and Basis of Payment:

The item "Bridge Mounted Sign Support" as called for by the contract, will not be measured for payment, but will be paid for at the contract lump sum price bid, complete in place and accepted. The price and payment shall constitute full compensation for furnishing all labor, materials, tools and equipment required to fabricate and erect the sign support(s) at the designated location(s). The item shall include the cost of coring, epoxy grouting, anchor bolts, furnishing, fabrication and erection of the sign support(s), including blast cleaning, galvanizing, and all incidentals necessary to complete the work.

NOTE

When more than one bridge mounted sign support is required, the contractor shall submit a bid price for each bridge mounted sign support. The lump sum price for the item shall be the sum of the prices for each bridge mounted sign supports.

The Department reserves the right to delete from the contract, construction of one or more individual sign support(s) and the lump sum price to be paid will be reduced in accordance with Contractor's itemized bid price list for that individual sign support. There shall be no extra compensation to the Contractor if such deletion is made.

11/17/14

605664 - STEEL SIGN STRUCTURES

Description:

This work shall consist of furnishing, fabricating and erecting the sign structures as shown on the plans. Such work shall include the steel sign structure, concrete foundations, excavation and backfill and temporary shoring as required and shall include all materials, labor, tools, equipment, and incidentals necessary to complete the work.

Materials:

All materials provided for the steel sign structures shall conform to the following:

(a) Steel Pipes - Steel pipe shall be certified by mill test report to meet ASTM Specification A 53, Type S, Grade B with the exception that AP15L, Grade B may be used when the specified wall thickness is greater then ½". Only Electrical Resistance Welded (ERW) manufactured single seam pipe is permitted. However, when the required pipe size is greater than 24", double seam pipe may be used. A mill test report must be provided, certified and signed by the pipe manufacturer, containing physical and chemical properties and the manufacturer process used to produce the pipe.

(b) Caps for the ends of chords and tops of post shall be steel conforming to ASTM A 36 (AASHTO M 183) and shall be hot dip galvanized in accordance with ASTM A 123 (AASHTO M 111) Specification.

Steel for structural angles, plates and bars shall conform to the requirements of ASTM A 36 (AASHTO M 183), Grade 36 or ASTM A 709 (AASHTO M 270), Grade 50. All steel shall meet the testing requirements for notch toughness (Charpy testing, zone #2) and requirements of Section 605 of the standard specifications.

(c) Anchor Bolts, nuts and washers - Steel anchor bolts, nuts and washers shall conform to ASTM Specification F 1554, Grade 55. The anchor bolts shall be hot dip galvanized as per ASTM Specification A 153 (AASHTO M 232), Class C.

(d) U-Bolts - ASTM A307.

(e) U-Bolt Nuts - ASTM A307.

(f) Fasteners - Chord splice assembly fasteners shall be high strength steel conforming to ASTM A 325 (AASHTO M 164) and shall be hot dip galvanized as per ASTM A 153, Class C as specified in plans.

All other fasteners shall be stainless steel conforming to ASTM A 320, Grade B8, Class 1 Specification or as specified in plans.

(g) Concrete – Standard Specification 812, Class B

(h) Reinforcing Steel - ASTM A615, Grade 60, epoxy coated.

(i) Galvanizing (Zinc Coating) - All structural steel that is not stainless shall be hot-dipped galvanized in accordance with ASTM A123. After fabrication and completion of any welded connections, each steel section shall be hot dip galvanized according to the requirements of ASTM Specification A 123 (AASHTO M 111). A single dip galvanizing process is preferred if size permits.

Apply hot-dip galvanized coating to iron and steel plates, pipe, tube, and structural shapes according to ASTM A 123.

Apply hot-dip galvanized coating to iron and steel hardware according to ASTM A 153. Repair hot dipped galvanized coating on iron and steel plates, pipe, tube, structural shapes, and hardware according to ASTM A 780.

(j) Casings for drilled shafts - Use material as specified in ASTM A 252, Grade 2 (use smooth, non-corrugated steel pipe). Ensure that the casing is capable of withstanding handling and driving stresses and the pressures of the concrete and surrounding earth. Use a casing with an inside diameter that is at least as large as the indicated shaft size. The Contractor may increase the size of the casing to facilitate construction operations at no cost to the Department.

Construction Methods:

(a) As shown on the plans and as follows:

General. Prepare and submit detailed shop drawings for review and acceptance. Drawings shall be stamped by a PE registered in the state of Delaware. Material and workmanship not previously inspected will be inspected on the work site. Remove rejected material from the work site. Satisfactorily restore the site to its original condition, as directed, including the disposal of excess or unsuitable material. Contractor to verify sign and structure clearances.

Fabrication:

Ensure that the steel fabricating plant is certified under the AISC Quality Certification Program. Before fabrication, submit a copy of the proposed welding procedures to the Engineer for approval. Follow the approved welding procedures, and ensure that welders are qualified according to ANSI/AWS D1.1 or ANSI/AWS D1.2, as appropriate.

After fabrication and welding, hot-dip galvanize the steel assemblies as specified in "Galvanizing (Zinc Coating) Section". After galvanizing, but before shipment to the Project, return the truss and posts to the fabricator for final shop assembly to verify camber, alignment, and contact of splice mating surfaces.

Shipping and Handling:

Notify the Engineer at least 3 days before shipping to the Project or galvanizer so that a final quality inspection can be performed. The Engineer will seal all materials approved for shipping and provide written approval to the fabricator.

Ensure that members are loaded, hauled, and unloaded so that they are not deformed or damaged. Store structural materials above the ground on platforms, skids, or other supports. Keep the structural materials free from accumulation of dirt, oil, acids, or other foreign matter.

Any damage to galvanizing that occurs during shipping, handling or erection shall be repaired with a liquid galvanizing repair. Such repair material shall be submitted to the Engineer for approval prior to use.

Quality Control and Acceptance:

Notify the Engineer, in writing, 15 days in advance of beginning work at the fabrication shop, so that arrangements for inspection may be made.

Perform at least the minimum specified number of quality control inspections according to the applicable ANSI/ AASHTO/ AWS specification, and any other tests and inspections necessary to control the quality of the work. The Engineer will perform non-destructive testing quality assurance inspections following the non-destructive testing quality control (QC) inspection performed by the fabricator.

Ensure that all quality control inspectors are AWS Certified Welding Inspectors, qualified according to the provisions of AWS QC1.

Inspect and test according to ANSI/ AASHTO/ AWS D1.1 Welding Code and the following:

Perform magnetic particle testing at a frequency of 10 percent of the number of welds per unit. For cantilever sign support structures, perform magnetic particle testing at a frequency of 100 percent on all chord splice assembly welds and post base welds.

Before shipping, assemble the completed and accepted truss units in the shop and check the truss span for dimensions, straightness, alignment, and camber. Measure the camber with the truss units on their sides.

(b) Drilled Shaft Foundations.

1. Installation Plan

Submit the installation plan. Do not begin constructing the drilled shaft until the Engineer approves the Plan.

2. Location and Alignment

Construct the drilled shaft within 3 inches of plan position in the horizontal plane at the elevation of the top of the shaft. Ensure that the vertical alignment of a shaft excavation does not vary from the plan alignment by more than 1/8 inch per foot of depth.

3. Excavation Log

Maintain an excavation log during shaft excavation that includes the following:

i. Description and approximate top and bottom elevation of each soil or rock material encountered during shaft excavation.

ii. Elevations at which seepage or groundwater flow are encountered.

iii. The type of tools used for the excavation.

iv. Changes in the type of tools used for excavation.

v. Ensure that discrepancies noted on the log by the Engineer are resolved by the end of each day. Provide 2 copies of the final log to the Engineer within 24 hours after a shaft excavation is completed and approved.

vi. Reuse excavated material if possible.

4. Constructing Using Casings

Construct drilled shafts using casings for this project. The Contractor may either place casings in a predrilled hole or advance casings through the ground by twisting, driving, or vibrating.

The Contractor shall submit, in the installation plan, details of the proposed casing method (including casing lengths and diameters) and the proposed procedures of casing installation to the Engineer for review.

Ensure that casings are clean, round, straight, and free of weld breaks and holes that would allow passage of water or plastic concrete. With Engineer approval, the Contractor may provide casings larger in diameter than shown on the Plans. The Contractor may elect to use Temporary or Permanent casings. The bid price shall include the cost of the selected casing method.

i. **Temporary Casings**. Telescoping, pre-drilling with slurry, and over-reaming to beyond the outside diameter of the casing may be required to install casing.

   Remove temporary casing before completing concrete placement in the drilled shaft. Before withdrawing the casing, ensure that the level of plastic concrete in the casing is at least 5 feet above either the hydrostatic water level in the formation or the level of drilling fluid in the annular space behind the casing, whichever is higher. As the casing is withdrawn, maintain an adequate level of concrete within the casing so that fluid trapped behind the casing is displaced upward and discharged at the ground surface without contaminating or displacing the shaft concrete.

If the Contractor removes a specified diameter or length of casing and substitutes a longer or larger diameter casing through caving soils, the Contractor shall stabilize the excavation using slurry or backfill before the new casing is installed.

If temporary casings become bound or fouled during shaft construction and cannot be practically removed, the Department will designate the drilled shaft defective. Submit working drawings for approval proposing corrective measures. Do not begin corrective measures until the Department approves the working drawings.

ii. **Permanent Casing**. The Contractor may elect to use permanent casing. Ensure casings are continuous between the top and bottom elevations shown on the Plans. After installation is complete, cut off the permanent casing at the specified elevation.

After installing the casing, repair damage to coated surfaces of the casing exposed to the air by applying an organic zinc prime coat from the same manufacturer as the shop-applied inorganic zinc prime coat.

5. Removing Obstructions

Remove surface and subsurface obstructions at drilled shaft locations. The Contractor may need to use special procedures and tools when the drilled shaft excavation cannot be advanced using conventional augers fitted with soil or rock teeth, drilling buckets or under-reaming tools. Special procedures and tools may include: chisels, boulder breakers, core barrels, air tools, hand excavation, temporary casing, and increasing the hole diameter. Any form of blasting is prohibited.

6. Excavation Cleaning and Verification

Unless otherwise approved by the Engineer, ensure that at least 50 percent of the base of each shaft has less than 1/2 inch of sediment at the time of concrete placement. Ensure that the maximum depth of sediment or debris at any place on the base of the shaft does not exceed 1-1/2 inches.

In the presence of the Engineer, determine the cleanliness of the bottom of the shaft by the use of sounding. After final cleaning, determine the dimensions, depth, and alignment as directed by the Engineer.

7. Reinforcement Steel Cages and Conduits

Immediately after the shaft excavation has been inspected and approved, place the pre-assembled reinforcement steel cage, consisting of longitudinal and transverse bars, spirals, cage stiffeners, spacers, centralizers, and other necessary appurtenances into the drilled shaft hole. Remove internal stiffeners as the cage is placed in the drilled shaft hole. Install any conduits (as shown of the Contract Drawings) into the drilled shaft hole before placing concrete.

Use concrete spacers or other approved noncorrosive spacing devices at sufficient intervals near the bottom, and at intervals not exceeding 10 feet up the shaft, to ensure concentric spacing for the entire cage length. If the size of the spacers is not shown on the Plans, provide spacers that will create a minimum 3-inch annular space.

Provide cylindrical concrete supports to ensure that the bottom of the cage is maintained at the specified distance above the base.

8. Concrete Placement Time Limitations

Place concrete continuously from the bottom to the top elevation of the shaft.

Ensure that the concrete placement is completed within 2 hours. The Engineer may allow the concrete placement time to exceed 2 hours if the Contractor demonstrates that the slump of the concrete will not be less than 4 inches during the entire time of concrete placement.

9. Concrete Placement Methods

The Contractor may request 1 additional set of cylinders to be taken for determining strength for early removal. If additional cylinders are requested, notify the Engineer at least 24 hours before placing.

When using a concrete pump to place concrete for the drilled shaft, provide a standby pump that is immediately available if there is a pump failure.

Check the elevation of the top of the steel cage before, during, and after concrete placement. If the final upward displacement of the rebar cage exceeds 2 inches or if the downward displacement exceeds 6 inches per 20 feet of shaft length, the Engineer will reject the drilled shaft. Correct the shaft to the satisfaction of the Engineer.

Set anchor bolts into a template to maintain alignment and elevation. Secure in position to prevent displacement while placing concrete. Before placing the concrete, place reinforcement steel and conduit as specified in Section 812. Ensure that concrete placement complies with the limitations specified. Place concrete as specified. Cure concrete as specified.

i. **Tremie Method**. Ensure that tremie tubes are of sufficient length, weight, and diameter to discharge concrete at the shaft base elevation. Ensure that the inside and outside surfaces of the tremie are clean and smooth to allow the flow of concrete during concrete placement and an unimpeded withdrawal of the tremie tube after concrete placement. Ensure that the tremie tube's inside diameter is at least 6 times the maximum size of aggregate used in the concrete mix. Do not use tremie tubes less than 10 inches in diameter. Ensure that the tremie tube thickness is adequate to prevent crimping or sharp bends. Do not use tremie tubes that have aluminum parts that will come in contact with concrete. Ensure that the tremie tube is watertight.

   Do not begin placing concrete underwater until the tremie is placed to the shaft base elevation. The Contractor may use valves, bottom plates, or plugs to ensure concrete discharge begins within one tremie diameter of the base. Remove plugs from the excavation or construct them using a material that will not cause a defect in the shaft if not removed. Construct the discharge end of the tremie to allow the free radial flow of concrete during placement operations.

   Ensure that the tremie tube discharge end is immersed at least 5 feet in concrete at all times after starting the flow of concrete. Maintain a continuous flow of the concrete at a positive pressure differential to prevent water or slurry intrusion into the shaft concrete.

   If the tremie tube discharge end is removed from the plastic concrete and discharges concrete above the rising concrete level, the Engineer will consider the drilled shaft defective. To correct this defect, the Contractor may: remove the reinforcement cage and concrete, complete necessary sidewall removal directed by the Engineer, and replace the shaft; or, the Contractor may re-plug the tremie tube, recharge with concrete, and insert a minimum of 5 feet below the existing top level of concrete before continuing placing concrete.

ii. **Pumped Method**. Ensure that pump lines have a minimum diameter of 4 inches and are constructed with watertight joints.

   Ensure that the discharge end remains at least 5 feet below the surface of the plastic concrete. When lifting the pump line during concreting, temporarily reduce the line pressure until the discharge end has been repositioned at a higher level in the excavation.

   Ensure that waste concrete overflows the full top circumference of the casing evenly. Waste concrete is the top 24 inches of the initial concrete placed, plus the height of additional volume of waste concrete deposited in the shaft where concrete placement was halted and restarted, plus any additional amount necessary to produce full strength, non-segregated concrete at the plan shaft top level. Continue placing concrete until the waste concrete is pushed upward and ejected completely out of the top of the casing and wasted; or, place an additional 24 inches of concrete above the planned shaft top level and allow to cure in place for removal later. Remove waste concrete at the top of the shaft to maintain a uniform appearance and to meet the specified dimensions of the shaft.

Do not channel or bleed off waste concrete using notches, holes, or cuts in the casing top. The Contractor may remove or pump out plastic concrete in the casing that is above the top elevation of the drilled shaft after ejecting waste concrete to the top elevation.

10. Approval

The Engineer may reject drilled shafts because of damage; incorrect location, misalignment, or failure to install the drilled shaft to the proper bearing stratum.

Do not place sign structure on drilled shaft until the concrete in the shaft reaches a minimum of 90 percent of the required 28-day compressive strength.

(c) Erection Plan:

At least 15 days before erecting posts and trusses, submit a plan to the Engineer showing the proposed equipment to be used. Include calculations and lift points to maintain the truss assembly in plumb position during placement, detailed erection instructions and drawings of all structures, and the proposed scheme for traffic control during the erection of the posts and trusses.

The Contractor shall plan his work so that no more than one lane at a time will be closed during construction.

(d) Erecting Posts, Trusses and Tower Structures:

Straighten any deformed structural material before being laid out, punched, drilled, or otherwise worked on in the shop. The Engineer will reject structural material with sharp kinks or bends. Verify bolt alignment before erecting towers. Do not erect posts and tower shafts on the completed drilled shaft until approved by the Engineer. Install high-strength steel bolts as specified in plan.

1. Trusses

   Connect the truss abutting chord splices according to Subsection 11.5.6 of the AASHTO LRFD Bridge Construction Specifications.

   Provide 2 working platforms that allow the bolt assembly tightening from opposite sides of the structure. Provide 2 impact wrenches. Sequentially tighten by initiating and progressing the tightening of the bolts in a pattern whereby a 180-degree opposite side repetition is maintained. Sequentially tighten each bolt and nut to the same calibrated increment.

2. Posts

   Clean and lubricate threads of anchor bolts and nuts before installing post. Ensure that the top of the concrete drilled shaft is free of dirt or other foreign materials. Install the top and bottom bolt assemblies as shown on the Plans.

   After erecting the posts and tightening all nuts as outlined above, add a second nut to each anchor bolt and adjust snug tight. After installing the second nut, ensure all nuts are in a snug tight condition. Snug tight is defined as the tightness that exists when all surfaces on the joint are in firm contact with one another.

   Fully tighten anchor bolts by turning the nuts an additional 30 to 45 degrees. Progress by sequentially tightening the nuts on opposite side of the base plate (180 degrees apart).

   After installing and adjusting all nuts, pour concrete grout pad and install rodent screen if shown on Contract Drawings.

(e) Bearing Areas. Construct the tower base bearing areas of concrete pedestals, in a true and level position. Full bearing is required under bases.

(f) Compaction of any required backfill shall be in accordance with Section 202 of the Standard Specifications.

(g) All signs and miscellaneous attachments shall be installed within the same 8-hour period that the trusses are erected when existing sign is being removed.

Method of Measurement:

The number of Steel Sign Structures specified on the plans or as directed by the Engineer and constructed according to these specifications, complete in place and accepted, will not be measured for payment, but shall be paid for on a lump sum basis for each sign structure.

Basis of Payment:

The number of Steel Sign Structures and foundations, as determined above, shall be paid for at the contract lump sum price bid "Steel Sign Structure," which price and payment shall include all excavation, backfill, and backfilling in accordance with Section 207, temporary shoring, concrete, reinforcing steel, galvanized structural steel, casings, anchor bolts, bolts, washers, nuts, and all labor, materials, equipment and incidentals necessary to construct the sign structure and foundation.

NOTE:

A breakout sheet attached to the Proposal list the Steel Sign Structures under this item. The Contractor shall fill in a unit price for each item and the cost (unit price times the proposed quantity). The lump sum bid for Item 605664 - Steel Sign Structure shall be the sum of the cost for all items listed. The breakout sheet shall be attached to the Bid Proposal. Failure to submit the breakout sheet with the Bid Proposal will result in the Bid Proposal being declared non-responsive and rejected.

The Department reserves the right to delete from the Contract one or more of the items listed and right to add or subtract from the quantity of each item. The lump sum to be paid will be adjusted in accordance with the Contractor's unit prices as required above. There will be no extra compensation if such additions and/or deletions are made.

11/17/14

606503 - STEEL HAND RAILING

Description:

This work consists of furnishing and installing galvanized steel handrail at Retaining Wall 2 as detailed on the Construction Plans. It includes furnishing and installing all required connectors and hardware.

Materials:

The steel hand railing elements shall conform to ASTM designation A-36.

The grout for the post connections to the concrete walkway shall be the non-shrink, non-metallic type. The grout shall be either Super Por-Rok Grout manufactured by Minwax, Construction Products Division (15 Mercedes Ave., Montvale, N.J. 07645 tel. no. 201-391-0253) or Sure-Grip Utility Grout manufactured by Dayton Superior Corp.(Phila., PA tel. No. 215-532-7786) or an approved equal.

The railing shall be galvanized in accordance with AASHTO M 123.

Construction Methods:

Submit shop drawings for approval prior to fabrication of the hand railing. Prior to placing concrete, install 4 inch PVC sleeves in the concrete walkway for later placement of the handrail posts. Grout the handrail posts into position following curing of the walkway concrete and complete the handrail installation. The railing must be in place prior to opening the walkway to pedestrian traffic.

Method of Measurement:

The quantity of steel handrail will be measured as the number of linear feet of steel handrail installed and accepted.

Basis of Payment:

The quantity of steel handrail will be paid for at the Contract unit price per linear foot. Price and payment shall constitute full compensation for furnishing and installing all handrail materials, PVC sleeves, and grout as detailed on the plans and in this specification; and as necessary to complete the item.

1/8/15

612520 - CORRUGATED POLYETHYLENE PIPE, TYPE S, 15"
612522 - CORRUGATED POLYETHYLENE PIPE, TYPE S, 12"
612523 - CORRUGATED POLYETHYLENE PIPE, TYPE S, 18"
612524 - CORRUGATED POLYETHYLENE PIPE, TYPE S, 24"
612525 - CORRUGATED POLYETHYLENE PIPE, TYPE S, 30"
612526 - CORRUGATED POLYETHYLENE PIPE, TYPE S, 36"
612530 - CORRUGATED POLYETHYLENE PIPE, TYPE S OR D, 42"
612531 - CORRUGATED POLYETHYLENE PIPE, TYPE S OR D, 48"
612534 - CORRUGATED POLYETHYLENE PIPE, TYPE S, 8"
612544 - CORRUGATED POLYETHYLENE PIPE, TYPE S, 60"

Description:

This work consists of furnishing and installing corrugated polyethylene pipe with a smooth interior in a reasonably close conformity with lines and grades indicated on the Plans, and as directed by the Engineer.

Materials:

Pipes, couplings and fittings shall be made of polyethylene compounds, and shall meet all applicable requirements of AASHTO M294 current edition Type S or Type D for pipe sizes 12" (300 mm) and larger. Polyethylene pipes, couplings and fittings less than 12" (300 mm) in diameter shall meet the requirements of AASHTO M252 current edition. The pipes and fittings shall be free of foreign inclusions and visible defects and pipe shall be cut squarely and cleanly so as to not adversely affect joining or connecting. Visible defects such as cracks, creases, unpigmented or nonuniformly pigmented pipe are not permissible in the pipe as furnished.

Joints for all pipe and fittings shall use gasketed watertight bell/spigot or bell/bell couplers. The gaskets shall meet the requirements of ASTM F477 and the joint system shall be certified to meet a 10.8 psi (74 kPa) laboratory test per ASTM D3212. In addition, the joint system shall provide sufficient longitudinal strength to preserve pipe alignment and prevent separation at the joint.

The Contractor shall provide a manufacturer's certificate signed by the manufacturer's representative stating the product was manufactured, tested and supplied in accordance with all the applicable requirements of AASHTO M-294 (or ASSHTO M252 as applicable), ASTM F477 and ASTM D3212. The manufacturer shall verify compliance with AASHTO M294 through the National Transportation Product Evaluation Program.

Construction Methods:

General. The pipe shall be installed per the notes and details shown on the plans and in accordance with the requirements of ASTM D2321 or the manufactures published guidelines whichever is more stringent. The manufactures representative must be present at the beginning of the installation unless the engineer is confident in the contractors work. Having a representative on the site or not does not dismiss the contractor's liability.

Excavation. The trench in which the pipe is laid shall be excavated in accordance with Section 208 and The Standard Construction Details to the required depth. The width of the trench shall provide a minimum clearance of 18" (450 mm) between the trench wall and the O.D. of the pipe. If flowable fill is used, trench width shall provide 6" (150 mm) between the trench wall and O.D. of the pipe. Floating of pipe must be controlled. When multiple pipes are place side by side, a minimum of 18" (450 mm) shall be allowed between pipes or 6" (150 mm) if flowable fill is used.

Minimum cover for pipe under pavement, including local roads, subdivision roads and non-residential driveways, shall be 1' measured from the top of pipe to bottom of pavement. The minimum cover for pipe under the travel way of roads with higher classifications shall be 2' measured from the top of pipe to the bottom of pavement. Otherwise, the cover shall be 1' measured from the top of pipe to top of grade unless otherwise recommended by the manufacturer to prevent pipe flotation.

Bedding of Pipe. Unless noted otherwise, all pipes shall be placed on Class C bedding as shown on The Standard Construction Details. The outside thirds of the bedding material shall be compacted. The areas around the joints shall be hand excavated to accommodate the bell when the outside diameter if the bell is greater than the pipe.

Joints. The spigot of the pipe shall be fully inserted into the bell to ensure a tight joint.

Laying Pipe. All pipe shall be laid in an upgrade direction unless otherwise directed. The pipe shall be laid with the lowest point of the inside diameter conforming to the flow line shown on the Plans. All pipe shall be carefully laid with the bell ends upgrade, with the spigot ends fully entered into the adjoining bell, and true to the lines and grades shown on the Plans, or as directed. Any pipe which is not in true alignment, or which shows any settlement after laying, shall be taken up and re-laid. Unsuitable material encountered below the flow line of the pipe shall be removed to a depth and replaced, as directed.

Backfill. Placement of backfill shall conform to Section 208 except as follows:

The initial backfill lift shall not exceed 12" (300 mm) of loose material or be higher than the spring line of the pipe. The material shall be sliced into the haunches of the pipe using a shovel. A maximum of 8" (200 mm) of loose material shall be placed for each remaining lift. Caution shall be taken not to hit the pipe with any mechanical compaction equipment. Caution shall also be taken not to disturb the pipes alignment.

Where heavy construction equipment is expected to travel over the shallow buried pipe the pipe shall be protected by temporarily placing a cover of material as recommended by the manufacturer.

Method of Measurement:

The quantity of polyethylene pipe will be measured as the actual number of linear feet (linear meters) of each type of pipe placed and accepted, measured from end to end of pipe, including structure wall thickness, but excluding structure interior.

Basis of Payment:

The quantity of polyethylene pipe will be paid for at the Contract unit price per linear foot (linear meter) for each type of pipe. Price and payment will constitute full compensation for furnishing, hauling, and installing pipe; for excavation and backfill, for furnishing and placing Type C Borrow, (#57 stone may be substituted under roadway), for all cribbing or foundation treatment (Class C bedding) necessary to prevent settlement; for all shoring and sheeting; for the replacement of any pipe which is not true in alignment or which shows any settlement after laying; for verifying and correcting deflection, for protection of shallow buried pipe and for all material, labor, equipment, tools, and incidentals required to complete the work. Payment for excavation and replacement of unsuitable material encountered below the Class C bedding will be provided for under Section 208.

For round pipe under 24" (600 mm) nominal inside diameter, the excavation (excluding rock), backfill, and backfilling will be included in the price for this work. For pipe of nominal inside diameter or horizontal dimension of 24" (600 mm) and over, payment for excavation and backfill will be in accordance with Section 208. Furnishing of Borrow Type C for pipe of nominal inside diameter or horizontal dimension of 24" (600 mm) and over, will be paid for under Section 210.

Payment for excavation and replacement of unsuitable material encountered below the flow line of pipe will be provided for under Section 208.

3/1/13

614747 - BORE 16" STEEL PIPE CASING
614818 - BORE 24" STEEL PIPE CASING
614906 – PLACE 16" STEEL PIPE CASING
614907 – PLACE 24" STEEL PIPE CASING

Description:

This work consists of furnishing and installing steel casing pipes by boring or open cutting as shown on the plans. All the work shall be in accordance with this special provision and in reasonably close conformity with the limits, dimensions, lines and grades shown on the Plans or established by the Engineer.

The pipe joints shall have 30 percent beveled ends suitable for welding in the field. Joints shall be welded in accordance with the requirements of AWWA C-206.

Any requirements included in the Technical Specifications that are not addressed on the plans or by these Special Provisions, shall be performed in accordance with the applicable sections of the Technical Specifications. The Contractor is advised to obtain and be fully acquainted with the applicable specifications of the Owner.

The Owner of the sewer line on this project is the Kent County, Delaware, Department of Public Works and the Technical Specifications are titled, "Department of Public Works, Kent County Delaware, Pump Station 8 Replacement and Relocation, Technical Specification, August 2012" and are included in this contract as Appendix A to the Special Provisions.

Specifications:

DelDOT Standard Specification Sections 208.04, 209.04, 812.02, 812.03 (Class B)

Kent County Standard Detail Sheet SS-19

Contract Drawings

These Special Provisions

Materials:

Steel Pipe

Pipe shall meet the requirements of ASTM Specification A 139 for Grade B steel and shall have a minimum wall thickness of 3/8" for pipes of 30" diameter and less. Pipe sizes larger than 30" shall have a minimum wall thickness of ½". Used pipe or out of round pipe is not acceptable. Pipe shall conform to AWWA C-200 and shall include 2 coats (10 mil each) of bitumastic coal tar epoxy inside and out. Bitumastic coal tar epoxy shall be 300M as manufactured by Kop Coat, Tnemec, or equal. After welding or cutting the pipe, the welded and/or cut end shall be recoated with bituminous material to the satisfaction of the Engineer. The Contractor shall provide the Engineer with a letter of compliance or corporate certificate verifying that the steel pipe provided complies with these specifications.

The pipe being encased shall be supported, as shown on the Kent County Public Works Casing Detail (sheet SS-19). Space between the casing pipe and the pipe being encased shall be closed with 12" thick Class B concrete (as specified in Section 812.03 of the Delaware Standard Specifications) at each end of the casing pipe.

As shown on the Plans or as directed by the Engineer, a galvanized steel pipe of 1" diameter shall be installed through the concrete seal at the bottom of the down grade end of the casing pipe for draining entrapped water.

Borrow for Backfill

Borrow Type C for backfilling shall conform to the requirements of Section 209.04 of the DelDOT Standard Specifications.

Construction Methods:

Where boring and jacking of steel pipe is required, work shall be done as follows:

A. An entrance pit shall be excavated to provide a jacking face of at least 3 feet or more above the pipe. This open face shall be shored securely to prevent slipping or raveling of the face.

B. Casing pipe holes shall be mechanically bored through the soil by a cutting head on a continuous auger mounted inside the pipe. The auger shall extend a minimum distance beyond the end of the casing pipe to preclude formation of voids outside of the pipe shell. The auger and cutting head arrangement shall be removable from within the pipe in the event an obstruction is encountered. The over-cut by the cutting head shall not exceed the outside diameter of the pipe by more than ½".

C. The casing pipe shall be adequately protected to prevent crushing or other damage under jacking pressures. Backstops shall be provided for adequately distributing the jack thrust without causing deformation of the soil or other damage. Should the casing pipe be damaged, such damaged portion, if not in the hole, shall be replaced; however, if inserted, the encasement pipe shall be abandoned in place, suitably plugged, and an alternate installation made, as directed by the Engineer, and at the Contractor's expense.

D. Required boring entrance and exit pits or shafts shall be excavated and maintained to dimensions as small as practical and/or as shown on the Plans. Said excavations shall be adequately barricaded, sheeted, braced and dewatered, as required, in accordance with the applicable OSHA Standards.

E. The boring and jacking operations shall be done simultaneously, with continuous installation, until the casing pipe is in final position. Correct line and grade shall be carefully maintained. Add-on sections of casing pipe shall be full-circumference welded to the preceding length, developing water-tight total pipe strength joints. The casing installation shall produce no upheaval, settlement, cracking, movement or distortion of the soil and any features above the casing.

F. Plans and description of the arrangement to be used shall be submitted to the Engineer for approval and no work shall proceed until such approval is obtained.

G. Bored and jacked installations shall have a bored hole essentially the same as the outside diameter of the pipe. If voids should develop or if the bored hole diameter is greater than the outside diameter of the pipe by more than approximately 1", grouting or other methods approved by the Engineer shall be employed to fill such voids.

Pressure grouting of the soils, or freezing of the soils before jacking, boring, or tunneling may be required at the direction of the Engineer to stabilize the soils, control water, prevent loss of material and prevent settlement or displacement of embankment. Grout shall be cement, chemical or other special injection material selected to accomplish the necessary stabilization.

The materials to be used and the method of injection shall be prepared by a Registered Professional Soils Engineer or by an experienced and qualified company specializing in this work and submitted for approval to the Engineer before the start of work. Proof of experience and competency shall accompany the submission.

H. When water is known or expected to be encountered, pumps of sufficient capacity to handle the flow shall be maintained at the site. They shall be a constantly attended operation on a 24-hour basis until, in the judgment of the Engineer, their operation can be safely halted. When dewatering, close observation shall be maintained to detect any settlement or displacement of features above the casing.

I. Although not anticipated, blasting will be permitted as directed. If rock is encountered, the work shall be performed in accordance with DelDOT Standard Specification Section 206. Payment will be negotiated.

J. At all times when the work is being progressed, a field supervisor for the work with no less than 12 months of experience in the operation of the equipment being used shall be present. The name and applicable experience shall be submitted to the Engineer for approval prior to beginning the work. If boring, drilling, or similar machines are being used, the machine operator also shall have no less than 12 months experience in the operation of the equipment being used.

Lengths of steel casing pipe shall be jointed together with a full-circumference weld in accordance with that required in ANSI/AWS D 1.1 for full penetration welds.

The Contractor shall inspect the location where the pipe is to be installed and familiarize himself/herself with the conditions under which the work will be performed and with all necessary detail as to the orderly prosecution of the work. The omission of any details for the satisfactory installation of the work in its entirety shall not relieve the Contractor of full responsibility.

Testing of the casing pipe shall be done before carrier pipes are placed within the casing according to the following procedure.

A. General: The Contractor shall furnish all labor, tools, materials and equipment including mirrors, flashlights, or other artificial lighting, subject to the approval of the Engineer.

B. Mirror Testing: Upon completion of jacking and pipe laying of the casing pipe, the Engineer will conduct a mirror test to check for defects, and for horizontal or vertical misalignment. Mirror testing shall consist of reflecting sunlight or artificial light via mirrors through the completed section of pipe line which, in order to be accepted, shall be true and straight in horizontal and vertical alignment to allow for the full passage of the reflected light.

C. Upon completion of jacking and pipe laying of the casing pipe, the Contractor shall pull a 6' long mandrel, approximately ½" less in diameter than the inside of the casing, through the entire casing.

Where steel casing pipe is installed by open-cut methods, work shall be done as follows:

A. Install sheeting, shoring, or have an approved trench box on-site to meet OSHA requirements.

B. Excavate the required trench to a width of at least 12 inches outside the casing pipe diameter on either side.

C. When water is known or expected to be encountered, pumps of sufficient capacity to handle the flow shall be maintained at the site. They shall be a constantly attended operation on a 24-hour basis until, in the judgment of the Engineer, their operation can be safely halted.

D. Place the casing pipe to the designed line and grade.

E. Backfill the trench using material meeting DelDOT Standard Specifications for Type C borrow, or existing material meeting Type C borrow, up to the bottom of patching materials under existing and proposed roadways and shoulders in accordance with DelDOT Standard Specification Section 208.04. In areas outside of the roadway or proposed roadway including shoulders, Type C material shall be placed at least one foot above the top of the sewer line. Excavated material may be used for backfill above the Type C borrow in areas outside of roadway and shoulders provided it is dry and free of organic material.

F. Although not anticipated, blasting will be permitted as directed. If rock is encountered, the work shall be performed in accordance with DelDOT Standard Specification Section 206. Payment will be negotiated.

Method of Measurement:

The quantity of steel pipe casing installed by boring (Items 614747 and 614818) will be measured as the actual number of linear feet of each size of casing pipe placed and accepted measured horizontally along the centerline of pipe from end to end installed and accepted.

The quantity of steel pipe casing installed by open-cut methods (Items 614906 and 614907) will be measured as the actual number of linear feet of each size of pipe placed and accepted measured horizontally along the centerline of pipe from end to end installed and accepted.

Basis of Payment:

The quantity of steel pipe casing installed by boring will be paid for at the Contract unit price per linear foot for each size of bored casing pipe (Items 614747 and 614818). Price and payment will constitute full compensation for entrance and exit pit excavation and backfill including Type C Borrow if necessary; the storage and rehandling of excavation, disposal of all excess excavation; pumping or other disposal or control of water; the furnishing and placing of sheeting and bracing as needed, temporary support of existing Utilities as needed, the furnishing and placing of bituminous coated steel pipe, including visual and mandrel testing, the filling of voids, concrete plugs and drainage tubes, welding, furnishing and placing spacers and supports for the carrier pipe, and the furnishing of all labor, tools, materials, apparatus, equipment and related work necessary to complete the work as shown, specified and directed. Any required and approved roadway patching will be paid for using the applicable roadway/patching pay items.

The quantity of steel pipe casing installed by open-cut methods (Items 614906 and 614907) will be paid for at the Contract unit price per linear foot for each size of pipe. Price and payment shall constitute full compensation for all cribbing, shoring and sheeting, excavation, backfilling, Type C Borrow Backfill if required, stone bedding if required due to ground water, support of existing Utilities if needed, welding, concrete plugs and drainage tubes, dewatering, furnishing and placing spacers and supports for the carrier pipe, disposal of any excess soil or material, for furnishing and installing bituminous coated steel casing pipe, and the furnishing of all labor, tools, materials, equipment and incidentals necessary to complete the work. Any required and approved roadway patching above the borrow backfill will be paid for using the applicable roadway/patching pay items.

Concrete barrier or other devices to protect the excavation areas shall be paid for separately under their respective bid items.

11/17/14

617509 - CORRUGATED POLYETHYLENE FLARED END SECTION, 12"
617510 - CORRUGATED POLYETHYLENE FLARED END SECTION, 15"
617511 - CORRUGATED POLYETHYLENE FLARED END SECTION, 18"
617512 - CORRUGATED POLYETHYLENE FLARED END SECTION, 24"
617513 - CORRUGATED POLYETHYLENE FLARED END SECTION, 30"
617514 - CORRUGATED POLYETHYLENE FLARED END SECTION, 36"

Description:

The item(s) shall consist of furnishing and installing corrugated polyethylene flared end section in conformance with the locations, notes on the plans and as directed by the Engineer.

Materials and Construction Methods:

The flared end section shall be made of polyethylene compounds conforming to the requirements of AASHTO M294-90.

The flared end Section shall be attached to the end of the polyethylene pipe in accordance with the recommendations of the manufacturer's.

Basis of Payment:

The payment for the item(s) shall be made for at the contract unit price bid per Each for the item "Corrugated Polyethylene Flared End Section" of the diameter required by the contract, which price and payment shall constitute full compensation for furnishing and installing all materials, hauling, excavation and backfill, for cribbing, shoring, sheeting, for all labor, tools, equipment and necessary incidents to complete the work.

4/7/04

619519 - DYNAMIC PILE TESTING BY CONTRACTOR

Description:

This item shall consist of furnishing all materials, equipment, access, and qualified personnel necessary to perform all high-strain dynamic testing and monitoring of driven piles at the locations designated on the Plans or as directed by the Engineer. The work shall also include analysis and report preparation in accordance with this Special Provision.

Note: This Special Provision replaces Special Provision 619500 - Dynamic Pile Testing By DelDOT.

Materials and Construction Methods:

All equipment, testing and reporting procedures shall be provided and performed in strict accordance with ASTM D4945 - *Standard Test Method for High-Strain Dynamic Testing of Piles*.

The Contractor shall engage the services of a specialty subcontractor experienced in high-strain dynamic monitoring of driven piles to perform dynamic testing and to evaluate and report results to the Department. The specialty subcontractor shall have at least five (5) years of documented experience in the performance and interpretation of dynamic pile testing. The subcontractor's field engineer or technician, who will be operating the instrumentation and collecting the data, shall have documented experience on at least ten (10) prior projects with similar pile requirements. The field engineer or technician responsible for operating the instrumentation shall be fully capable of understanding and interpreting the data being collected during driving. The specialty subcontractor for dynamic testing shall be selected by the Contractor and submitted for approval by the Engineer a minimum of 10 working days prior to the work beginning. Approval will be based on qualifications and applicable previous experience on other projects.

The Contractor shall provide DelDOT reasonable inspection access along the full length and circumference of all piles prepared for instrumentation attachment prior to the piles being lifted and located in the leads.

Dynamic monitoring instrumentation, including all gages and cables, shall not be installed on the pile until the pile has been lifted and aligned in the leads and the hammer and helmet have been properly set.

Anticipated pile splices shall be made prior to the start of driving so that no splices will be required during the dynamic testing.

The specialty subcontractor shall perform dynamic testing during the entire initial drive and restrike of all piles so designated on the Plans or as otherwise directed by the Engineer. The dynamic testing firm shall continuously monitor the tensile and compressive stresses during driving to ensure that the permissible stress limits provided by the Engineer are not exceeded during driving. Should the driving operation result in stresses that approach or exceed the permissible limits, the dynamic testing firm's equipment operator shall immediately have the hammer stroke reduced or the driving operation stopped in order to prevent pile damage. If non-axial driving is indicated by dynamic test measurements, pile driving shall be stopped immediately and the Contractor shall realign the driving system or take other corrective action, as necessary, before resuming driving.

If the top of pile is damaged or becomes deformed at any time during the dynamic testing of the piles, pile driving shall be stopped and the damaged area cut off in accordance with Section 619 of the Standard Specifications. The remaining pile section shall be properly prepared for gauge installation and inspected by the Department prior to the continuation of driving.

All dynamically tested piles shall be driven to an adequate depth to achieve the minimum tip elevation and the minimum initial driving resistance specified by the Engineer. Should the field data indicate the hammer system is not transferring to the pile the full energy anticipated at the end of initial drive, the Contractor shall increase the hammer stroke and/or driving resistance until the minimum initial drive capacity is displayed on the dynamic testing apparatus. However, in no case, shall the permissible stress limits be exceeded.

The Contractor shall maintain a minimum distance of 1 foot (300 mm) between the pile monitoring gages and the ground surface, water surface, or pile template. If additional ground penetration is required, the driving shall be halted, the gages removed and the pile spliced before proceeding with additional driving and monitoring. Prior to splicing, the pile splice segment shall be properly prepared for gage installation in accordance with ASTM D4945 and made accessible to DelDOT for inspection. After the pile has been properly spliced and the hammer and leads have been reset, the gages shall be reattached to the new pile segment and the drive continued.

Restriking of all test piles, and certain production piles selected by the Engineer, shall be dynamically tested by the Contractor. The Contractor shall wait up to five (5) calendar days after the completion of initial driving before dynamically testing the restrike of any given pile, unless otherwise specified on the Plans or as directed by the Engineer.

Prior to restrike, the Contractor shall mark the pile in 1 (25 mm) increments for more accurate measurement of pile movement during restrike. The Department may elect to monitor the pile movement more precisely by utilizing a survey level. In such cases, the Contractor shall not proceed with the restrike prior to the Department obtaining its requested survey data. The maximum total number of hammer blows required during restrike will be 30 or the maximum total penetration will be 6 (150 mm), whichever occurs first.

All restrikes shall be performed using the same pile hammer, helmet, and compressed cushion material used to install the piles during initial driving. The pile hammer shall be fully warmed up and operated at full stroke, or as otherwise specified by the Engineer, during the pile restrike. The warm-up procedure shall consist of a minimum of 20 blows of the hammer at full stroke at locations other than the piles to be restruck.

If for any reason, the pile hammer malfunctions, the helmet fails, the cushioning materials fail, or any other component of the pile driving system does not function properly during the pile restrike, the Contractor shall wait up to five (5) calendar days and perform additional restrikes at no additional cost to the Department until the pile driving system operates properly through a complete continuous restrike procedure.

Reporting

The Dynamic Testing Consultant shall prepare a written report presenting the results of the test pile program in accordance with the requirements of ASTM D4945 including specific discussion of the pile capacity obtained from the dynamic testing, the performance of the hammer and driving system, driving stress levels, and pile integrity. The following data shall also be provided in the report for the full length of driving at intervals of not more than 10 hammer blows: bearing capacity from the Case Goble method, bearing capacity from at least one additional recognized method, input and reflection values of force and velocity, maximum transferred energy, maximum compressive stress, maximum tensile stress, blows per minute, values of upward and downward traveling force wave, ram stroke, pile penetration depth and corresponding blow sequence.

CAPWAP analyses shall be performed for all initial drives and restrikes of dynamically tested piles. A minimum of one (1) CAPWAP analysis shall be performed for a representative blow near the end of each initial drive and a minimum of two (2) representative blows shall be analyzed towards the beginning of the restrike. The Engineer may request, at no additional cost, an average of one additional CAPWAP analysis per initial drive or restrike at selected pile penetration depths.

Within three (3) working days of the completion of each dynamic test, the Contractor's specialty subcontractor shall submit to the Department a report meeting the requirements of this Special Provision that is signed and sealed by a Professional Engineer licensed in the State of Delaware. In addition to the raw data and ASTM D4945 requirements, the report shall include detailed results of the CAPWAP analyses including, but not limited to, all extrema tables; pile profile and pile model tables; simulated load test curves for the tip and top of the pile; the soil parameters used in the analysis by matching the measured and computed values of forces, velocities, and displacements; and static resistance distribution along the length of the pile, in a format approved by the Engineer.

All raw data and computer analyses shall be made available in electronic format to the Department for additional analysis.

The Engineer shall furnish to the Contractor production pile driving criteria and recommended pile order lengths within three (3) working days of receiving complete and acceptable high-strain dynamic testing reports for all associated test piles within the subject pile group.

Method of Measurement:

The quantity of Dynamic Pile Testing By Contractor will be measured and paid on an Each basis upon receipt and acceptance of the associated dynamic testing report(s). Each initial drive and each restrike dynamically monitored by the Contractor shall be measured as separate units. In other words, one pile dynamically monitored during initial drive and restrike shall be measured as a quantity of two (2) Each.

Basis of Payment:

Payment for Dynamic Pile Testing By Contractor authorized and found acceptable by the Engineer will be made at the Contract unit price per Each for Item 619519. Price and Payment will constitute full compensation for furnishing tools, labor, specialty subcontractor, materials, equipment, analyses, reports, and incidental work required to perform high-strain dynamic pile testing during initial driving and restrikes including providing inspection access to the Department.

10/22/07

622500 - TEMPORARY STEEL SHEET PILES, (UNPROTECTED)

Description:

The item shall consist of furnishing, driving, and removing the steel sheet piles in reasonably close conformity and in accordance with the locations, details on Plans and/or as directed by the Engineer.

Materials and Construction Methods:

The materials and construction methods for this work should conform to all the applicable requirements of Section 622 Steel Sheet Piles, except the sheet piles shall not be coated, and shall become the property of the Contractor after removal from the locations. Other steel sheet piles, after obtaining approval from the Engineer shall be used if required, at the unit-price bid of this item.

Method of Measurement:

The number of square feet of Temporary Steel Sheet piles, (Unprotected) to be paid for under this item shall be the actual number of square feet of steel sheet piles complete in place and accepted, computed from field measurement. Horizontal measurements of the completed installation shall be taken on a straight line between interlocks (the nominal or published width), and not around the perimeter of the sheet pile units.

Basis of Payment:

The payment for this item shall be made for at the contract unit-price bid per Square Foot for "Temporary Steel Sheet Piles, (Unprotected)", which price and payment shall constitute full compensation for furnishing, driving, removing, disposing of, for all labor, tools, equipment, and incidentals required to complete this item.

708512 - DRAINAGE INLET, SPECIAL I
708513 - DRAINAGE INLET, SPECIAL II
708514 - DRAINAGE INLET, SPECIAL III
708515 - DRAINAGE INLET, SPECIAL IV
708516 - DRAINAGE INLET, SPECIAL V
708517 - DRAINAGE INLET, SPECIAL VI
708518 - DRAINAGE INLET, SPECIAL VII

Description:

This work consists of furnishing all materials and constructing special drainage inlets (catch basins) in accordance with locations, notes, details on Plans, applicable DelDOT Standard Construction details and as directed by the Engineer.

Materials and Construction Methods:

Materials and construction methods for special drainage inlets shall conform to the applicable requirements of Section 708 of the Standard Specifications, Standard Construction Details, and notes with details on the Plans.

Cover slabs with integral frames and grates for Drainage Inlets, Special III, IV, V, and VI are detailed on the plans. Inlet boxes for these units shall be constructed in accordance with DelDOT Standard Construction Detail sheet D-4. Frames and grates shall be provided as detailed on Standard Construction Detail sheet D-5-2.

Material and fabrication details for Drainage Inlet, Special VII are included in the Construction Details section of the plans.

Method of Measurement and Basis of Payment:

Measurement and payment for the special drainage inlets shall be made in accordance with the Subsections 708.15 and 708.16 of the Standard Specifications.

1/8/15

708563 - PERSONAL GRATE FOR PIPE INLET

Description:

This work consists of furnishing all materials, fabricating, delivering and constructing personal grates for pipe inlets as shown on the details on the Plans, as directed by the Engineer and as required by these Special Provisions.

Materials:

Materials shall conform to the requirements of Sections 603 and 612 and shall be galvanized in accordance with Subsection 826.07 including all rebar, hardware and fasteners as shown on the Plans.

Working drawings shall be submitted in accordance with Subsection 105.04.

Construction Methods:

Personal grates for pipe inlets shall be constructed based on the details shown on the Plans and at the size and locations shown on the Plans.

Method of Measurement:

The quantity of personal grate for pipe inlet will not be measured.

Basis of Payment:

The quantity of personal grate for pipe inlet will be paid for at the Contract unit price lump sum. Price and payment will constitute full compensation for furnishing, hauling and installing materials, including bar reinforcement; lock, for excavating including removal and disposal of existing end sections, backfilling, and compacting; for cribbing, shoring, sheeting, coating, and paving; and for all labor, materials, equipment, tools, and incidentals required to complete the work. Design services for the personal grate for pipe inlet including the preparation and submittal of working drawings shall be incidental to this item.

Note:

The breakout sheet attached to the Bid Proposal shows all personnel grate for pipe inlets proposed for this Contract. The Contractor shall fill in the per each unit price and the cost (unit price times the proposed quantity) for each size listed. The lump sum price bid for item 708563-Personal Grate for Pipe Inlet shall be in the sum of the total cost for all sizes listed. The completed breakout sheet shall be attached to the Bid Proposal. Failure to submit the breakout sheet will result in the Bid Proposal as being declared non-responsive and rejected.

The Department reserves the right to delete from the Contract the furnishing and installing of one or more of the sizes listed and the right to add or subtract from the quantity of each size listed. The lump sum to be paid will be adjusted in accordance with the Contractor's unit prices as required above. There will be no extra compensation to the Contractor if such additions and/or deletions are made.

6/11/2013

708577 - SANITARY MANHOLE, SPECIAL I

Description:

This work consists of furnishing materials and constructing a 48 inch precast concrete Sanitary Sewer Manhole specified as a 48" Precast Manhole, Type A-2 on Kent County Standard Detail Sheet SS-07, and as directed by the Engineer. It includes connecting to new and/or existing pipe(s), precast concrete masonry, manhole frame and lid, all in conformity with the notes and details on the plans, the Kent County Standard Details, and these Special Provisions.

The Contractor is responsible for assuring that the manhole will fit the field conditions encountered. No additional compensation will be considered to correct openings in the manhole that were not properly cast in the shop.

Any requirements included in the Technical Specifications that are not addressed on the plans or by these Special Provisions, shall be performed in accordance with the applicable sections of the Technical Specifications. The Contractor is advised to obtain and be fully acquainted with the applicable specifications of the Owner.

The Owner of the sewer line on this project is the Kent County, Delaware, Department of Public Works and the Technical Specifications are titled, "Department of Public Works, Kent County Delaware, Pump Station 8 Replacement and Relocation, Technical Specification, August 2012" and are included in this contract as Appendix A to the Special Provisions.

Specifications:

DelDOT Standard Specification Sections 209.04, 708.08, 708.14

Technical Specification Section 02530

Kent County Standard Detail Sheets SS-07 and SS-15

Contract Drawings

These Special Provisions

Materials and Construction Methods:

Precast Manhole materials shall conform to the notes and details on Kent County Standard Detail sheet SS-07 and to the Technical Specifications. Shop drawings, including proposed concrete mix design, pipe openings, and reinforcing details, shall be submitted to the Engineer for review and approval prior to fabricating the manholes.

Castings and Manhole Covers shall conform to the notes and details on Kent County Standard Detail sheet SS-15.

Non-shrink grout shall conform to ASTM C1107.

Manholes shall be tested as described in the plan notes.

Borrow Type C for backfilling shall conform to the requirements of Section 209.04 of the DelDOT Standard Specifications.

Excavation and Backfilling for manhole installation shall conform to Sections 708.08 and 708.14 of the DelDOT Standard Specifications.

Sheeting, shoring, or an approved steel trench box shall be installed, if needed, to meet all applicable OSHA requirements.

Method of Measurement:

The quantity of special 48 inch precast concrete manholes will be measured as the actual number of manholes constructed, complete in place and accepted.

Basis of Payment:

The quantity of special 48 inch precast concrete sanitary manholes (Sanitary Manhole, Special I) will be paid for at the Contract unit price per each. Price and payment will constitute full compensation for furnishing and placing materials, including cast-in place concrete, precast concrete sections, watertight joint material, bar reinforcement, removal of portions of existing pipe, frame and grate and/or cover, stone bedding, brick, mortar, grout, exterior coating, interior lining, steps, inserts, channels, watertight pipe penetration seals, and for all labor, equipment, tools, and incidentals necessary to complete this item. Also included in the price per each manhole is the excavation, sheeting or shoring if required to meet OSHA requirements, backfilling, Type C Backfill if necessary, shop drawing preparation, work to tie-in any existing or installed pipes, disposal of any excess excavation, and testing.

11/17/14

708578 - SANITARY MANHOLE, SPECIAL II

Description:

This work consists of furnishing materials and constructing a 48 inch Force Main Combination Sewage Air Release / Vacuum Relief Valve and Manhole as shown on Kent County Standard Detail Sheets PS-07 and PS-07B, and as directed by the Engineer. It includes precast concrete sections, air release/vacuum relief valve assembly, manhole frame and lid, all in conformity with the notes and details on the plans, the Kent County Standard Details, and these Special Provisions.

The Contractor is responsible for assuring that the manhole will fit the field conditions encountered. No additional compensation will be considered to correct openings in the manhole that were not properly cast in the shop.

Any requirements included in the Technical Specifications that are not addressed on the plans or by these Special Provisions, shall be performed in accordance with the applicable sections of the Technical Specifications. The Contractor is advised to obtain and be fully acquainted with the applicable specifications of the Owner.

The Owner of the sewer line on this project is the Kent County, Delaware, Department of Public Works and the Technical Specifications are titled, "Department of Public Works, Kent County Delaware, Pump Station 8 Replacement and Relocation, Technical Specification, August 2012" and are included in this contract as Appendix A to the Special Provisions.

Specifications:

DelDOT Standard Specification Sections 209.04, 708.08, 708.14

Technical Specification Section 02530

Kent County Standard Detail Sheets PS-07, PS-07B, and SS-15

Contract Drawings

These Special Provisions

Materials and Construction Methods:

Precast Air Release Manhole materials shall conform to the notes and details on Kent County Standard Detail sheets PS-07 and PS-07B and to the Technical Specifications. Shop drawings, including proposed mix design, pipe openings, and reinforcing details, shall be submitted to the Engineer for review and approval prior to fabricating the manholes.

Castings and Manhole Covers shall conform to the notes and details on Kent County Standard Detail sheet SS-15.

Manholes shall be tested as described in the plan notes.

Borrow Type C for backfilling shall conform to the requirements of Section 209.04 of the DelDOT Standard Specifications.

Excavation and Backfilling for manhole installation shall conform to Sections 708.08 and 708.14 of the DelDOT Standard Specifications.

Sheeting, shoring, or an approved steel trench box shall be installed, if needed, to meet all applicable OSHA requirements.

Method of Measurement:

The quantity of Sanitary Manhole, Special II will be measured as the actual number of 48 inch Force Main Combination Air Release / Vacuum Relief Valve Manholes constructed, complete in place and accepted.

Basis of Payment:

The quantity of 48 inch Force Main Combination Air Release / Vacuum Relief Manholes (Sanitary Manholes, Special II) will be paid for at the Contract unit price per each. Price and payment will constitute full compensation for furnishing and placing materials, including cast-in-place concrete, precast concrete sections, watertight joint material, bar reinforcement, removal of portions of existing pipe, frame and grate and/or cover, stone bedding, concrete block supports, mortar, grout, exterior coating, interior lining, pipe with Tapping Tee, air release valve/vacuum relief valve assembly, stainless steel hardware, steps, inserts, watertight pipe penetration seals, and for all labor, equipment, tools, and incidentals necessary to complete this item. Also included in the price per each manhole is the excavation, sheeting or shoring if required to meet OSHA requirements, backfilling, Type C Backfill if necessary, shop drawing preparation, work to tie-in any existing or installed pipes, disposal of any excess excavation, and testing.

11/17/14

708582 - MANHOLE, SPECIAL

Description:

This work consists of furnishing all materials and constructing a special manhole in accordance with locations, notes, details on Plans, applicable DelDOT Standard Construction details, and as directed by the Engineer.

Materials and Construction Methods:

Materials and construction methods for the special manhole shall conform to the applicable requirements of Section 708 of the Standard Specifications, Standard Construction Details, and notes with details on the Plans.

A cover slab with an integral frame and manhole lid is detailed on the plans. The box structure for this unit shall be constructed in accordance with DelDOT Standard Construction Detail sheet D-4. A frame and lid shall be provided meeting the Standard Construction Details of sheet D-6-3.

Method of Measurement and Basis of Payment:

Measurement and payment for the special manhole shall be made in accordance with Subsections 708.15 and 708.16 of the Standard Specifications.

1/8/15

708585 - JUNCTION BOX, 48" X 30"
708586 - JUNCTION BOX, 48" X 48"
708587 - JUNCTION BOX, 66" X 30"
708588 - JUNCTION BOX, 66" X 48"
708589 - JUNCTION BOX, 66" X 66"

Description:

This work consists of furnishing materials and constructing a junction box of the type specified on the Plans, and as directed. It includes excavation, placing of pipe, concrete masonry, reinforcing and forms all in conformity with the Standard Construction Details, the Plans, and these specifications.

Materials:

Materials used in the construction of the junction box shall conform to Subsections 708.02, 708.03, and 708.04 of the Standard Specifications.

Construction Methods:

Construction methods shall conform to Standard Construction Details and applicable requirements of Section 708 of the Standard Specifications.

Method of Measurement:

The quantity of junction boxes will be measured as the actual number of junction boxes constructed in accordance with these special provisions, complete in place and accepted.

Basis of Payment:

The quantity of junction boxes will be paid for at the Contract unit price for each. Price and payment shall constitute full compensation for furnishing and placing all materials, including bar reinforcement; for all excavation and backfilling around the structures, for the disposal of surplus materials; and for all labor, equipment, tools, and incidentals necessary to complete the item.

6/27/01

708601 - SANITARY MANHOLE, SPECIAL III

Description:

This work consists of furnishing materials and constructing a 60 inch precast concrete Sanitary Sewer Drop Manhole as shown on Kent County Standard Detail Sheet SS-21A, and as directed by the Engineer. It includes connecting to new and/or existing pipe(s), precast concrete masonry, manhole frame and lid, bends, tees, and related hardware, all in conformity with the notes and details on the plans, the Kent County Standard Details, and these Special Provisions.

The Contractor is responsible for assuring that the manhole will fit the field conditions encountered. No additional compensation will be considered to correct openings in the manhole that were not properly cast in the shop.

Any requirements included in the Technical Specifications that are not addressed on the plans or by these Special Provisions, shall be performed in accordance with the applicable sections of the Technical Specifications. The Contractor is advised to obtain and be fully acquainted with the applicable specifications of the Owner.

The Owner of the sewer line on this project is the Kent County, Delaware, Department of Public Works and the Technical Specifications are titled, "Department of Public Works, Kent County Delaware, Pump Station 8 Replacement and Relocation, Technical Specification, August 2012" and are included in this contract as Appendix A to the Special Provisions.

Specifications:

DelDOT Standard Specification Sections 209.04, 708.08, 708.14

Technical Specification Sections 02530

Kent County Standard Detail Sheets SS-21A and SS-15

Contract Drawings

These Special Provisions

Materials and Construction Methods:

Precast Manhole materials shall conform to the notes and details on Kent County Standard Detail sheet SS-21A and to the Technical Specifications. Shop drawings, including proposed concrete mix design, pipe openings, and reinforcing details, shall be submitted to the Engineer for review and approval prior to fabricating the manholes.

Castings and Manhole Covers shall conform to the notes and details on Kent County Standard Detail sheet SS-15.

Non-shrink grout shall conform to ASTM C1107.

Manholes shall be tested as described in the plan notes.

Borrow Type C for backfilling shall conform to the requirements of Section 209.04 of the DelDOT Standard Specifications.

Excavation and Backfilling for manhole installation shall conform to Sections 708.08 and 708.14 of the DelDOT Standard Specifications.

Sheeting, shoring, or an approved steel trench box shall be installed, if needed, to meet all applicable OSHA requirements.

Method of Measurement:

The quantity of special 60 inch precast concrete drop manholes will be measured as the actual number of manholes constructed, complete in place and accepted.

Basis of Payment:

The quantity of special 60 inch precast concrete sanitary drop manholes (Sanitary Manhole, Special III) will be paid for at the Contract unit price per each. Price and payment will constitute full compensation for furnishing and placing materials, including cast-in-place concrete, precast concrete sections, watertight joint material, bar reinforcement, removal of portions of existing pipe, frame and grate and/or cover, stone bedding, brick, mortar, grout, exterior coating, interior lining, bends, tees, stainless steel straps, gaskets, drop pipe, drop pipe connections, steps, inserts, channels, watertight pipe penetration seals, and for all labor, equipment, tools, and incidentals necessary to complete this item. Also included in the price per each manhole is the excavation, sheeting or shoring if required to meet OSHA requirements, backfilling, Type C Backfill if necessary, shop drawing preparation, work to tie-in any existing or installed pipes, disposal of any excess excavation, and testing.

11/17/14

708602 - SANITARY MANHOLE, SPECIAL IV

Description:

This work consists of furnishing materials and constructing a 48 inch precast concrete Force Main Discharge Manhole shown on Kent County Standard Detail Sheet PS-05, and as directed by the Engineer. It includes connecting to new and/or existing pipe(s), precast concrete masonry, manhole frame and lid, all in conformity with the notes and details on the plans, the Kent County Standard Details, and these Special Provisions.

The Contractor is responsible for assuring that the manhole will fit the field conditions encountered. No additional compensation will be considered to correct openings in the manhole that were not properly cast in the shop.

Any requirements included in the Technical Specifications that are not addressed on the plans or by these Special Provisions, shall be performed in accordance with the applicable sections of the Technical Specifications. The Contractor is advised to obtain and be fully acquainted with the applicable specifications of the Owner.

The Owner of the sewer line on this project is the Kent County, Delaware, Department of Public Works and the Technical Specifications are titled, "Department of Public Works, Kent County Delaware, Pump Station 8 Replacement and Relocation, Technical Specification, August 2012" and are included in this contract as Appendix A to the Special Provisions.

Specifications:

DelDOT Standard Specification Sections 209.04, 708.08, 708.14

Technical Specification Section 02530

Kent County Standard Detail Sheets PS-05, SS-07 and SS-15

Contract Drawings

These Special Provisions

Materials and Construction Methods:

Force Main Discharge Manhole materials shall conform to the notes and details on Kent County Standard Detail sheet PS-05 and to the Technical Specifications. Shop drawings, including proposed concrete mix design, pipe openings, and reinforcing details, shall be submitted to the Engineer for review and approval prior to fabricating the manholes.

Castings and Manhole Covers shall conform to the notes and details on Kent County Standard Detail sheet SS-15.

Non-shrink grout shall conform to ASTM C1107.

Manholes shall be tested as described in the plan notes.

Borrow Type C for backfilling shall conform to the requirements of Section 209.04 of the DelDOT Standard Specifications.

Excavation and Backfilling for manhole installation shall conform to Sections 708.08 and 708.14 of the DelDOT Standard Specifications.

Sheeting, shoring, or an approved steel trench box shall be installed, if needed, to meet all applicable OSHA requirements.

Method of Measurement:

The quantity of special 48 inch precast concrete force main discharge manholes will be measured as the actual number of manholes constructed, complete in place and accepted.

Basis of Payment:

The quantity of special 48 inch precast concrete Force Main Discharge Manholes (Sanitary Manhole, Special IV) will be paid for at the Contract unit price per each. Price and payment will constitute full compensation for furnishing and placing materials, including cast-in-place concrete, precast concrete sections, watertight joint material, bar reinforcement, removal of portions of existing pipe, frame and grate and/or cover, stone bedding, brick, brick or concrete flow channel, mortar, grout, exterior coating, interior lining, steps, inserts, channels, watertight pipe penetration seals, flexible gasket connections, and for all labor, equipment, tools, and incidentals necessary to complete this item. Also included in the price per each manhole is the excavation, sheeting or shoring if required to meet OSHA requirements, backfilling, Type C Backfill if necessary, shop drawing preparation, work to tie-in any existing or installed pipes, disposal of any excess excavation, and testing.

11/17/14

710506 - ADJUST AND REPAIR EXISTING SANITARY MANHOLE

Description:

This work consists of adjusting and repairing existing sanitary manholes in accordance with notes and details on the Plans and as directed by the Engineer.

Materials and Construction Methods:

Materials and construction methods shall conform to the applicable requirements of Section 710 of the Standard Specifications, and the Standard Specifications of the owner of the sewer system. If there is a conflict between the Department's Specifications and the Specifications of the owner, the latter will prevail.

Method of Measurement and Basis of Payment:

The method of measurement and basis of payment for the item shall be made in accordance with Subsections 710.09 and 710.10 of the Standard Specifications.

8/28/01

710507 - ADJUST AND REPAIR EXISTING SANITARY CLEANOUTS

Description:

This work consists of adjusting and repairing the existing sanitary cleanouts in accordance with the notes and details on the Plans and as directed by the Engineer.

Materials and Construction Method:

Portland cement concrete shall be Class B and shall conform to the requirements of Section 812 of the Standard Specifications. Pipe and other materials required for the cleanouts shall be similar to the original structure.

Covers of the cleanouts shall be removed, and masonry found to be in poor condition, shall be rebuilt using materials conforming with the original structure. Top of the cleanouts shall be adjusted to the proper grade prior to the paving operations.

Method of Measurement:

The quantity of sanitary cleanouts adjusted and repaired will be measured as the actual number of sanitary cleanouts adjusted, repaired and accepted.

Basis of Payment:

The quantity of sanitary cleanouts adjusted and repaired will be paid for at the Contract unit price per each. Price and payment will constitute full compensation for adjusting and repairing the cleanouts, for all materials; for excavation, backfill and backfilling; for all labor, equipment, tools and necessary incidentals to complete the work.

6/19/06

710509 - INSTALL MANHOLE OVER EXISTING SANITARY SEWER

Description:

This work consists of furnishing materials and constructing a 48 inch Precast Concrete "Doghouse" type manhole as detailed on Kent County Standard Detail sheets SS-07 (Type A-2) and SS-24 and as directed by the Engineer. It includes connecting to new and/or existing pipe(s), precast concrete masonry, manhole frame and lid, all in conformity with the notes and details on the plans, the Kent County Standard Details, and these Special Provisions. The connection may require furnishing and staging tanker trucks and pumps to accommodate flow until the tie-in is completed. Any excess flow in tankers shall be transported to the treatment facility located south of Frederica, DE.

In addition, prior to submitting shop drawings for this type of manhole, the Contractor shall excavate a test hole(s) to verify the exact size, location, and orientation of the existing pipe(s) entering and/or exiting the "Doghouse" manhole. The "Doghouse" opening shown on the shop drawing shall reflect the information obtained from the test hole(s). The Contractor is responsible for assuring that the manhole will fit the field conditions encountered. No additional compensation will be considered to correct openings in the manhole that were not properly cast in the shop.

Any requirements included in the Technical Specifications that are not addressed on the plans or by these Special Provisions, shall be performed in accordance with the applicable sections of the Technical Specifications. The Contractor is advised to obtain and be fully acquainted with the applicable specifications of the Owner.

The Owner of the sewer line on this project is the Kent County, Delaware, Department of Public Works and the Technical Specifications are titled, "Department of Public Works, Kent County Delaware, Pump Station 8 Replacement and Relocation, Technical Specification, August 2012" and are included in this contract as Appendix A to the Special Provisions.

Specifications:

DelDOT Standard Specification Sections 209.04, 708.08, 708.14

Technical Specification Section 02530

Kent County Standard Detail Sheets SS-07, SS-24, and SS-15

Contract Drawings

These Special Provisions

Materials and Construction Methods:

Precast Manhole materials shall conform to the notes and details on Kent County Standard Detail sheets SS-07 and SS-24. Shop drawings, including proposed concrete mix design, pipe openings, and reinforcing details, shall be submitted to the Engineer for review and approval prior to fabricating the manholes.

Castings and Manhole Covers shall conform to the notes and details on Kent County Standard Detail sheet SS-15.

Non-shrink grout shall conform to ASTM C1107.

Manholes shall be tested as described in the Plan notes.

Borrow Type C for backfilling shall conform to the requirements of Section 209.04 of the DelDOT Standard Specifications.

Excavation and Backfilling for manhole installation shall conform to Sections 708.08 and 708.14 of the DelDOT Standard Specifications. Sheeting, shoring, or an approved steel trench box shall be installed, if needed, to meet all applicable OSHA requirements.

Method of Measurement:

The quantity of 48 inch precast concrete doghouse manholes over existing sanitary sewer will be measured as the actual number of manholes constructed, complete in place and accepted.

Basis of Payment:

The quantity of special 48 inch precast concrete doghouse manholes over existing sanitary sewer will be paid for at the Contract unit price per each. Price and payment will constitute full compensation for furnishing and placing materials, including cast-in-place concrete, precast concrete sections, watertight joint material, bar reinforcement, removal of portions of existing pipe, frame and grate and/or cover, stone bedding, brick, mortar, grout, steps, exterior coating, interior lining, inserts, channels, watertight pipe penetration seals, and for all labor, equipment, tools, and incidentals necessary to complete this item. Included in the price per each manhole is the excavation, sheeting or shoring if required to meet OSHA requirements, backfilling, Type C Backfill if necessary, shop drawing preparation, work to tie-in any existing or installed pipes including furnishing pumps and tanker trucks if necessary to handle excess flow, disposal of any excess excavation and/or excess flow, and testing. Test hole excavation, backfill for the test hole(s), and backfilling the test hole(s) are also to be included in the price for this item.

11/17/14

712531 - CHANNEL BED FILL

Description:

Furnish and place Channel Bed Fill to the limits specified in the construction plan set.

Materials:

Provide aggregate material meeting the following requirements:

Provide natural, rounded, unwashed and uncrushed aggregate material meeting the gradation of Table 1 when tested in accordance with AASHTO T-11 and T-27.

a. Aggregate material meeting this requirement may be located within the excavation area of the project. The Contractor may salvage this material at his/her discretion by separating and stockpiling the material meeting the requirements of Table 1 and Notes 1&2.
b. Angular quarried aggregate is unacceptable.
c. The cost of salvaging and stockpiling existing material and removing excess stockpiled material is incidental to 712531 – Channel Bed Fill.

Table 1

Percent Passing	Light [3]	Medium [4]	Heavy
5-inch	100	90-100 [1]	Gradation to be noted on plan sheets
1-inch	100 [1]	0-20[2]	
3/4-inch	30-70		
3/8-inch	0-10 [2]		

Notes:
[1] Salvaged materials may contain material exceeding this size and be acceptable.
[2] Salvaged materials may contain up to 20% passing the 3/8-inch sieve but not to exceed 10% passing the #200 sieve when tested in accordance with T-11.
[3] Unless noted otherwise on plan sheets, Light gradation shall be used in locations in Sussex County
[4] Unless noted otherwise on plan sheets, Medium gradation shall be used in locations in Kent and New Castle Counties.

Method of Measurement:

Quantity of Channel Bed Fill will be measured by cubic yards of material acceptably placed.

Basis of Payment:

The quantity of Channel Bed Fill will be paid for at the Contract unit price per cubic yard. Price and Payment will constitute full compensation for all labor, equipment, and other incidentals required to salvage, stockpile, maintain, furnish, haul, place, and remove and dispose of all material necessary to complete the work.

Excavation of existing streambed material will be paid under its respective item.

4/10/12

715500 - UNDERDRAIN OUTLET PIPE, 6
715504 - UNDERDRAIN OUTLET PIPE, 8

Description:

This work consists of furnishing and placing underdrain outlet pipe in accordance with the locations, notes and details shown on the Plans and as directed by the Engineer.

Materials and Construction Methods:

The materials and construction methods for underdrain outlet pipe shall conform to the applicable requirements of Section 715 of the Standard Specifications, except there shall be no requirements for filter fabric and Del. No. 8 stone around the pipe and the pipe shall not be perforated. The material for underdrain outlet pipe shall be the same as for perforated pipe underdrains.

The installed under drain outlet pipe shall be video inspected in accordance with Subsection 715.07 of the Standard Specifications.

Method of Measurement:

The quantity of underdrain outlet pipe will be measured from end to end in linear feet (linear meters) of pipe completed and accepted.

Basis of Payment:

The quantity of underdrain outlet pipe will be paid for at the Contract unit price per linear foot (linear meter) of the diameter as specified on the Plans. Price and payment will constitute full compensation for furnishing all materials, excavation and backfilling, connectors, bolts to block outlet opening to prevent small animals from entering, video inspection for all labor, tools, equipment and incidentals to complete the item.

10/29/01

720512 - P.C.C. SAFETY BARRIER PERMANENT, DOUBLE FACE
720529 - P.C.C. SAFETY BARRIER PERMANENT, SINGLE FACE
720587 - P.C.C. SAFETY BARRIER PERMANENT, DOUBLE FACE, MODIFIED

Description:

This work consists of furnishing all materials and constructing permanent portland cement concrete safety barrier in accordance with the locations, details, notes shown on the Plans, and/or as directed by the Engineer.

Materials:

Material shall conform to the requirements listed on the Plans, and as noted herein. For cast-in-place barrier, Portland cement concrete shall be 4500 psi (30 MPa) minimum and shall conform to the material requirements of Class A, Section 812, Portland Cement Concrete of the Standard Specifications. For slip formed barrier, PC concrete shall be a Class B mix specifically designed for slip form operations and approved by DelDOT Materials and Research Section.

Bar reinforcement shall be epoxy coated meeting the requirements Section 604 Grade 60 (Grade 400).

Construction Methods:

Construction shall conform with the applicable subsections of Sections 602 and 603 of the Standard Specifications, and details shown on the Plans.

The Contractor shall have the option of constructing the permanent safety barriers by selecting Cast-In-Place, or Pre-Cast, or Slip-form methods. The Contractor shall submit his/her plans for the selected method to the Department's Materials and Research Section for approval. In case of selecting the Slip-form method, the Contractor shall be able to demonstrate his/her ability to successfully accomplish the item by his/her past involvement in doing such work. Slip-form plans shall show the sawing of 3" (75 mm) deep contraction joints every 10' - 20' (3 m - 6 m) as determined by the Engineer. The joints shall be sawed within 2-24 hours after placement of concrete depending upon the weather conditions.

Method of Measurement:

The quantity of permanent portland cement safety barrier will be measured by the linear foot (linear meter) along the toe of the barrier, installed in place and accepted.

Basis of Payment:

The quantity of portland cement safety barrier will be paid for at the Contract unit price per linear foot (linear meter) for each type of barrier. Price and payment will constitute full compensation for all material, formwork, sawing of joints, reinforcement bars, and concrete all complete in place and accepted, for all labor, equipment, tools and incidentals necessary to complete the work. Payment for this item includes excavation and the P.C.C. footer portion of the barrier included in this item.

1/8/15

720544 - REFLECTORS, WHITE, CONCRETE
720545 - REFLECTORS, YELLOW, CONCRETE

Description:

This work consists of furnishing and installing white and/or yellow reflectors on P.C.C. Safety Barrier or on concrete surfaces in accordance with the details and at the designated locations as shown on the Plans and/or as directed by the Engineer.

Materials and Construction Methods:

The reflector and related hardware shall be approved prior to its installation.

The reflector unit shall be installed to the P.C.C. Safety Barrier or to any other required concrete objects in accordance with the manufacturer's recommendations and/or notes on the Plans.

Method of Measurement:

The quantity of reflectors will be measured as the actual number of reflectors installed and accepted.

Basis of Payment:

The quantity of reflectors will be paid for at the Contract unit price per each. Price and payment will constitute full compensation for furnishing the reflector, installing, labor, equipment, tools, and incidentals necessary to complete the work.

10/29/01

720559 – POST-MOUNTED DELINEATORS

Description:

The item shall consist of furnishing all materials and installing post mounted delineators in accordance with the locations, notes and details on the Plans and as directed by the Engineer.

Materials:

All post mounted delineators shall meet the general design requirements of delineators in accordance with Part 3 of the Delaware Manual on Uniform Traffic Control Devices (DEMUTCD).

Delineators - The delineators shall be sheet aluminum cover with Type III-a reflective sheeting. The reflective sheeting shall consist of a retro-reflective lens system having a smooth outer surface. The sheeting shall have a precoated adhesive backing protected by a removable liner and be the type specified on the Plans. Types I through IV refer to levels of performance in terms of reflective intensity. The delineator blank shall be 3 1/4" (83 mm) in diameter. Sheet aluminum cover and reflective sheeting are each 0.063" (2 mm) thick. Material for aluminum and hardware shall be approved by Engineer.

Posts - Steel posts for post mounted delineators and hazard markers shall be a "U" channel section weighing approximately 1.12 lb/ft (1.67 kg/m). Posts shall be punched with at least three (3) 3/8-inch (9 mm) holes on the centerline, spaced at 4-inch centers beginning 1-1/2 inches (37 mm) from the top. The holes are to be punched prior to galvanizing of the posts. Posts shall be of steel conforming to the provisions of ASTM A-36, and shall be galvanized after fabrication in accordance with the provisions of ASTM A123.

Samples - Two samples each of the posts, brackets, connecting devices, and driving heads complete with reflector units proposed to be furnished by the contractor shall be submitted to the Engineer for approval. Samples should include steel posts and each color of delineator to be used.

Special Keys and Wrenches - Whenever special keys, wrenches, or special locking instruments are required for the removal, placing, maintenance and repair for any of the component parts of the delineators, the contractor will be required to furnish and deliver to the Engineer one of each type for each 500 delineators or portion thereof.

Construction Methods:

Delineators shall be yellow on the left edge of roadway and white on the right edge of roadway. Red delineators shall be mounted on the back of the post if shown on the Plans.

The posts supporting post-mounted delineators shall be driven to a minimum depth of 18" (450 mm) by the use of suitable driving tools in such manner and by the use of such protective devices that the delineators will not be distorted or damaged. In those areas where a post is located in an area paved with concrete or bituminous material, a hole slightly larger than the post may be made through the paving, the post driven as provided above, and the paving returned to its original condition, all to the satisfaction of the Engineer. In lieu of driving, posts in paved areas may be set in concrete. Delineator posts shall be so erected that the delineators are 4'0" (1.2 m) above nearest pavement edge, a minimum of 2'0" (.6 m) and maximum of 8’ from the edge of shoulder or as directed by the Engineer and shall be true to line and grade and truly vertical.

Delineator installation and spacing shall be in accordance with the Part 3 of the Delaware Manual on Uniform Traffic Control Devices (DEMUTCD) in addition to the following requirements.

Mainline delineators are required on the right side of all interstates, expressways and freeways. When Raise Pavement Markers are present they are only required prior to and through curves. For Ramps delineators are needed on the outside of the curve only, however, when the curve reverses there shall be three (3) installations on both sides of the ramp. On tangent ramp sections, the delineators shall be on the right only. All ramp delineators will have a single red delineator on the opposite side of oncoming traffic.

Method of Measurement:

Measurement of these items for payment will be on a per each basis, the quantity to be paid for will be the number of post mounted delineators actually installed and accepted by the Engineer, regardless of color, single or double installations mounted on steel posts.

Basis of Payment:

Payment for delineators will be made at the contract unit price per Each bid for Post Mounted Delineators, which price and payment thereof shall constitute full compensation for furnishing and erecting posts; furnishing and mounting all delineator assemblies; and for furnishing all materials, labor, tools, equipment, and incidentals necessary to complete this item of work.

3/19/12

720585 - GUARDRAIL END TREATMENT ATTENUATOR, TYPE 1 - 31
720586 - GUARDRAIL END TREATMENT ATTENUATOR, TYPE 2 - 31
720588 - GUARDRAIL END TREATMENT ATTENUATOR, TYPE 3 - 31

Description:

This work consists of furnishing and installing an impact attenuating guardrail end treatment in accordance with the locations, notes and details on the Plans, the Standard Construction Details, these Special Provisions, and as directed by the Engineer.

Materials:

The end treatment system shall meet the requirements of NCHRP Report No. 350 Test Level 3. The Guardrail End Treatment, Type 1 shall be designed for installation parallel to the roadway. The Guardrail End Treatment, Type 2 shall be designed for installation with the end flared back from the roadway. The Guardrail End Treatment, Type 3 shall be designed for installation where 2 runs of guardrail come together.

The entire end treatment shall be designed for quick and easy replacement after an impact.

Guardrail End Treatment Attenuator Type 1 shall have a minimum of 2 square feet (0.2 square meters) of yellow retroreflective material on the nose. Guardrail End Treatment Attenuator, Type 2 and Type 3 shall have a minimum of 3 square feet (0.3 square meters) of yellow retroreflective material on the nose.

The Contractor shall submit shop drawings, the manufacturer's certification, and the manufacturer's installation instructions to the Engineer. Installation cannot begin until these submissions have been approved by the Engineer.

Construction Methods:

The end treatment system shall be fabricated and installed in accordance with the manufacturer's recommendations and details shown on the Plans.

The end treatment system shall be installed so that there is no rigid object projecting more 4 (100 mm) above ground level in that portion of the attenuator impacted and broken away by an errant vehicle. It is the intent that the errant vehicle not be snagged by an embedded component of the end treatment attenuator.

The grading between the edge of pavement and the end treatment shall be 10:1 or flatter for the length of the end treatment.

Reflectorized washers are not to be used on attenuators unless specified and/or approved by the manufacturer.

The Guardrail End Treatment Attenuator, Type 1 shall be installed with steel tubes and soil plates for the first 4 (min.) wood post. As an alternate, the first 4 (min.) post may be hinged, breakaway steel post if the manufacturer's specifications permit.

Unless otherwise noted on the Plans, the Guardrail End Treatment Attenuator, Type 1 shall be installed with a 25:1 taper beginning 50' (15 m) from the end of the end treatment.

Method of Measurement:

The quantity of guardrail end treatment attenuators will be measured as the number of each type fabricated, installed and accepted.

Note: All guardrail end treatment attenuators will be considered as 50 feet (15 meters) long. The 50' (15 m) length will begin at the center of the nose post and extend back along the attenuator and guardrail to which it is attached. Any guardrail within the 50' (15 m) length will be considered as part of the guardrail end treatment attenuator and not be measured separately. Measurement for the guardrail will begin 50' (15 m) from the center of the nose post of the attenuator.

Basis of Payment:

The quantity of guardrail end treatment attenuators will be paid for at the Contract unit price per each type of guardrail end treatment attenuator. Price and payment will constitute full compensation for furnishing all materials, fabrication and installation and for all materials, labor, equipment, tools and incidentals required to complete the work.

Note: When this item is completely installed, the Contractor may notify the Engineer and request acceptance. The Engineer will make an inspection of the installation and the Contractor shall correct any deficiencies. Once the corrective work is completed to the satisfaction of the Engineer, the installation will be accepted and the Contractor will be relieved from the responsibility for this item. If this item is damaged before the final acceptance of the project, and the damage is not the result of the Contractor's negligence, the Engineer will notify the Contractor to make repairs, and the Contractor will make repairs at the unit price bid (in the case of complete replacement) or at a negotiated price (in the case of partial replacement or repair). Damage caused by the Contractor shall be repaired at no cost to the Department.

8/12/2013

727523 - CANTILEVER SLIDE GATE, 26'
727526 - CANTILEVER SLIDE GATE, 22'

Description:

This work consists of furnishing and installing all materials for a cantilever gate and motorized operator unit of the size noted and in accordance with the location, notes and details on the Plans, these Special Provisions and Standard Specifications.

The Contractor will install the cantilever slide gate and motorized gate operator, including the concrete pad, as part of Item 727523. Conduit from the power source to the gate operator, wiring from the power source to the gate operator, signalization conduit, and overhead roadway lighting (including conduit and wiring), will also be provided by the Contractor under separate pay items. DelDOT's Traffic Contractor will furnish and install the Opticom poles, detectors, related wiring, and a signal head.

Prior to beginning construction on Item 727523, a coordination meeting shall be held to include DelDOT's Traffic Contractor representatives, the Cantilever Slide Gate Contractor, and the Contractor installing the conduit and wiring.

Submittals - The Contractor shall submit to the Engineer for approval the manufacturer's product data, specifications, installation instructions and maintenance instructions for all materials.

Materials:

All gate material components shall be by the same manufacturer.

Gate Frame - The gate shall be a Cantilever Slide Gate that, when used in tandem, will fit the openings as shown on the Plans and attach to proposed Right of Way fencing at locations shown on the plans. Cantilever overhangs for the specified openings shall be per the manufacturer's recommendation. Cantilever overhang frames shall have brace rods per the manufacturer's recommendations, but not less than 10mm (3/8 in.) diameter.

The top and end gate frames shall be constructed of 2 in. square aluminum tubing, alloy 6063-T6, welded at all corners so as to form a rigid one piece unit. The bottom rail shall be a 4 in. x 2 in. aluminum tube as shown on the plans. Intermediate post uprights in the gate shall also be 2 in. square aluminum.

Swivel type zinc die cast trucks with sealed lubricant ball bearing wheels, minimum 2 in. in diameter with side rolling wheels, shall be provided to insure alignment of the truck in track. Total weight of gate system shall not exceed 1,200 lb.

All gate hangers, latches, brackets, guide assemblies and stops shall be malleable iron or steel and galvanized after fabrication. A latch shall be provided that can be activated on-site from both sides of the gate.

Gate posts shall be 4 in. outside diameter schedule 40 galvanized steel posts. Posts shall be set in Class B concrete as shown on the details and as specified by the manufacturer.

Guide wheel assemblies shall be provided for each supporting post. Each assembly shall consist of two rubber wheels attached to the post so that the bottom horizontal member shall roll between the wheels. Wheels shall be adjustable to maintain plumb gate frames and proper alignment.

The cantilever sliding gate and overhang frames shall have barbed wire installed at the top. The barbed wire shall be galvanized steel conforming to the requirements of ASTM A-121 and shall consist of three strand 12 ½ gage (2.51 mm) wire with tightly wrapped, sharp, four point barbs formed of 14 gage (2.03 mm) wire spaced evenly at not more than 5 in intervals. Galvanizing shall be Class 3.

Concrete for setting post shall meet Class B concrete of Section 812 of the Standard Specifications.

The gate fabric shall be 2 in. mesh consisting of 9 gage galvanized steel wire or 9 gage aluminum coated steel wire as specified in Standard Specification 825.02 (c).

The cantilever sliding gate manufacturer shall warrant the cantilever sliding gate and the truck assembly on which it rolls against failure from normal use for a minimum period of three (3) years from the date of acceptance by DelDOT. "Failure" shall be defined as any defect in manufacturing and/or assembly that prevents the gate from operating in a normal manner.

Gate Operator - The Gate Operator shall be compatible with the proposed gate. At a minimum, it shall be UL listed and equipped with a one horsepower, 220 volt, single phase motor with a 70 VA transformer. The motor shall be a single direction, high starting torque type and shall be internally protected against, and with a manual reset, for overload protection. The Gate Operator shall have a minimum three (3) gallon per minute capacity hydraulic pump. Motor contactor shall meet NEMA size "O" specifications. Limit switches shall be rated at NEMA 4/13 and be readily adjustable with modular construction.

The Gate Operator shall have open override circuitry to provide complete control of the gate (from external controls) while closing. An internal timer shall limit the run time of the operator to a maximum of 90 seconds in any one direction to protect the gate operating system. Reversal of the gate from an open condition or by a safety device shall be delayed by 1.5 seconds to prevent shock load damage to the gate operating system. The Gate Operator shall be supplied with an internal relay capable of receiving a 24 Volt, 1,000 Ohm, D.C. signal for control movements of the gate and have full system capabilities so additional control systems can easily be added in the field. The Gate Operator shall also be supplied with an internal adjustable timer capable of delaying the closing of the gate up to 90 seconds after a closing signal has been received. The Gate Operator control circuit shall have the built-in capability of providing a signal output if the gate does not reach the full close position within 90 seconds of activation. The Gate Operator shall have a power disconnect switch at the control box for safety.

Gate speed shall be 18 inches per second. A drive rail shall be supplied capable of being attached to the cantilever gate bottom frame. The Gate Operator shall be placed on a concrete pad constructed by the Contractor. The location of the concrete pad adjacent to the cantilever gate shall be to the specifications of the Gate Operator manufacturer. Gate Operator housing shall be 14 gage, galvanized steel.

The Contractor shall supply two color coded wiring diagrams for the Gate Operator at each location, including all internal adaptations and field connections.

Anchor bolts to mount the Gate Operator to the concrete pad shall be furnished and installed as shown on the plans.

Electrical Service:

Electrical connections between the power source, the Gate Operator, and the Cantilever gate shall be made by the Contractor. The Service Pedestal, conduit, and wiring will also be provided by the Contractor using their respective pay items.

Construction Methods:

All materials shall be installed in accordance with these specifications, the manufacturer's recommendations, notes and/or details on the plans and/or as directed by the Engineer.

Method of Measurement:

The quantity of cantilever slide gates will be measured as the number fabricated, installed, and accepted.

Basis of Payment:

The quantity of cantilever slide gates will be paid for at the Contract unit price per each. Price and payment for each unit will constitute full compensation for furnishing and placing all materials as described in this Specification and as shown on the Contract Plans, and for all labor, equipment, including but not limited to the cantilever slide gate, gate locking mechanism, anchors to the proposed fence (where applicable), barbed wire, motorized gate operator, concrete pad and anchor bolts, electrical connections, warranty, and all incidentals necessary to complete the work.

727527 - CHAIN FENCE

Description:

This work consists of furnishing all materials and installing chain fence for construction of modified gabions in accordance with notes and details on the Stormwater Management section of the Plans, these specifications, and directions from the Engineer.

Materials:

Posts shall be 2 ¼" O.D. galvanized schedule 40 steel pipe. Pipe shall be galvanized inside and out. The posts shall otherwise comply with the material requirements listed in Standard Specification 825.02(a).

Steel rope ties shall be 1/8" galvanized steel. All steel rope clamps and fasteners shall be galvanized steel.

Chain link fence shall be 9 gage, double dipped galvanized steel and shall otherwise meet the requirements of Section 825.02(c).

Construction Methods:

The posts, fence, and ties shall be installed in accordance with notes and details on the Plans. Posts shall be installed to the depth specified on the plans by driving the posts, using manual or mechanical methods. The method used to install the post shall not cause deformation to the post or damage to the galvanized coating.

Method of Measurement:

The quantity of chain fence will be measured in linear feet (meters) of chain fence installed and accepted. Measurement will be made along the actual fence constructed.

Basis of Payment:

The quantity of chain fence will be paid for at the Contract unit price per linear foot. Price and payment will constitute full compensation for furnishing all materials, erecting the fence and for all labor, equipment, tools and incidentals required to complete the work.

1/8/15

727528 - VINYL RAIL FENCE

Description:

This work consists of furnishing all materials and installing a vinyl rail fence in accordance with notes and details on the Plans, these specifications, and directions from the Engineer.

Materials:

P.C. Concrete shall meet the requirements of Section 812 Class B.

Fence components shall be made of high impact, ultra violet (UV) resistant, rigid poly vinyl chloride (PVC), and shall comply with ASTM D 1784, Class 14244 B. Color shall be as specified on the Plans. Posts shall have a minimum wall thickness of 0.135″ (3.43 mm) and a minimum corner radius of 3/8″ (9.5 mm). The rails shall have a wall thickness of 0.90″ (2.29 mm) and a minimum corner radius of 11/32″ (8.7 mm). Posts and terminal posts shall have one piece, molded caps that have a minimum thickness of 0.095″ (2.41 mm) and match the post cross section.

Incidentals such as fasteners, anchorage and PVC cement shall meet the requirements of the manufacturer.

Construction Methods:

The rail fence shall be constructed in accordance with notes and details on the Plans and the manufacturer's installation instructions.

Method of Measurement:

The quantity of vinyl rail fence will be measured as the actual number at linear feet (meters) of rail fence installed and accepted. The length will be measured along the line of the fence from the center of end post to center of end post.

Basis of Payment:

The quantity of vinyl rail fence will be paid for at the Contract unit price per linear foot (meter). Price and payment will constitute full compensation for furnishing all material, for erecting fence, for excavation and concrete for post anchors, and for all labor, equipment, tools, and incidentals required to complete the work.

1/8/15

735501 - HERBICIDE APPLICATION, NOXIOUS WEEDS

Description:

This work consists of furnishing and applying the herbicides to vegetation on the soil surface as directed by the Engineer.

Materials:

The herbicide (s) for treatment shall be selected by the contractor. Labels and Material Safety Data Sheets for the selected materials shall be submitted with the contractors bid.

Construction Methods:

All herbicides shall be applied in accordance with the EPA approved label. The herbicides shall not be applied within six (6) hours of rainfall.

Method of Measurement:

The quantity of herbicide application will be measured by the acre (hectare) of surface area treated with herbicide material.

Basis of Payment:

The quantity of herbicide application will be paid for at the Contract price per acre (hectare). Price and payment will constitute full compensation for furnishing all materials, applying the herbicide in aqueous solution, for all labor, equipment, tools, and incidentals to complete the work.

09/09/09

736500 - MOWING ROADSIDE
736501 - MOWING MEDIAN
736502 - MOWING

Description:

This work consists of mowing roadside, median, and/or any designated areas to a height between approximately 4″ (100 mm) and 6″ (150 mm), unless otherwise indicated on the Plans, and in accordance with the locations, notes on the Plans and/or as directed by the Engineer.

Equipment:

Equipment used for mowing operations shall be mechanical, and shall be sufficiently equipped with safety devices to protect the operator, motorists, and pedestrians from moving hazards, and shall have prior approval of the Engineer. Hand mowing shall be performed on inaccessible areas at the direction of the Engineer.

Method of Measurement:

The quantity of mowing will be measured in linear feet (linear meters) of Mowing Roadside and/or Mowing Median, and in acres (hectares) for other designated areas.

Measurement for Mowing Roadside, shall be made along the approximate center line of the adjacent pavement for mowing areas between the right of way and pavement.

Measurement for Mowing Median shall be made along the approximate center line of the median area to be mowed.

No measurements shall be made for mowing traffic separation islands in intersections.

Basis of Payment:

The quantity of Mowing Roadside and/or Mowing Median, will be paid for at the Contract unit price per linear foot (linear meter) bid "Mowing Roadside" and/or "Mowing Median", and Contract unit price per acre (hectare) for "Mowing", as specifically applicable to this Contract. Price and payment shall constitute full compensation for all labor, tools, equipment, fuels, lubricants, safety devices, necessary traffic controls, location moves, and incidentals necessary for the performance of the work.

Mowing of traffic separation islands in intersections shall not be paid for separately, but are considered incidental to Mowing Roadside or Mowing Median.

For new construction contracts, there shall be no payment for the final clean up mowing as required in Subsection 104.13 of the Standard Specifications.

1/8/15

743551 - FURNISH AND MAINTAIN REMOTE COMMUNICATION PORTABLE CHANGEABLE MESSAGE SIGN

Description:

The item shall consist of furnishing, placing, relocating, operating and maintaining trailer mounted portable changeable message sign(s) with remote communication ability as shown on plans or as directed by the Engineer.

The remote communication portable changeable message sign (PCMS) must be approved by the Department prior to use.

Remote Communication Equipment:

The PCMS shall be supplied with remote communication equipment meeting the following specifications:

Modem unit:

1. CP-WAN-B311-A CONNECTPORT WAN 3G W/EMBEDDED - VERIZON EVDO REV A MODULE & VPN

Antenna Equipment:

1. 85449 ANTENNA BASE
2. TRA806/17103 ANTENNA
3. 195 CABLE 2ft SMA-MALE TO N-MALE

Operation and Maintenance:

The design, operation and placement of the PCMS shall comply with Part 6 of the Delaware Manual on Uniform Traffic Control Devices (DEMUTCD) and with the Portable Changeable Message Signs memorandum. PCMS shall be placed and relocated at locations specified in the Contract documents or as directed by the Engineer. PCMS shall be placed as far from the travel lane as practical so as not to contribute to a roadside hazard. The PCMS memorandum can be found on the DelDOT website at the following link:

http://www.deldot.gov/information/pubs_forms/manuals/de_mutcd/pdf/Portable_Changeable_Message_Signs.pdf

Prior to use, a Portable Changeable Message Sign Approval Form shall be submitted for each PCMS location. The approval form shall be submitted to the District Safety Officer by the Engineer prior to placement of the PCMS. The approval form can be found on the DelDOT website at the following link:

http://www.deldot.gov/information/pubs_forms/manuals/de_mutcd/pdf/PCMS_Approval_Form.doc

PCMS identified within the rights-of-way of the State of Delaware that are not approved shall be removed by DelDOT forces from the right-of-way immediately. PCMS that have been approved for use but are not being used consistent with the approval or those devices that do not have adequate traffic control devices in their support shall require corrective actions by the applicant as deemed necessary by the Engineer. Corrective action shall be completed as soon as possible, but no more than 24 hours after notification. Failure to perform the corrective action will result in removal of the message board as describe previously.

The Contractor shall have a qualified and trained PCMS programmer(s) to program desired messages, and mechanic(s) to perform required service on the PCMS unit, available on a 24 hour basis. The Contractor shall maintain and service the PCMS unit throughout the period of its operation on the job.

Prior to acceptance for use, the Contractor shall successfully demonstrate remote communication capabilities between the PCMS and the DelDOT Transportation Management Center (TMC) to the satisfaction of the Engineer and a TMC representative.

Method of Mesaurement:

The item Furnish and Maintain Remote Communication Portable Changeable Message Sign will be measured per each-day.

Basis of Payment:

The payment for this item will be made at the Contract unit price per Each-Day bid for the Item 743551 - Furnish and Maintain Remote Communication Portable Changeable Message Sign, which price and payment shall constitute full compensation for furnishing the PCMS with remote communications equipment and trailer, placing, relocating, operating, programming, final removal when no longer required, and for all labor, tools, equipment, and necessary incidentals to complete the work.

Should an operational problem be reported to the Contractor at any time during use of the unit, the Contractor shall have two hours after receipt of notification to rectify the problem to the satisfaction of the Engineer. If such repair is not made satisfactorily, no payment will be made for the PCMS.

It is the Department's intent to provide a continuously operating Portable Changeable Message Sign whenever the unit is in service. The Contractor is required to make all necessary arrangements to assure continuous operation of the unit. The Contractor shall designate an on-site representative, other than the Project Superintendent, who shall be the Department's contact on all project issues related to the Portable Changeable Message Sign.

3/10/10

744500 - CONDUIT JUNCTION WELL, TYPE 6, PRECAST POLYMER CONCRETE
744506 - CONDUIT JUNCTION WELL, TYPE 7, PRECAST POLYMER CONCRETE
744507 - CONDUIT JUNCTION WELL, TYPE 8, PRECAST POLYMER CONCRETE
744508 - CONDUIT JUNCTION WELL, TYPE 9, PRECAST POLYMER CONCRETE
744509 - CONDUIT JUNCTION WELL, TYPE 10, PRECAST POLYMER CONCRETE
744520 - CONDUIT JUNCTION WELL, TYPE 1, PRECAST CONCRETE
744523 - CONDUIT JUNCTION WELL, TYPE 4, PRECAST CONCRETE
744524 - CONDUIT JUNCTION WELL, TYPE 5, PRECAST CONCRETE
744530 - CONDUIT JUNCTION WELL, TYPE 11, PRECAST CONCRETE/POLYMER LID-FRAME
744531 - CONDUIT JUNCTION WELL, TYPE 14, PRECAST CONCRETE/POLYMER LID-FRAME
744532 - CONDUIT JUNCTION WELL, TYPE 15, PRECAST CONCRETE/POLYMER LID-FRAME

Description:

This work consists of supplying, constructing and installing conduit junction wells as shown on the applicable Plan Sheets or Standard Construction details

Materials:

Concrete shall conform to Section 812, Class B of the Standard Specifications.

Castings shall conform to Section 708.05 of the Standard Specifications.

Frames and lids shall be in accordance with Sections 708 and 744 of the Standard Specifications.

All required hardware and wire for Bonding and Grounding as shown on the Standard Construction or applicable Plan details.

Types 6, 7, 8 and 10 are precast polymer concrete stackable boxes with no base.

Precast polymer concrete is reinforced by heavy-weave fiberglass with a compressive strength of 9,000-15,000 psi, impact energy of 30-72 ft. lbs. and a tensile strength of 800-1,100 psi. Precast polymer concrete should be tested according to the requirements of ASTM Method D-543, Section 7, Procedure 1 for chemical resistance.

All precast polymer concrete covers shall be the heavy-duty type with a design load of 15,000 lbs. over a 10" square. The coefficient of friction should be greater than 0.5. The precast polymer concrete cover logo shall bear the inscription "DelDOT" (Types 6, 8, and 10) or "DelDOT TRAFFIC FIBER OPTICS" (Type 7).

Types 11, 14, and 15 are precast polymer frame and lids installed on a precast concrete base. Precast polymer concrete frame and lids shall be the heavy-duty nonconductive type with a design load of 15,000 lbs. over a 10" square. The coefficient of friction should be greater than 0.5. The precast polymer concrete lid logo shall bear the inscription "DelDOT ELECTRIC"(Types 11, 14, and 15)

Construction Methods:

The conduit junction well shall conform to the dimensions shown on the Standard Construction or applicable Plan Details, or on the manufacturer's specifications and shall be built so as to ensure that the cast iron frame and lid or polymer concrete box and cover are set level with the surrounding surface when constructed within pavement, sidewalks, pedestrian curb ramps, etc., and set above grade and graded to drain away from the junction well when constructed in unpaved areas. More than one conduit may extend into the well and shall conform to the dimensions shown on the applicable plan sheets or Standard Construction Details. A stone base shall be built for all types of junction wells. Grounding and bonding of the units shall be performed as shown on the plans or Standard Construction details.

Method of Measurement:

The quantity of junction wells shall be the actual number of conduit junction wells by type, that are supplied, constructed, complete in place, and accepted, including cast iron frames and lids with grounding lugs, precast polymer concrete frame and covers, or precast polymer concrete covers, stone base, bonding, grounding, and splicing if required. Frames and lids or precast polymer concrete covers must be installed prior to acceptance of this item.

Payment for all conduits extending into the junction well shall be included in the items for conduit installation.

The length of ALL conduits within a junction well shall conform to the Standard Construction or applicable Plan Details or as directed by Engineer. Payment for cutting existing conduit as directed by Engineer, where a junction well is replaced with a larger type of junction well is included in the bid price. The removal and replacement of cables within the conduits to be shortened shall be handled under other items of this contract.

Basis of Payment:

Payment for conduit junction wells as measured above shall be made at the Contract unit price per each junction well of the type indicated, completely installed and constructed, including excavation, backfilling, and stone base. Price and payment will constitute full compensation for all labor, equipment, tools, and incidentals required to complete the work.

2/29/12

744544 – ADJUST OR REPAIR EXISTING CONDUIT JUNCTION WELL

Description:

This work consists of adjusting or repairing existing conduit junction wells, including furnishing all materials, in accordance with this specification, notes and details on the applicable Plans, the Standard Construction Details, and as directed by the Engineer. If Bonding and Grounding of the unit is required, that work will be paid for under "Bonding and Grounding Existing Junction Well".

Materials:

Portland cement concrete shall conform to the requirements of Section 812, Class B.
Mortar shall conform to the requirements of Section 611.
Brick shall conform to the requirements of Section 611.
Concrete block shall conform to the requirements of Section 819.

Construction Methods:

Repair of conduit junction wells includes repairing/patching the masonry walls and resetting existing frames and lids or precast polymer concrete covers.

Adjusting involves raising the elevation of the frame and lid to match the grade of the surrounding area.

Method of Measurement:

The quantity of conduit junction wells adjusted or repaired will be measured as the actual number of conduit junction wells adjusted or repaired and accepted. If a new frame and lid or precast polymer concrete cover is needed, it will be supplied under a separate item.

Basis of Payment:

The quantity of conduit junction wells will be paid for at the Contract unit price per each junction well. Price and payment will constitute full compensation for excavating, backfilling, compacting and disposing of excess materials, for furnishing and placing all materials and for all labor equipment, tools and incidentals required to complete the work.

2/29/12

745601 - FURNISH & INSTALL UP TO 3" FLEXIBLE METALLIC-LIQUIDTIGHT CONDUIT
745602 - FURNISH & INSTALL UP TO 4" SCHEDULE 80 HDPE CONDUIT (BORE)
745603 - FURNISH & INSTALL UP TO 4" SCHEDULE 80 PVC CONDUIT (OPEN CUT)
745604 - FURNISH & INSTALL UP TO 4" SCHEDULE 80 PVC CONDUIT (TRENCH)
745605 - FURNISH & INSTALL UP TO 4" SCHEDULE 80 PVC (ON STRUCTURE)
745606 - FURNISH & INSTALL UP TO 4" GALVANIZED STEEL CONDUIT (TRENCH)
745607 - FURNISH & INSTALL UP TO 4" GALVANIZED STEEL CONDUIT (BORE)
745608 - FURNISH & INSTALL UP TO 4" GALVANIZED STEEL CONDUIT (OPEN CUT)
745609 - FURNISH & INSTALL UP TO 4" GALVANIZED STEEL CONDUIT (ON STRUCTURE)
745610 - FURNISH & INSTALL UP TO 4" NONMETALLIC POLE RISER SHIELD

Description:

Furnish and install HDPE, PVC, or Galvanized steel conduits of any size less than or equal to 4 inches in diameter (3 inches or less for Flexible Metallic Liquidtight Conduit) as described below.

Materials:

All conduits shall be UL listed.

HDPE Conduit - 4" or less diameter, high density polyethylene (HDPE) schedule 80, smooth wall conduit with permanently pre-lubricated lining, meeting ASTM D2447, ASTM D3035 and NEMA TC7 specifications.

PVC Conduit - 4" or less diameter, schedule 80 rigid polyvinyl chloride (PVC) conduit, meeting Commercial Standard CS-272-65 (PVC), ASTM D-1785 and U.C. Standard 651 specifications.

Galvanized Steel Conduit - 4" or less diameter, rigid galvanized steel conduit meeting National Electric Code 2002, Article 344.

Nonmetallic Pole Riser Shield – 4" diameter or less nonmetallic pole riser shield with belled ends meeting NEMA TC-19 specifications.

Flexible Metallic-Liquidtight Conduit – meets National Electric Code 2002, Article 350

Weatherhead for galvanized or PVC conduit – material shall match the adjoining conduit

Insulated grounding bushing with knockouts - meet or exceed UL 514 B

Condulets for conduit sizes - material shall match the adjoining conduit

Anchors - A 307, Galvanized per A 153

One hole conduit hangers - Steel City Series 6H or 6H-B, CADDY CD3B Rigid Conduit Hanger, or approved equal

End caps - material shall match the adjoining conduit

LONG sweep sections for conduit sizes - material shall match the adjoining conduit, and shall be manufactured 90 degree sweeping bends.

Construction Methods:

General Installation Requirements - The Department has the right to reject any installation method proposed for a given work site. PVC shall not be installed under existing pavement unless it is on a continuous roll or with the Engineer's written approval.

Conduit installed underground shall be installed in a straight line between terminal points. In straight runs, junction well spacing shall be no more than 600 feet for fiber optic conduit or no more than 300 feet for copper in conduit, or as directed by the Engineer. If bends are required during installation, they must be manufactured sweeping bends. The Engineer will be consulted before any bends are installed to ensure that the proper arc is provided.

Conduit shall have a minimum cover as measured from the finished grade of 24 inches and a maximum cover of 48 inches.

The opening shall be filled half way with the cover material, and tamped down firmly before filling in the remainder of the opening. Additional lifts shall be used as required to install the metallic warning tape at the specified depth. All cover material shall be free of rocks, debris, vegetation or other deleterious material that may damage the conduit. An underground utility warning tape shall be installed as specified in this section and the remainder of the fill shall be added, tamping down the top layer.

Conduit not terminated to a base or in a junction well shall be terminated 2 feet beyond the edge of the pavement unless otherwise directed by the Engineer, and properly capped. Tape is NOT an approved method. Conduit shall not extend more than 3 inches inside a junction well. See Standard Construction Details or applicable Plan Details for typical methods of termination.

All underground conduits shall be marked in the ground with a metallic warning tape. The marking tape shall be buried directly above the conduit run that it identifies, at a depth of approximately 12 inches below final grade. The tape identifying ALL conduits shall be at least 6 inches wide, and have a minimum thickness of 3 mils and 500 percent elongation.

The color of the metallic warning tape identifying fiber optic cable should be bright orange (preferably AULCC orange), and shall read "WARNING - OPTICAL CABLE" or other wording approved by the Engineer that conveys the same message. The color of the tape identifying all other cables shall be bright red, and shall read "WARNING —BURIED ELECTRIC BELOW" or other wording approved by the Engineer that conveys the same message.

Using conduit tools, rigid metallic conduit shall be cut, reamed, and threaded. The thread length shall be as necessary to ensure that the sections of conduits when screwed into a coupling and tightened correctly will butt together and the joint will be watertight. A three-piece threaded union, as approved by the Engineer, shall be used to join two threaded lengths of conduit in the case where a standard coupling will not work. A threaded union shall not be used in a conduit run that is to be driven. At no time is a threadless coupling or a split-bolt coupling to be used for direct buried conduit.

All lengths of HDPE conduit shall be connected with irreversible fusion couplings. Mechanical and removable couplings will not be accepted.

All lengths of PVC conduit shall be connected by one conduit end fitting inside the flared end of the other conduit section. If this is not possible, then a coupling may be used. Regardless of how connection is made, all joints shall be sealed with the appropriate epoxy to ensure that the two conduit pieces bond to one another to form a solid waterproof link. Using conduit tools, the conduit shall be cut and prepared. If approved by the Engineer, a coupler module may be used where conduit segments do not align properly to allow the flared end of one conduit segment to mate with the normal end of the other segment.

Sealed end caps (with knockouts if empty) shall be placed on the ends of all conduits, after compressed air has been used to clear all foreign matter.

If not already pre-installed by the manufacturer, a polyester or polypropylene pulling rope or tape (fish wire) with a minimum rated strength of 1250 pounds shall be installed in each conduit for future use. In instances where the Contractor installs the cable, the fish wire may be eliminated.

All PVC and HDPE conduits shall have a continuous metallic trace wire installed for the entire length of the conduit run for all fiber installations.

Installation of Conduit Under Existing Pavement, Directional Bore -

Directional bore shall be used for installation of conduits under existing pavement with a conduit diameter not less than 1-1/2". The size of a bore shall not exceed the outside diameter of the conduit by more than 1 inch. If it does, cement grout shall be pumped into the void. **Only HDPE and/or Galvanized Steel conduit may be installed by Directional Bore methods.**

Installation of Conduit Under Existing Pavement, Open Cut -

Installation by sawcutting the full pavement depth and removing the existing pavement with an excavator or by hand methods, shall be used only for conduits not less than 1-1/2" diameter. The Engineer must first approve all open cutting of roadways. The width and length of open cut and patch restoration materials shall be as shown on the plan details. The Contractor shall be responsible for the removal of all cut pavement and surplus excavation, and for the replacement and correction of any damaged pavement outside the sawcut limits after the conduit(s) are installed. Asphalt pavement, concrete, base course, sawcutting, and/or borrow from an outside source as required to restore the roadway will be paid for separately under their respective bid items.

Installation of Conduit Under New Pavement, Unpaved Trench -

Trenching or other approved method shall be used for installation of conduit in unpaved trench or under new pavement. Backfill in conduit trenches shall be compacted thoroughly as it is being placed. At the discretion of the Engineer, sod,that must be removed for the placement of conduit, shall be removed either by the use of an approved sod cutter and then replaced, or 6 inches of topsoil shall be placed and the surface seeded in accordance with Section 734001 - Seeding. In areas where new pavement is to be placed or in areas where total reconstruction is taking place, sodding or seeding may not be required by the Engineer. Sodding and/or topsoil from an outside source if required will be paid for separately under their respective bid items. Seeding is considered incidental to the conduit item.

Installation Of Conduit On Structure -

Conduit installed on structure shall consist of drilling anchors into concrete, brick, stone, steel or wood and mounting the conduit with the proper clamps or hangers. The conduit shall be attached to the structure by use of one-hole conduit hangers and approved anchors not more than 36 inches apart. Any 90-degree turns in the conduit run shall be accomplished by placing the proper size and type manufactured sweeping bends for the application needed.

Installation of Nonmetallic Riser Shield or Flexible Metallic Liquidtight Conduit -

Riser Shield and/or Flexible Metallic Liquidtight Conduit installed on wood poles, metal poles, structures, and/or mast arms shall be installed in a straight line. The conduit, when attached to poles, shall be attached with 2-hole straps spaced not more than 36 inches apart with the top-most strap being 12 inches from the weatherhead and the lower-most being 12 inches from the condulet. A weatherhead matching the diameter of the conduit shall be installed on the upper end of the conduit. A condulet of the same size as the conduit being installed, but not smaller than 2 inches shall be placed 48 inches above finished grade. Install two, 2-hole straps of the proper size, evenly spaced below the condulet. Nonmetallic pole risers (U-guard) shall be installed on poles to allow interduct to be connected directly to messenger cable. The underground conduit shall be as close to the base of the pole as possible. If the nonmetallic pole riser or metallic liquidtight conduit is not the same size as the conduit, an adapter shall be used at no additional cost to the Department. The nonmetallic pole riser or metallic liquidtight conduit shall be attached to the pole with 1/4" x 1-1/2" galvanized lag bolts with washers. Lag bolts will be used every 36 inches on BOTH sides of the nonmetallic pole riser or liquidtight conduit, and in the top most and bottom most set of slots. Flexible metallic liquidtight conduit shown on the plans to be installed on mast arms or on metal structure shall also include stainless steel banding placed at a maximum of 5 feet intervals.

Method of Measurement:

The quantity of conduit or riser shield installed as specified, shall be measured as the number of linear feet of each conduit or riser shield installed as specified, complete in place, and accepted.

The length of each conduit installed under existing pavement by a directional bore or by open cutting the pavement shall be measured along the path of the bore or open cut, from the point that cannot be trenched to the point that trenching can resume.

The length of any conduit that is reduced or divided (with a junction well or conduit body) shall be measured as part of the larger conduit.

Basis of Payment:

The quantity of conduit or riser shield will be paid for at the Contract unit price per linear foot. Price and payment shall include full compensation for furnishing all conduit and/or riser shield materials, equipment, labor, and incidentals necessary to complete the item.

For conduit installed by Directional Bore, the linear foot payment also includes excavation and backfilling for Bore Equipment, placing the conduit, caps if required, and all other requirements and incidentals listed in the body of this specification.

For conduit installed by Open Cutting existing pavement, the linear foot payment also includes excavating, backfilling, placing the conduit, disposal of excess materials, and all other requirements and incidentals listed in the body of this specification.

For conduit installed in an Unpaved Trench, the linear foot payment also includes excavating, removal of sod if required, backfilling, placing the conduit, disposal of excess materials, replacing excavated on-site sod if required, seeding if required, and all other requirements and incidentals listed in the body of this specification. Sod and/or topsoil furnished from an outside source, will be paid for separately.

For conduit installed on a structure, the linear foot payment also includes furnishing and installing anchors and hangers, removal of excess materials, and all other requirements and incidentals listed in the body of this specification.

For riser shield or flexible metallic conduit installed on poles, mast arms, or structures the linear foot payment also includes furnishing and installing straps, weatherhead, condulet, lag bolts and washers, any other required mounting hardware, and all other requirements and incidentals listed in the body of this specification.

1/8/15

746507 – INSTALLATION OF STEEL POLE (LESS THAN 40')
746528 - INSTALLATION OF STEEL POLE (EQUAL TO OR GREATER THAN 40')
746697 - INSTALLATION OF WOOD POLE
746815 - INSTALLATION OF LUMINAIRE
746831 - INSTALLATION OF PEDESTAL POLE
746928 – INSTALLATION OF STEEL MAST ARM POLE WITH SINGLE OR TWIN MAST ARM UP TO 70'
746942 - INSTALLATION OF LIGHTING POLE WITH ARM AND LUMINAIRE

Description:

This work consists of installing the specified type of pole on an existing pole base (or ground mounted for wood pole) in accordance with the locations, notes, and details on the Plans and as directed by the Engineer.

Materials:

Unless specified otherwise, the steel mast arm(s), steel pole, pedestal pole, wood pole, lighting pole, luminaire, and all necessary hardware shall be furnished by the Department. These materials can be obtained from the Department's Dover Sign Shop. The Contractor shall inform the Department two working days prior to picking up the pole, and other related hardware. Where pole installation is part of the work of relocating an existing pole on a project, the pole and related hardware shall be that which is removed from the existing pole site.

Construction Methods:

General -

Prior to erecting a pole, the Contractor shall be sure that there is a sufficient length of anchor bolt to permit the anchor bolt to extend at least flush with the top of the top nut when that nut is tightened in place. If this condition does not exist, the Contractor shall not erect the pole and shall notify and await instructions from the Engineer.

Connection of the mast arm(s) or other required assembly shall be performed by the Contractor according to his selected installation methods.

The Contractor shall make special note of any aerial utilities within the area and coordinate his work accordingly.

All conduit caps or knockouts are to be removed from the conduit, which extends from the pole base and grounding insulated bushings installed. A #6 Copper ground wire shall be installed between the ¾" ground rod clamp and the grounding insulated bushings, and to the lug or stud in the metal pole or pedestal. On the multi-section steel camera poles, the #6 copper ground wire shall continue up to the top of the upper section of the pole from the grounding insulated bushing to a bonding lug attached to the camera mounting bolts. At no time shall the #6 wire be installed between the leveling nut and the pole.

Steel Mast Arm Pole or Steel Pole –

The steel pole shall be erected by a suitable hoisting device as approved by the Engineer. The Contractor shall insure that the hoisting device is rated for the weight and reach necessary. The Contractor shall use the equipment to raise the pole into position, place the pole on the anchor bolts, and shall hold the pole in place until the nuts have been installed and tightened on the anchor bolts in accordance with the applicable Plan sheets or Standard Construction Details.

On all steel pole installations a proper nut as shown on the plan details shall be used under the base of the pole and a proper nut shall be used above the base of the pole. Once the pole is set, the anchor bolt nuts shall be adjusted and tightened to properly position the pole as indicated on the applicable Plan sheets or Standard Construction Details. Once the pole is set in place, properly canted, and the nuts tightened, and the ground wire connected, the area between the base of the pole and the top of the foundation shall be formed

and grouted as indicated on the applicable Plan sheets or Standard Construction Details. The anchor bolt covers and hand hole cover shall be placed on the pole after the pole has been erected in place.

Pedestal Pole -

The pedestal pole shall be erected by hand. Once the pedestal is set in place, properly plumbed, the nuts tightened, and the ground wire connected, the contractor shall place the hand hole cover on the pedestal.

Wood Pole –

This work consists of installing wood poles with a butt plate and #6 bare copper ground wire from the butt plate to the top of the pole. A ground rod may be used in place of the butt plate. The pole shall be located as shown on the Plans and as directed by the Engineer.

The pole shall be erected in a hole at least 6 feet deep or the height of the pole divided by 6, whichever is larger. The hole shall be dug in such a manner as to preclude over-sizing the diameter.

Sufficient earth shall be placed in the hole to fill it completely and provide a ridge around the hole after it has been properly filled. During refill, the earth shall be placed in layers not to exceed one foot and shall be well tamped with a power tamper.

The pole shall be set vertically in all directions, unless otherwise specified.

Copper coated fasteners shall be placed not more than 3 feet apart on the ground wire.

The ground rod, if utilized, shall be driven vertically into the ground, shall extend 4 inches above ground level and shall be fastened to ground wire with ground clamp. Ground rods shall be a minimum of 10 feet in length. Butt plates and/or ground rods will be incidental to this bid item. The Ground Wire will be paid for under its respective item.

Lighting Pole with Arm and Luminaire –

This work consists of installing lighting poles, arms and luminaires on an existing base.

Electrical connection of the luminaire is also included. To make the connection, the Contractor shall furnish the following materials:

- Connector kits shall be of waterproof, molded synthetic rubber suitable for burial in the ground or exposure to sunlight. The cable connection shall be compression type, applied by means of a compression tool. Connectors shall be 600-volt, fabricated from high strength copper alloy, quick disconnect, in-line connectors, fused for ungrounded conductor and non-fused for neutral at each pole.
- #8 AWG wire
- Split bolt connectors
- Electrical tape

These materials, other than the #8 wire, are to be included in the price bid for this item. The wire will be paid under its respective item. The unit shall be attached to the existing service cable and tested. On wood poles, if the service cable is not available, a 5 foot tail shall be left at the pole end of the mast arm. On metal poles, the electrical connections and grounding of pole will be made in the base. If the service cable is not available, a 5 foot tail shall be left in the pole base.

Installation of the pole and arm shall be as specified under **Steel Mast Arm Pole** above.

Installation of Luminaire –

This item includes picking up the luminaire unit at the DelDOT sign shop, transporting it to the specified location and installing it on an existing pole to provide a fully functioning overhead light. The materials for connecting the luminaire (as listed above under "**Lighting Pole with Arm and Luminaire")** are also to be furnished as part of this item. These materials, other than the #8 wire, are to be included in the

price bid for this item. The wire will be paid under its respective item. The unit shall be attached to the existing service cable and tested. On wood poles, if the service cable is not available, a 5 foot tail shall be left at the pole end of the mast arm. On metal poles, the electrical connections and grounding of pole will be made in the base. If the service cable is not available, a 5 foot tail shall be left in the pole base.

Method of Measurement:

The quantity of poles will be measured on a per each basis as the number of poles installed as specified, complete and accepted under the applicable bid item listed above.
"Installation of Luminaire" will also be paid on a per each basis if the unit is being installed as a replacement or on a previously installed existing pole.

Basis of Payment:

General - Price and payment per each pole type shall include full compensation for picking up the materials at the DelDOT Sign Shop, transporting and setting the poles, and for all labor, tools, equipment, and incidentals necessary to complete the item.

Steel Mast Arm Pole or Steel Pole – In addition to the general statement, note that #6 Ground Wire will be paid for separately under its respective item. Any required fasteners for the ground are considered incidental to the Steel Pole being installed.

Pedestal Pole – As noted in general above

Wood Pole – In addition to the general statement, payment includes excavating the hole, furnishing and installing the butt plate or ground rod, and furnishing and installing fasteners for the ground wire.

Lighting Pole with Arm and Luminaire – In addition to the general statement, payment includes furnishing the listed materials, connecting, and testing the luminaire to result in a fully functioning light pole assembly. #8 wire will be paid for separately under its respective item.

Installation of Luminaire – This item includes picking up a luminaire, furnishing the listed materials, transporting, installing, and testing each luminaire. The item will be used for payment only when the luminaire is being installed as a replacement and/or on a previously installed pole. Luminaires installed as part of an entire light pole assembly are included for payment under the item titled "**Lighting Pole with Arm and Luminaire" (Item 746942).**

2/29/12

746517 - ALUMINUM LIGHTING STANDARD WITH SINGLE DAVIT ARM, 30' POLE
746518 - ALUMINUM LIGHTING STANDARD WITH SINGLE DAVIT ARM, 35' POLE
746519 - ALUMINUM LIGHTING STANDARD WITH SINGLE DAVIT ARM, 40' POLE
746520 - ALUMINUM LIGHTING STANDARD WITH DOUBLE DAVIT ARM, 30' POLE
746521 - ALUMINUM LIGHTING STANDARD WITH DOUBLE DAVIT ARM, 35' POLE
746522 - ALUMINUM LIGHTING STANDARD WITH DOUBLE DAVIT ARM, 40' POLE
746618 - ALUMINUM LIGHTING STANDARD WITH SINGLE DAVIT ARM, 45' POLE

Description:

The work consists of furnishing and installing Aluminum Lighting Standard with Single Davit Arm and/or Aluminum Lighting Standard Pole with Double Davit Arms, breakaway transformer base, luminaires, in accordance with the details on the Plans, and/or as directed by the Engineer to make a functional street lighting system. The foundation will be provided under other items in the contract.

Materials and Construction Methods:

All materials shall be of the best quality and free from all defects. No materials shall be installed until approved by the Engineer. Any material not specifically covered in these specifications shall be in accordance with accepted standards and as directed by the Engineer. Any materials deemed unsatisfactory by the Engineer, shall be replaced by the Contractor.

Lighting standards shall meet or exceed the requirements of the latest edition of AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals" based on 90 mph (145 km/hr) wind loads, luminaire weight of 70 lb (32 kg) and luminaire projected area of 3 ft^2 ($0.3m^2$). Computations confirming conformance with AASHTO Specifications, with the year of the edition specified, shall be submitted to the Delaware Department of Transportation.

All electrical materials shall conform to the requirements of the National Electrical Code of the national Fire Protection Association, and shall conform to all local and special laws and/or ordinances governing such installations. Where these requirements do not govern, and where not otherwise specified, electrical materials shall conform to the Standardization Rules of the Institute of Electrical and Electronic Engineers.

Shop drawings and catalog cuts for all electrical and related materials shall be submitted by the Contractor for approval.

The bolts are to be supplied by the Contractor. The bolts will be installed using a template, and set so that luminaire arm is perpendicular to the roadway.

Anchor bolts, nuts, couplings, washers, and cap screws shall be of carbon steel conforming to the requirements of ASTM A307, and hot-dip galvanized in accordance with AASHTO M 232/M 232M..

New aluminum lighting standards shall consist of a tapered aluminum shaft having a base welded to the lower end. The pole shaft, pole extensions, and davit arms shall each be spun from one piece of seamless tubing, the strut and arm plates shall be extruded, all of which conform to the requirements of ASTM B221 aluminum alloy 6063-T6. The shaft shall have no circumferential welds, except at the lower end joining the shaft to the base and shall conform to the dimensions listed in the chart below. The shaft shall contain an internal vibration dampening device positioned approximately 2/3 the height of the pole. The top of the lighting standard shaft shall be drilled for two 1/2" (13 mm) lockbolts to secure the davit bracket to the lighting standard shaft. If the pole is not placed on a transformer base, it will have one 3" x 5" (75 mm x 125 mm) handhole which after pole is set should face so that maintainer may view oncoming traffic.

HEIGHT OF POLE	DAVIT ARM LENGTH	OUTER DIAMETER	WALL THICKNESS
30' (9 m)	10' (3.0 m)	10" (250 mm)	0.156" (3.96 mm)
	12' (3.6 m)	10" (250 mm)	0.156" (3.96 mm)

HEIGHT OF POLE	DAVIT ARM LENGTH	OUTER DIAMETER	WALL THICKNESS
	15' (4.6 m)	10" (250 mm)	0.156" (3.96 mm)
	20' (6.1 m)	10" (250 mm)	0.156" (3.96 mm)
35' (10.5 m)	10' (3.0 m)	10" (250 mm)	0.156" (3.96 mm)
	12' (3.6 m)	10" (250 mm)	0.156" (3.96 mm)
	15' (4.6 m)	10" (250 mm)	0.156" (3.96 mm)
	20' (6.1 m)	10" (250 mm)	0.188" (4.78 mm)
40' (12 m)	10' (3.0 m)	10" (250 mm)	0.188" (4.78 mm)
	12' (3.6 m)	10" (250 mm)	0.188" (4.78 mm)
	15' (4.6 m)	10" (250 mm)	0.188" (4.78 mm)
	20' (6.1 m)	10" (250 mm)	0.219" (5.56 mm)
45' (13.5 m)	10' (3.0 m)	10" (250 mm)	0.188" (4.78 mm)
	12' (3.6 m)	10" (250 mm)	0.188" (4.78 mm
	15' (4.6 m)	10" (250 mm)	0.188" (4.78 mm)
	20' (6.1 m)	10" (250 mm)	0.250" (6.35 mm)

Bracket arms shall be of the davit type consisting of an aluminum shaft having the outer diameter and wall thickness as listed in the table above. The davit arm shall be designed to slip over the top of the lighting standard shaft for a distance of at least 12" (300 mm). The luminaire end of the davit arm shall be fitted with a 2" (50 mm) NPS aluminum pipe not less than 6" (150 mm) long. The height of the lighting standards will be determined by the Contractor to provide a nominal mounting height as shown on the Plans. The length of the davit arm will be as shown on the Plans or 12' (3.6 m) if not specified elsewhere. Davit arm less than 10' (3.0 m) long shall not be used without written permission from the Chief Traffic Engineer.

Each lighting standard shall be provided with a permanent tag which shall be 2" x 4" (50 mm by 100 mm) fabricated from clear anodized 1/16" (1.6 mm) thick aluminum. The edge shall be smooth and corners rounded and the tag shall be curved to fit the light standard shaft. Tags shall be secured to shafts by means of four (4) 1/8" (3 mm) diameter 18-8 stainless steel round head drive screws of self-tapping screws. The embossed identifying letters and/or numerals shall be not less than 3/4" (19 mm) high with stroke of not less than 3/16" (4.8 mm). Identifying letters and/or numerals shall be designated on the Plans.

Transformer Base: Transformer bases, when required, shall conform to the latest edition of AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaire and Traffic Signals".

Before any work, begins the Contractor shall submit documents showing that the breakaway device meets the current AASHTO Breakaway Design.

For breakaway installations, the standard shall electrically disconnect from the supply wire at the foundation when knocked down by an errant vehicle or from some other cause.

Luminaire: The luminaire shall have a precision die cast aluminum housing with an optical assembly, a removable mounting door and of wattage and type as specified on the Plans. The luminaire shall be of the multi-voltage ballast regulator type.

The refractor of the optical assembly shall be attached to the luminaire housing thru a hinge and latch arrangement. The optical assembly shall consist of a highly polished aluminum reflector, and a heat resistant shatter resistant borosilicate glass refractor. The refractor door shall be tightly sealed with an appropriate gasket. The latch for the refractor door shall be of sufficient size to enable easy handling and constructed of rust resistant materials; the latch shall produce an audible click when it is properly locked.

The luminaire shall be equipped with a porcelain, corrosion resistant socket. The socket shall be easily adjustable to give one of twelve different light distributions; such adjustments shall be accomplished through adjusting not more than two screws within the optical assembly. The socket in this installation shall be preset to provide a distribution pattern as indicated on the Plans or type III distribution pattern of luminaire if not indicated.

The luminaire shall have a 2 bolt slipfitting suitable for mounting on 1/2" to 2" (13 mm to 50 mm) pipe. The luminaire shall be designed with a leveling pad and capable of being adjusted ±5 degrees for proper leveling.

The luminaire shall be completely wired so that it shall require only the connection of the power supply cables to a terminal block for energizing the entire fixture.

In order to provide for normal exchange of air between the inside and outside of the optical system, a ventilating channel shall be provided.The channel shall contain a charcoal filter which will prevent the entrance of flying insects and other small animal life forms, as well as provide a cleaning action on the air to remove smoke and dust particles.

All major electrical components, including ballast and the photoelectric control, shall be mounted on a removable door assembly and connected to the fixture electrically through a quick disconnect plug. The removal of the door shall be accomplished by loosening the captive screw and unplugging the quick disconnect plug. The luminaire shall employ solderless push-on type connectors for all wiring connections to facilitate the replacement of any component.

The unit shall contain an integral ballast capable of maintaining the wattage of the H.P.S. lamp throughout the life of the lamp. The ballast and the photoelectric control shall be suitable for operating the units in the wattage as shown on the Plans. The wattage of the luminaires for this Contract are listed on the quantity sheet.

No luminaire shall be installed until the lamp socket position has been inspected and approved by the Engineer. If no light distribution pattern is given the socket position shall produce a light pattern as indicated on the Plans, then type III as designated in the specification for the luminaire. All luminaires shall be adjusted up or down on the slipfitter to provide maximum light on the roadway to be lighted. The connections between the luminaire and service cable shall be made with a connector kit using #10 AWG single wire. Installation of the connector kit shall be in accordance with the manufacturers recommendations.

The Contractor shall furnish and install one or more of the following luminaires or an approved equal as specified on the Plans and/or as required by the Utility owner.

STANDARD MATERIALS

LUMINAIRE 400 Watt High Pressure Sodium Roadway, with Photo Cell Receptacle and Field Replaceable 9110-60-25 Regulated Multi-voltage Ballast, Type III Light Pattern, or as shown on Plans, 1 1/2" - 2" (38 mm - 50 mm) Slipfitter

Cooper/Crouse Hinds OVY Swing-down	Cat. #OVY40SWW3ET4
GE M-400A Power/Door	Cat. #M4AR40S0A2GMN32

or approved equal;

LUMINAIRE 250 Watt High Pressure Sodium Roadway, with Photo Cell Receptacle and Field Replaceable 9110-60-26 Regulated Multi-Voltage Ballast, Type III Light Pattern, or as shown on Plans, 38 mm - 50 mm Slipfitter

Cooper/Crouse-Hinds OVY Swing-down	Cat. #OVY25SWW3ET4
GE M-250 A2 Power/Door	Cat. #M2AR25S0A2GMS32

or approved equal;

LUMINAIRE 100 Watt High Pressure Sodium Roadway, with Photo Cell Receptacle and Field Replaceable 9110-60-27 120V Regulator Ballast, Type II Light Pattern, or as shown on Plans, 1 1/4" - 2" (32 mm - 50 mm) Slipfitter

Cooper/Crouse-Hinds OVX Swing-down	Cat. #OVX10SK22ET4
GE M-250A2 Power/Door	Cat. #M24R10S1M1AMS21

or approved equal;

LUMINAIRE 70 Watt High Pressure Sodium Alley/Security, 120V with Normal Power Factor Ballast, Photo Cell, 9110-60-28 Lamp and Type II Acrylic Lens for Mounting on 1 1/4" - 2" (32 mm or 50 mm) Bracket (Not Included)

Cooper/Crouse Hinds RMA (Specify Less Bracket w/Type II Lens)	Cat. #RMA70SR222LV5
GE Type 201 SA (Specify Less Bracket w/Type II Lens)	Cat. #SAM07S1N5S4LV5ALC

or approved equal;

LUMINAIRE 70 Watt High Pressure Sodium Black Colonial, with 120V Photo Cell Receptacle, 120V Reactor 9110-69-34 Ballast, Type III Acrylic Lens, Black Finish with 3" (75 mm) Slipfitter

Cooper/Crouse-Hinds	Cat. #LXF70SR2334
GE TC 100	Cat. #T10R07S1N2AMS3BL
ITT American Rev.	Cat. #47-570E3-6

or approved equal;

Installations of Lighting Standards: Lighting Standards shall be installed and located in accordance with the Plans, to provide continuously aligned lighting.

The bracket arms shall be set perpendicular to the edge of the roadway unless otherwise ordered or specified. If necessary aluminum shims may be used to plumb the pole.

Method of Measurement:

The quantity of aluminum lighting standards with single on double davit arms of the size(s) specified will be measured as the actual number installed and accepted.

Basis of Payment:

The quantity of aluminum lighting standards with single or double davit arms will be paid for at the Contract unit price per each. Price and payment will constitute full compensation for furnishing all materials including concrete, labor, equipment, hardware, anchor bolts, washers, shims and nuts, supply and installation of the transformer base, supply and installation of poles and davit arm(s), and supply and installation of the luminaires. This price will also include all miscellaneous hardware, connector kits, and wiring from the supply cables to the luminaire(s), labor, tools, equipment, and incidentals necessary to complete the work.

6/25/13

746538 - BRIDGE ELECTRICAL SYSTEM

Description:

This work consists of furnishing and installing PVC conduit, fittings, junction boxes (hand holes), PVC sleeves and caps as shown on the Plans, as specified herein, and/or as directed by the Engineer.

Materials:

PVC Conduit - 2 1/2" schedule 80 rigid polyvinyl chloride (PVC) conduit, meeting Commercial Standard CS-272-65 (PVC), ASTM D-1785 and U.C. Standard 651 specifications.

RWIS (Road Weather Information System) Conduit - 1" diameter PVC Conduit, Schedule 80

Junction Boxes (Hand Holes) - shall meet ANSI Specifications, U.L. requirements and listed as raintight and shall accommodate the size and number of conduits shown on the Plans. Junction boxes/wells shall be galvanized steel alloy. The boxes shall be sized so that at least 1 1/2 inches of cover is maintained between the back side of the box and the back face of the concrete parapet wall.

PVC Sleeves - 6" Schedule 80 with cap

Shop drawings and/or catalog cuts for the above listed materials shall be submitted to the Engineer for approval. Weather sensors will be furnished and installed by others.

Construction Methods:

Prior to placing the concrete bridge deck, the Contractor shall install a vertical 6 inch PVC sleeve in the deck at the location of the weather sensor. Drill a hole in the sleeve to accept a 1 inch PVC conduit tied to the bottom of the top rebar mat. A 1 inch PVC conduit shall extend from the sleeve to a 9" x 9" x 6" junction box in the parapet face. A pull wire shall also be installed to facilitate wire installation through the conduit by others. The top of the PVC sleeve in the deck shall be capped to avoid concrete intrusion and shall be clearly marked following deck concrete placement so that it can be avoided during deck grooving operations and easily located by the weather sensor installer. DelDOT's Traffic Signal Construction manager (or representative) shall be contacted to review the RWIS conduit system set up prior to placing any deck or parapet concrete.

Prior to placing the Bridge Parapet Wall concrete, the Contractor shall extend the 1" inch weather sensor PVC conduit to a 9" x 9" x 6" Junction Box (Hand Hole) shown on the ITMS and Bridge plans. 2 ea 2 ½" PVC conduits shall be installed through the bridge and approach parapets, sweeping through and under the approach parapet wall moment slabs and exiting to junction wells located just outside the approach parapet and MSE wall limits. All conduits shall include a pull wire for future cable installation. Junction boxes in the bridge shall be positioned to avoid any fence posts and/or Guardrail to Bridge attachments and shall be flush with the front face of the parapet wall. Conduits exiting the structure shall be positioned to avoid all guardrail posts.

Prior to placing moment slab concrete, all conduits exiting the parapet walls must be installed through the parapets and beneath the concrete moment slabs, including any necessary sweeps to properly enter the Junction Wells outside of the structure. For this project, a second weather sensor is located in the hotmix pavement just north of the bridge structure in the SR 1 northbound lane. At this location, a 1 inch Schedule 80 PVC conduit shall be placed under (or through) the moment slab below the approach parapet prior to placing concrete. This conduit shall be extended under (or through) the Graded Aggregate Base Course to the Weather Sensor location where it shall enter a 6 inch PVC conduit placed vertically at the sensor location.

This conduit shall be capped and protected during placement of the GABC and hotmix. The location shall be clearly marked so that it can be located by Traffic's contractor for installation of the roadway sensor following paving operations. The other end of the 1 inch PVC conduit at this location shall be extended into the parapet wall above the moment slab and into a 9" x 9" x 6" Junction Box (Hand Hole) mounted flush with the parapet face.

Note that 2 additional 9" x 9" x 6" Junction Boxes (Hand Holes) shall be installed in the parapet walls at locations shown on the ITMS plans.

Method of Measurement:

The quantity of bridge electrical system will not be measured.

Basis of Payment:

The quantity of bridge electrical system will be paid for at the lump sum bid price. Price and payment will constitute full compensation for furnishing and installing the required 2 ½" Schedule 80 PVC conduits within the parapet walls, extending to the Junction Well(s) located outside the wall limits; 1" PVC conduit, 6" PVC sleeves with caps, fittings, conduit sweeps, junction boxes (hand holes) in the parapet wall, pull wires within all conduits, and for all labor, equipment, tools, and incidentals required to complete the work. All wiring inside the conduits will be performed by others. Junction Wells located outside the wall limits will be paid for separately under their respective bid item.

1/8/15

746653 - ELECTRICAL TESTING

Description:

This work consists of furnishing all materials, equipment, tools, and labor necessary to perform electrical testing in accordance with these special provisions, notes and details on the plans, and as directed by the Engineer.

When this item is required to test a highway lighting system constructed as part of the Contract, the item shall also include a one year warranty of the highway lighting system. The highway lighting system is understood to include all items of work performed under this Contract to provide lighting of roadways, bikepaths, parking lots, signs, etc.

Construction Methods:

Ground Resistance Testing

The ground resistance shall be measured with a three-terminal, fall-of-potential, direct-reading, battery-powered earth tester with a 0.50 to 500 ohm scale or digital read-out. The 25 ohm reading shall be approximately at mid scale.

The test shall be performed according to the manufacturer's instructions and OSHA requirements. The test shall be performed when the soil is dry. The Contractor shall not add any chemical or salt solutions to any portion of the grounding system. All grounding rods and foundation grounds to be tested shall be installed a minimum of ten days prior to testing unless otherwise determined by the Engineer in the field.

Two auxiliary copper clad ground rods shall be driven into the ground at a minimum distance of 3 feet (one meter). The lateral spacing for each test rod shall be given in writing on the test report form and the spacing shall be approved by the Engineer.

Each ground rod or foundation ground shall be isolated with the bond wires disconnected when the test is being performed. The resistance to ground shall be 25 ohms or less.

Unless noted otherwise on the plans, there shall be two ground resistance tests performed under this item of work.

System Testing

Insulation from ground and roadway lighting circuits shall be tested as follows:

(1) Insulation from Ground. All underground circuits shall be tested for resistance to ground with a megger both before and after the conduit and wiring have been buried and all ground rods have been installed and connected. No circuit shall measure less than 10 megohms to ground. Circuits that fail will be inspected, repaired, and retested.

(2) Roadway Lighting Circuits. The Contractor shall connect field wiring to the load center terminals. The entire lighting system shall be energized for ten consecutive days for ten hours each day at the time directed by the Engineer prior to initial acceptance. Failures occurring during this test period shall be corrected. The Contractor shall repair or replace any equipment, components, or system that fails during this test. A retest shall be performed on the repaired portion at the Engineer's direction.

All tests shall be performed in the presence of the Engineer, and test results shall be written, dated, and given to the Engineer for approval.

Highway Lighting System Warranty:

The Contractor shall secure the manufacturer's warranties and/or guarantees on electrical and/or mechanical equipment. These warranties and/or guarantees shall be submitted to the Department upon final acceptance of the completed highway lighting system. In addition to the manufacturer's warranties and/or guarantees, the Contractor shall warrant to the Department the complete, installed highway lighting system to be free of defects, as hereafter defined, for one calendar year beginning at the initial acceptance of the highway lighting system by the Department. The initial acceptance of the highway lighting system will occur upon the satisfactory correction of all deficiencies noted in the lighting system during the final inspection of the project.

The highway lighting system will be considered defective if any of the following conditions are discovered by visual inspection or by inspection with testing equipment within the warranty period:

1. Defective lamps or ballasts.
2. Failure to operate, in whole or in part.
3. Power wire grounding less than ten mega-ohms.
4. Shifts in pole/foundation alignment.
5. Short circuits or open circuits anywhere within the system.
6. Deterioration of finishes, plating, or paint not normal and customary in the environment in which the equipment is installed.
7. Settlement of trench backfill.
8. Defective fuses.
9. Defective or improperly installed splices.

These conditions listed shall not be considered all inclusive.

The highway lighting system is comprised of all Contract items for lighting, including but not limited to conduits, junction wells, cables, load centers, transformers, cabinet pads, pole bases, poles, high mast poles, light standards with and without davit arms, luminaires, sign lighting, service installations, and reworked/relocated existing lighting facilities.

There will be initial and periodic highway lighting system performance inspections after the Contractor has completed all the work. The initial inspection, to be conducted during the final construction inspection, will be to determine if the initial performance requirements are met. Periodic reviews will be conducted at monthly intervals through the warranty period to determine the sustained ability of the highway lighting system to meet the stated performance requirements.

The Department review team will be responsible for evaluating the highway lighting system within the project limits for both day and night acceptability considering all the possible defects listed above. If the highway lighting system is considered defective because of abnormal operation or deterioration (as listed above), the Department will require repair or replacement of the defective portion at its sole option.

All defective areas, which may include all highway lighting systems and components within the project limits, identified by the Department during initial or periodic inspections shall be repaired by the Contractor in accordance with this Section. All highway lighting system repair shall begin immediately following the notice to the Contractor of the lighting system defect unless weather limitations prevent the corrective work. The Department shall be given notification before the Contractor begins corrective work and shall be allowed full inspection of all operations and provided safe access to the areas being repaired.

If at any time during the warranty period, the highway lighting system or any portion thereof is rendered defective as a result of other than a manufacturing design or construction defect, the Department will repair, replace or revise said system at its sole option. The Contractor will not be held responsible for the cost to correct failures due to design defects in the highway lighting system.

Method of Measurement:

The quantity of electrical testing will not be measured.

Basis of Payment:

The quantity of testing will be paid for at the Contract lump sum price. Price and payment will constitute full compensation for furnishing all testing equipment, including ground rods; performing the tests; preparing the reports; and for all labor, equipment, tools, and incidentals required to complete the work. For highway lighting systems, price and payment will also constitute full compensation for providing the warranties.

5/24/02

746843 - POLE BASE TYPE 1
746844 - POLE BASE TYPE 2
746845 - POLE BASE TYPE 2A
746846 - POLE BASE TYPE 2B
746847 - POLE BASE TYPE 3
746848 - POLE BASE TYPE 3A
746849 - POLE BASE TYPE 3B
746850 - POLE BASE TYPE 4A
746851 – POLE BASE TYPE 4B
746852 - POLE BASE TYPE 6

Description:

This work consists of constructing and furnishing round or square pole bases Types 1, 2, 2A, 2B, 3, 3A, 3B, 4A, 4B, and 6 for poles in accordance with the Standard Construction Details and at locations as directed by the Engineer.

Materials:

The concrete for pole bases shall conform to Section 812, Class B.

Bar reinforcement shall meet the requirements of Section 603 Grade 60.

Ground rods shall be copper clad, approved by the Underwriter's Laboratory and be supplied with approved clamps for connecting the grounding conductor to the rod.

Conduit for sweeps shall meet the requirements for galvanized rigid steel conduit in Section 745.

Anchor bolts and/or breakaway couplings for all pole bases will be provided by the entity that supplies the pole.

"Drop-in" Expansion Anchors and Bolts for Type 4A Pole Bases shall be provided by the Contractor. The anchors shall be stainless steel and shall accept ½" diameter stainless steel bolts. Anchors shall be Concrete Fastener Systems Model DIS12, Hilti HDI SS 303 or approved equal.

Construction Methods:

The bases shall conform to the dimensions as indicated on the Standard Construction Details. A ground rod shall be installed as shown. A minimum of 8 feet (2.5 m) of the ground rod must be driven into undisturbed soil.

If a utility or a right-of-way conflict is found when a Type 2 or Type 3 base is specified in the Plans, an alternate base of equivalent strength may be used as directed by the Engineer. A Type 2 base has two equivalents, namely Types 2A and 2B. A Type 3 base has two equivalents, namely Types 3A and 3B.

Though the contract calls for the use of a round pole base, the Contractor may use a square base at its discretion.

The end of the conduit sweeps in the ground shall be extended outside the concrete and any forms or sheeting by 12 inches (300 mm) and capped or connected to the existing conduit. If the conduit is to be capped underground for future use, it must be sealed with a galvanized threaded conduit plug. Tape is NOT an approved conduit plug. The location of the conduits shall be marked on the base with arrows drawn in the wet concrete within 6 inches (150 mm) of the outer edge.

Excavation for the pole bases may not exceed the dimension of the foundation by more than 12 inches (300 mm) in any one direction. If a form is used in the excavation more than 18 inches (450 mm) below the ground surface, it is necessary that the area between the form and excavation be filled with Borrow Type C and tamped on all sides in continuous, horizontal layers not to exceed 68 inches (200150 mm) in depth, loose measurement.

Where a pole base is to be placed in existing concrete pavement such as a sidewalk, the concrete shall be saw cut in a square pattern or removed to the nearest joint. In other pavement material, a round hole may be cut using an appropriate tool. Any damage to the existing pavement shall be repaired at the Contractor's expense and shall meet the approval of the Engineer. Any removal or replacement of any type of pavement under this item shall be an incidental cost to this item.

The bases shall be edged and have a broom finish.

Where water or highly unstable material is encountered during the excavation for the pole base, pole base sheeting may be required and the following steps shall apply:

1. The condition exists in the upper half of the excavation. Stop all work until the Bridge Design Section reviews the condition.

2. The condition exists below the upper half of the excavation:
   a. For a proposed Type 4A or 4B Base, increase the depth to 4 feet (1.2 m).

   b. For a proposed Type 1, 2, or 3 Pole Base, substitute a Type 3A Pole Base for all but a Type 3B Pole Base. The depth of the base shall be as determined in (e) below, or 9 feet (2.7 m), whichever is greater.

   c. For a proposed Type 6 Pole Base, substitute a Type 2 Pole base and increase the depth in accordance with (d) below.

   d. Determine the depth of the base, which would be in the unsatisfactory area. Multiply that depth by 0.7 and add the result to the original required depth of the base to obtain the final depth of the base. The reinforcing bars shall be extended using the required pattern to match the final depth in accordance with the requirements of Section 603.07 of the Standard Specifications.

Method of Measurement:

The quantity of pole bases will be measured as the actual number of bases constructed, complete in place and accepted. Concrete, excavation and backfilling around the base, ground rods, anchor bolts (if applicable) and the two conduit sweeps in the base are included in this item.

Furnishing Borrow Type C backfill material will be measured and paid for separately by the cubic yard (cubic meter).

Payment for any additional sweeps shall be paid for separately under the appropriate conduit items. The Contractor's use of square base rather than a specified round base shall not result in any additional cost to the Department.

Basis of Payment:

Borrow Type C will be paid for under Section 210. No payment for Borrow Type C backfill material placed outside of the vertical plans located 18" (450 mm) outside of the neat line perimeter of the vertical face of the pole base foundation.

Any increase in the vertical dimension required herein shall be paid for separately under Item 746614, Pole Base Extension; another item of this contract.

The quantity of pole bases will be paid for at the Contract unit price for each pole base type. If an alternate pole base type is selected by the Engineer, payment will be the Contract unit price for the alternate selected. Price and payment will constitute full compensation for furnishing and placing all materials including concrete, ground rods, all elements shown on the applicable Standard Construction Details, anchor bolts (if applicable) and a minimum of two conduit sweeps extending into the base; for excavating, backfilling and compacting around the base; for repairs to damaged existing pavement; for removal or replacement of pavement; and for all labor, equipment, tools, and incidentals required to complete the work.

746906 – FURNISH & INSTALL 4 - CONDUCTOR #18 AWG SHIELDED OPTICOM CABLE
746907 - FURNISH & INSTALL 1- CONDUCTOR #2 AWG STRANDED COPPER
746908 - FURNISH & INSTALL 1- CONDUCTOR #4 AWG STRANDED COPPER
746909 - FURNISH & INSTALL 1- CONDUCTOR #6 AWG STRANDED COPPER
746910 - FURNISH & INSTALL 1- CONDUCTOR #8 AWG STRANDED COPPER
746911 - FURNISH & INSTALL 1- CONDUCTOR #10 AWG STRANDED COPPER
746912 - FURNISH & INSTALL 1- CONDUCTOR #14 AWG STRANDED COPPER
746913 – FURNISH & INSTALL 2 - CONDUCTOR #14 AWG ALUMINUM SHIELDED CABLE
746914 - FURNISH & INSTALL #6 BARE STRANDED COPPER GROUND
746915 - FURNISH & INSTALL #8/2 WIRE UF W/GROUND
746916 - FURNISH & INSTALL #8/3 WIRE UF W/GROUND
746918 - FURNISH & INSTALL #2/0 AWG STRANDED COPPER
746919 - FURNISH & INSTALL #4/0 AWG STRANDED COPPER
746920 - FURNISH & INSTALL #14/4 TRAFFIC CONTROL CABLE
746921 - FURNISH & INSTALL #14/9 TRAFFIC CONTROL CABLE
746922 - FURNISH & INSTALL #14/16 TRAFFIC CONTROL CABLE

Description:

The pay items listed above include furnishing, installing, and splicing if approved, the various types and sizes of cable in conduit, or overhead and lashed to a span wire. All conduit installation will be paid for under their respective items.

Materials:

Cable - All electrical cables shall be manufactured in conformance with the National Electrical Code, 600-Volt, UL approved.

1. Stranded or solid, single conductor copper cables shall be XLP Insulated; USE or RHW rated

2. Type UF cable shall include ground and the number and size of conductors as shown on the plans. Use cable conforming to ANSI/UL 493.

3. 14/4, 14/9, 14/16 AWG Solid copper conductor Traffic Signal cable shall conform to IMSA Specification Number 19-1. Provide wire size and number of conductors as shown on the plans or as directed by the Engineer. Additional material requirements for Traffic Signal Cables are as follow:
   a. If requested, the Contractor shall provide independent test results to verify specification compliance. Costs of testing are incidental to the Cable item being supplied.
   b. All cables shall be supplied on reels with each reel containing one continuous length of cable.
   c. Color code to be used as established by IMSA Specifications. In addition to IMSA, DelDOT requires that individual tracers contrast with the base color to allow easy identification between each base color and the same base color plus tracer.
      To test for sufficient color contrast, remove the sheath for a length of 6 inches. All filler material and tapes shall be removed for the same length. All conductors of the same base color will be placed side by side and all other conductors will be hidden. The conductors will be held against a white or ivory surface and viewed from a distance of 6 feet. The base color, tracer, and tracer color must be identified within a period of three seconds after being placed in position. The same test for contrast will also be made for base colors. If either the base color or tracer color test fails, the material will be rejected.
   d. The tracer line width shall not exceed 3/20 inch when measured perpendicular to the edge of the line. Also, the total width of tracer lines on a conductor may not be equal to or greater than one-half the total circumference of the conductor.

4. Aluminum Shielded Cable shall be shielded two conductor controlled capacitance cable enclosed in an aluminized polyester shield within a polyethylene jacket, rated to 600 volts. The two conductors are AWG # 14 stranded copper. Cable shall meet IMSA 50-2. Referred to as "Home-run Cable".

5. Opticom Cable - must meet the manufacturer's recommended specifications

Splicing Materials -

1. Insulating (rubber) tape shall be of the self-bonding type and shall be 3M Company, Inc. (Cat. No. 130C, 2228); Plymouth Rubber (Cat. No. 2212); Permacel (Cat. No. 253, P280), or an approved equal.

2. Jacket (plastic) Tape shall be of the waterproof type and shall be 3M Company, Inc. (Cat. No. 33); Plymouth Rubber (Cat. No. 3117); Permacel (Cat. No. P29), or an approved equal.

3. For overhead traffic control cable splices:
   Wire Nuts – Ideal 74B or 76B, 3M Highland H-33, or approved equal

Cable Installation

Installation in Conduit:

This work consists of installing various types, sizes, and number of communications or electrical cable(s) in existing conduits, which may or may not contain an existing communications or electrical cable(s) or wire(s). Conduits may be located underground, within mast arms, on wood poles, or on metal poles.

The number of cables to be pulled through each conduit will be as shown on the Plans or as directed by the Engineer.

Construction Methods:

All cable must be transported by and unreeled from a cable trailer(s). The laying of reels on the ground and subsequent removal of wire or cable from this position is prohibited. Avoid damaging cable insulation when removing cable from drums or reels, or during installation of the cable.

Hand pulling methods are required for conduit sizes of 1-1/2" or less and are **preferred** for all other sizes. Dynamometer is recommended for use when pulling other than by hand.

Prior to installation, **written approval by the Engineer is required** for the use of any power-assisted methods of pulling communications or electrical cable(s) or wire(s) into conduit. A short piece of material that will part if the strain exceeds the amount specified below shall be used between the pulling grip and the pulling medium, unless industry standards require less:

150 lbs. for all pulls up through 12 pair communications cable; and
300 lbs. for all larger cables

Any and all cable(s) pulled into any conduit without the use of an acceptable pulling grip, Kellems or equal, and without the use of a strain release element or by using methods which may have or did result in pulling forces in excess of strain release material, or using methods which may have or did result in pulling forces in excess of those set forth herein or prescribed by industry standards are **unacceptable.**

Any and all unacceptable cable(s) shall be removed and replaced with new cable(s) using correct methods at no cost to the Department.

The installation of cable(s) in existing conduits shall be accomplished by pulling the cable(s) through the conduits. If required, pulling lubricant of the type recommended by the cable manufacturer will be used. The cable(s) shall be prepared for pulling by reeling them from their respective reels as they enter the conduit or by taking sufficient length from the reel(s) to comprise the set to be pulled. Care shall be taken to avoid damaging insulation and to eliminate any twists or kinks and to marry the cables in a straight lay. Care shall also be taken to prevent entry of moisture into the cable at all times during installation. Cable ends will be sealed using rubber tape and painted with a sealing type of waterproof compound until final splices are made.

The cable(s) shall be hand fed into the conduit. When, in the opinion of the Engineer, additional radius is required to prevent damage to the cable(s) a sleeve shall be used. There shall be no additional payment made for sleeves or their use.

Underground cable runs shall be started at one terminal point and shall be continuous without splices to the final terminal point except for "Home Run Cable" to "Loop Detector Wire". Opticom cable shall not be spliced in any application.

Additional cable(s) shall be left and arranged in a neat and orderly manner as noted:

1. When pulled through junction wells, 6 feet of copper cable, supported on cable rack assemblies
2. At the control box and other splice locations, 6 feet of cable, neatly arranged and laced with cable ties

When cable already exists in a conduit, the Contractor shall ensure that the placement of a fish does not damage or entangle the existing wire or cable(s). The lead end of a fish shall contain a blunt terminal. Bending and/or taping the end of the fish shall not be satisfactory nor shall any termination which contains rough edges or any sort of hook that might engage an existing wire or cable when the fish is extracted.

Where two or more wires occupy the same conduit, they shall be drawn in together and kept parallel to each other by means of a pulling head. Phase legs shall be arranged circumferentially and in sequence around the neutral wires.

All conduit ends shall be duct sealed after cable installations.

Installation on Span Wire Overhead:

This work consists of installing electrical cable on an existing span wire.

Construction Methods:

All electrical cable must be transported by and unreeled from a cable trailer(s). The laying of reels on the ground and subsequent removal of wire or cable from this position is prohibited. Avoid damaging cable insulation when removing cable from drums or reels, or during installation of the cable.

The electrical cable will not be spliced at the top of the pole but will continue on to be taped onto the span wire. The electrical cable shall be oriented so water will not run along its length and run into the steel pole. The electrical cable shall be installed on the underside of the span wire with no crossover or wraps around the span wire. The electrical cable shall be pulled tight without any kinks and the jacket (plastic) tape wrapped tight around the span wire and electrical cable at least six wraps every twelve to fourteen inches.

At each signal head location, there will be a loop of signal cable 36 inches long.

Splicing:

Traffic Control Cable and Single Conductor Stranded Wire :

General – Traffic signal cable splicing shall only be made above ground in pole hand-holes, transformer bases or on span wire at the signal head. Underground traffic control cable splices (except between loop detector wire and "home-run" cable) or splices in between conduit runs are prohibited. After cables have been installed and pending permanent splicing, the end of each section of cable in the control box and at all splice locations shall be carefully sealed, using rubber tape, and painted with a sealing type of waterproof compound. The circuit number of all cables and wires shall be identified by color coded tape attached to each of the cables and wires in the control box and at all splice locations. The color coded tape shall be secured to the cable or wire with nylon cable ties. Any splices found to be faulty within 90 days of installation shall be remade at the Contractor's expense. Insulation from each conductor to be spliced shall be removed to expose ½ inch of copper. Use of any tool or method which might nick the conductor is prohibited. Each conductor not being spliced shall be inspected and trimmed so that the conductor does not extend beyond the insulation. After each conductor to be spliced is connected, all conductors both used and not used shall be returned to their original configuration before the insulation was removed and then sealed as specified.

Individual cables shall not extend beyond the splice of the last signal head for each signal phase.

Shielded Opticom cable shall not be spliced.

Shielded Aluminum Cable ("Home-Run cable") may be spliced only with the loop detector wire in a junction well. No splicing of the "home-run cable" outside of this junction well is permitted.

Overhead - Conductors to be electrically connected shall be placed side by side with the exposed copper aligned. The copper shall then be twisted clockwise with pliers until a good mechanical connection shall be effected. A proper size wire nut shall be installed and hand tightened. If necessary to cover all the copper, minor trimming may be done. The copper splice shall be 5/16 inch long when trimmed. Care shall be taken to ensure that no insulation is caught up in the copper area of the splice. It is essential that the splice be kept dry. Therefore, care must be taken during taping and by placement of the completed splice to prevent water from entering the splice between or around the cables.

1. **Termination of cable (Butt Splice) -** The sheath of each cable shall be removed as necessary. When all conductors to be joined have been completed, the splice shall be prepared for taping. The cables shall be placed in a butt position and all wires and wire nuts shall be positioned to ensure that no shorts exist and that the splice area is reduced to as small a diameter as possible. Taping shall begin with rubber tape two inches over the intact sheath. Taping shall proceed toward the other cable overlapping half of the tape width until a point two inches on the other cable sheath has been reached. Taping shall then be repeated in the other direction starting one tape width wider than the previous wrap. Where necessary to cover all areas of the splice, overlapping shall be increased. Every area of the splice shall have rubber tape at least four layers (two fully overlapped passes) deep. The rubber tape shall be covered with plastic tape applied in the same fashion.

2. **Taps or Tee Splices** - The sheath of the through cable shall be removed for a distance of 8 inches centered on the point of splice. The sheath of the branch cable(s) shall be removed for a distance of 4 inches. The through cable conductors which are to be joined to the conductors of the branch cable(s) are to be separated out from the others and cut. No other conductors shall be cut for any purpose. Depending upon the need, the branch cable(s) may be placed beside one of the through cables and the splicing proceed or the through cable may be doubled back so that the parts of the through cable and the branch cable(s) are placed side by side. When all conductors to be joined have been completed, the splice shall be prepared for taping. The cables shall be placed in approximately their final position and an inspection for shorts shall be made. After all wire nuts and wires are properly positioned, taping shall begin on the through cable 2 inches from the end for the sheath. It shall proceed with 1/2 inch width overlap across the splice area and onto the other through sheath for a distance of 2 inches. The taping shall start at the end point and return back across the splice to the branch cable(s). It shall proceed along the branch cable(s) and onto the sheath for a distance of one inch. A return along the branch back to the main cable shall be made and the remaining part of the splice shall be taped continuing as before. Every area of the splice shall have rubber tape at least four layers (two fully overlapped passes) deep. The cables shall be placed in their final position and taped with two fully overlapped passes of plastic tape. Plastic tape need not cover the interior areas covered by the rubber tape. The splice shall be placed so that the branch cable(s) enters the splice from below to prevent water from flowing along the branch cable(s) into the splice area.

3. **Termination End of Cable** - Dead ended cables shall have 3" of sheath removed. Each individual cable shall be rubber taped then bundled and re-taped with vinyl tape and coated with waterproofing compound.

Method of Measurement:

The quantity of cable will be measured as the actual number of linear feet of cable furnished and pulled through conduits (underground, in mast arms, or on poles) or installed on a span wire in accordance with these specifications, complete in place, and accepted.

All required cable slack left at termination points or in junction wells shall be measured as part of this item.

Basis of Payment:

The quantity of cable furnished and pulled through all conduit (underground, in mast arms, or on poles) or furnished and installed on a span wire will be paid for at the Contract unit price per linear foot of

the applicable pay item. Splice installations and all costs related to the splice shall be incidental to the linear foot payment of the cable being spliced. Price and payment will constitute full compensation for all labor, equipment, tools, materials, material testing, splicing, taping, and incidentals required to complete the work as specified above.

1/8/15

746924 - FURNISH & INSTALL LOOP WIRE 1 - CONDUCTOR #14 AWG CABLE ENCASED IN ¼" FLEXIBLE TUBING IN A LOOP SAWCUT

Description:

Sawcut and seal existing pavement, furnish and install loop detector wire, as shown on the Plans and applicable Standard Construction Details.

Materials:

1. **1-conductor #14 AWG Cable in ¼" Flexible Tubing -** shall consist of cable preinstalled in a polyethylene (PE) plastic duct meeting IMSA 51-5. Cable shall be rated for 600 volts. The cable shall have a temperature tolerance range of at least - 65 to + 176 degrees Fahrenheit. The conductor is AWG #14 stranded copper. Outside diameter of the cable is 0.25 inches. Referred to as "loop wire"

2. **2-conductor #14 AWG Aluminum Shielded Cable –** see specifications for furnish and install cable. Referred to as "home-run cable".

3. **Flexible embedding sealer** - a cold poured, resilient type epoxy joint sealer, Bondo P 606 or Duracote D115 for concrete or asphalt pavement or E Poxy Industry 36 1 for concrete or E Poxy Industry11 1 for asphalt pavement, or approved equal. A sealer accelerant or retarder may be added per the manufacturer's specifications.

4. **Backer Rod** - 5/8" closed cell foam

5. **Tape** - Vinyl electrical tape shall have a PVC base with rubber based pressure sensitive adhesive. The tape shall be a minimum 7 mils thick and be UL listed and marked per UL Standard 510 as flame retardant and cold resistant. It shall be compatible with synthetic cable insulations, jackets and splicing compounds and rated for wire and cable splices up to 600-volts.

6. For splices in Junction Well (see plan or Standard Construction detail):

   a. Dual Wall Heat Shrink Tubing – Heat-shrink tubing shall be medium or heavy wall thickness, irradiated polyolefin tubing containing an adhesive mastic inner wall. Minimum wall thickness prior to contraction shall be 40 mils. When heated, the inner wall shall melt and fill all crevices and interstices of the object being covered while the outer wall shrinks to form a waterproof insulation. Each end of the heat-shrink tube or the open end of the end cap of heat-shrink tubing shall, after contraction, overlap the conductor insulation at least one and one-half inches. Heat-shrink tubing shall conform to the requirements in UL Standard 468D and ANSI C119.1, for extruded insulated tubing at 600 V.

   b. Soldering iron with Rosin Core solder

   c. Splicing Kit- In-line barrel type design, resin encapsulating compound kit with UL486 rating. Suitable for use in wet or direct buried locations. Resin encapsulating compounds shall be acceptable for use at 16 degrees C.

Construction Methods:

Loop Wire Installation:

The pavement saw cut shall be 5/8" wide and 3½" deep. It shall be "wet-cut" in the directions and sizes specified on the Plans, Standard Details or as directed by the Engineer. Contractor shall remove sharp edges in the saw cut and round the corners.

The saw cut shall be blown out with compressed air to remove all dust, water and particles of loose material prior to sealing.

The loop detector wire will then be installed using blunt tools so as to prevent damage to the polyethylene outer cover. One end of a loop detector wire shall be tagged to indicate start ("S"). A 5/8" backer rod shall be placed into the entire length of the saw cut to secure the wiring. All loop detector wires shall be laid in saw cuts in a clockwise rotation beginning with "S". The Engineer may require a High Voltage Ground Test with a 500 VDC megger after the loop detector installation is complete and prior to sealing saw cuts. If the resistance to ground is less than 100 megohms, this work will be rejected.

A sealer and sealer accelerant or retarder (if necessary) shall be applied in accordance with the manufacturer's directions and protected from traffic until it has set. A minimum of 1 inch of sealer shall be installed on top of the loop detector wire and finished flush with the pavement. Drilled holes in the pavement shall also be sealed.

Two loop detector wires shall be installed in a saw cut from the loop to the edge of the road. These two wires shall then extend from the end of the saw cut to a junction well (see Plan Details). Wires shall be parallel, twisted a minimum of 5 wraps per foot, and taped every 12" to 18" from the end of the saw cut to a junction well up to the splice.

The loop detector wire shall be continuous and without splices from the junction well, through the saw cuts and conduit.

Home-run Wire Installation - refer to furnish and install cable specifications and conduit installation specifications. Refer to plans for details.

Splicing - splices between the loop detector wire and home-run cable shall be done in accordance with the Standard Construction or plan details.
Conductors to be soldered shall be placed side by side with the exposed copper aligned. The copper shall then be twisted clockwise with pliers until a good mechanical connection is affected. The splice shall be coated with flux, heated with a soldering iron, and rosin core soldered in a manner that minimizes insulation damage. After each soldered connection is completed, it shall be properly insulated with heat shrink tubing.

After the electrical and mechanical connection is completed and before the splicing kit is applied, a test shall be made by the Contractor to ensure that all circuits are complete. An approved splice kit shall be installed as per manufacturer's instructions. A continuity test will be performed at the cabinet by the Department technician after the splicing kit is applied. The Department will be notified of the test results. If the continuity test fails the Contractor shall remake the splice and/or loop at his own expense.

If a splice is found to be faulty within 90 calendar days of installation, it shall be the Contractor's responsibility to remake the splice at his own expense.

Method of Measurement:

The quantity of loop detector wire to be measured under this item shall be the number of linear feet of sawcut in which loop detector wire is installed, sealed, tested, and accepted. Sealer, sealer accelerant or retarder shall be incidental to this item. Loop detector wire routed through the rotary drill penetration is considered incidental to the cost of the loop installation. Conduit and associated home-run cable between the junction well and cabinet will be measured and paid for under their respective items, separate from this specification. Splicing of the loop detector wire to a home-run cable in a junction well shall be incidental to the cost of the loop wire.

Basis of Payment:

The quantity of loop detector wire supplied and installed will be paid for at the Contract unit price per linear foot, determined by measuring the footage of sawcut described above. Price and payment shall constitute full compensation for “wet”-sawcutting, furnishing and placing all materials including loop detector wire, backer rod, sealer, drilling required for installation, concrete and pavement patching, sealing the conduit ends, internal bushings shown on the plans, and for all labor, equipment, tools, and splicing in the junction well. The price bid per linear foot of this item shall also include drilling required for installation, concrete and pavement patching at the loop wire installation location, sealing the conduit ends, internal bushings shown on the plans, and all incidentals necessary to complete the item.

746925 - FURNISH AND INSTALL ELECTRICAL SERVICE PEDESTAL - SIGNAL AND ITMS COMPONENTS (100 AMP)
746926 - FURNISH & INSTALL ELECTRICAL SERVICE PEDESTAL - LIGHTING (200 AMP)

Description:

Electrical service equipment consists of the equipment necessary to connect a utility company service to a traffic control device cabinet, lighting control cabinet, traffic monitoring station cabinet, or other traffic control device cabinet. Provide electrical service equipment at the phasing and amperage specified in Contract Documents. The electrical service system shall be tested in full prior to acceptance. Testing to be paid separately under its respective pay item. This work also includes coordinating the connection with the local utility company.

Materials:

Meter Sockets:

Provide either ringed or ringless type meter sockets as required by the utility company. If a meter is not required, provide a ringless socket with suitable shunts and a metallic cover plate. Provide stainless steel hardware for attaching the meter socket to the aluminum plate.

Main Disconnect:

Main Disconnect shall be NEMA standard KS 1-2001. The Main Disconnect shall be an enclosed circuit breaker in a Type 4 stainless steel enclosure with external operating handle that operates a circuit breaker and enclosure cover interlock. The external switch mechanism handle shall have provisions for securing in both the ON and OFF positions by padlock.

For 100 AMP or 200 AMP service, single phase Main Disconnect shall have 2 poles with solid neutral and shall be rated at 240 Volts. Three phase Main Disconnect shall have 3 poles with solid neutral and shall be rated at 600 Volts. The design of the neutral bar may be factory or field installable. Main Disconnect shall be labeled as "suitable for use as service equipment".

Provide molded case circuit breaker with lugs and capacity to accommodate the specified conductors and current and conforming to Federal Specification W-C-375b. The main disconnect shall be rated for 10,000AIC for 120/240V services or 22,000 AIC for 277/480V services.

Steel Mounting Posts:

Galvanized steel as shown on Standard Detail sheet T-15

Aluminum Panel:

.08" Thick, 5052-H38 Alloy conforming to ASTM B-209

Galvanized Conduit Nipples:

Per plans and/or Standard Detail Sheet T-17

Ground Rods:

¾" x 10' sectional copperclad steel with one piece cast bronze ground clamps

Miscellaneous Hardware (clamps, washers, bolts, bushings, etc.):

As noted in the body of this specification

Construction Methods:

Utility Connection - Before any control equipment or material is ordered, arrange a meeting with the utility company representatives, Signal Construction Inspection representatives and the Engineer to establish a schedule for utility connections. Do not disconnect, de-energize, reconnect, tamper with, or otherwise handle any of the utility company's facilities. Make the utility service connection to the point of service supplied by the utility company. Make the necessary arrangements with the utility companies to ensure having needed utilities available at the time of turn on. Delays due to utility energization, connection, or disconnection will not be a basis for time extension. Report any difficulties in securing utility company services to the Engineer as soon as possible.

General Installation Procedures - Electrical Utility Service Equipment shall be installed per the standard construction or applicable plan details.

Method of Measurement and Basis of Payment:

Electrical Utility Service Equipment will be measured and paid for at the Contract unit price per each at the phasing and amperage specified; Item 746925 for 100 AMP Service and item 746926 for 200 AMP Service The payment will be full compensation for the safety switches, meter socket, meter, shunts, aluminum plate, ground rods, conduit risers, elbows, conduit nipples and adapters, condulets, bushings, nuts, bolts, steel support posts and braces, and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

All conduit from the service pedestal to the power source and from the service pedestal to the control cabinet will be measured and paid for separately under the applicable conduit item(s).

All cable will be measured and paid for separately under the applicable cable item(s).

Electrical Testing will be paid for separately under its respective bid item.

Utility connection coordination with the utility company will not be measured, but the cost will be incidental to these item.

Utility company energizing, connection, and disconnection costs will be the responsibility of the Department.

11/17/14

747508 - LIGHTING CONTROL CENTER - 100 A
747509 - LIGHTING CONTROL CENTER - 200A

Description:

This work consists of furnishing and installing a lighting cabinet and all necessary electrical equipment, as indicated on the Plans, Standard Construction details, or as directed by the Engineer.

Materials:

Cabinet

The service cabinets and doors shall have a minimum size of 44" wide by 48" tall by 25" deep (Type R).

The cabinets and doors shall be constructed form 5052-H32 sheet aluminum alloy with a thickness of 0.125”. External welds shall be made by using Heliarc welding method, internal weld, may be made by the wire welding method. All welds shall be neatly formed and free of cracks, flow holes and otherwise irregularities.

The outside surface of the cabinet shall have a smooth uniform, natural aluminum finish. The cabinets shall have a sloped top to prevent accumulation of water on its top surface.

The enclosure door frame shall be double flanged out on all four sides. These flanges increase strength of opening and keep dust and liquids from dropping into enclosure when door is opened. The cabinet door shall be hinged on the right side when facing the cabinet and shall be a minimum 80% of the front surface area. The door shall be gasketed to satisfy requirements of NEMA 4X enclosure.

The door shall have a heavy gauge continuous hinge with ¼” diameter stainless steel hinge pin. Hinge shall be secured with 1/4-20 stainless steel carriage bolts and stainless steel nylock nuts.

Cabinets shall be provided with a 5052-H32 aluminum alloy metal back panel of 0.125” minimum thickness. All mounting hardware shall be furnished. All internal hardware shall be either stainless steel or cadmium pressed steel Type II, Class I.

Cabinets finish shall be natural aluminum mill finish for Federal Specification QQA-250/8.

Panelboard

Panelboards for three phase service shall be rated for 277/480 volt, three phase, four-wire operation. Panelboards for single phase service shall be rated for 240 volt, single phase three-wire operation. The panel board shall be UL listed and have a minimum of 200 amp rated main busses and main lugs only for 200A services and 100 amp rated main busses and main lugs only for 100A services. It shall have a minimum of 30 spaces for branch circuit breakers. It shall have a minimum 22,000 RMS symmetrical ampere short circuit current rating for 277/480V services or 10,000 RMS symmetrical ampere short circuit rating for 120/240V services. It shall conform to Federal Specification W-P-115C, Type 1, Class 1.

A solidly bonded equipment ground bar and neutral bar shall be provided.

The panel board shall be mounted within its own enclosure. It shall be of dead front construction and be rated NEMA Type 1. Finish shall be gray baked enamel.

Branch Circuit Breakers

Provide circuit breakers of quantity and current rating as required by the plans for proper circuiting and provide two spare breakers of like current rating as the other lighting circuit breakers. Circuit breakers shall be UL listed and comply with NEMA Standards and Federal Specification W-C-375B. Circuit breakers shall be rated for 10 KAIC for 120/240 volt service or 22KAIC for 277/480 volt service.

Lighting Contactor, Photocell and Override Control

Provide a central lighting contactor. Lighting contactor shall be electrically held, two or three pole as required for the given service type. Contacts shall be rated for 200 amps at the given service voltage. Coil shall be rated for the same voltage as the light fixtures.

Provide a remote photoelectric light control (photocell) mounted on the side of the lighting control cabinet using an OLB condulet body. Photocell shall be a cadmium-sulphide type with fail-safe in the "on" position. It shall be enclosed in a weatherproof housing, not susceptible to distortion, discoloration, cracking or crazing. It shall be a plug-in, locking type for mounting in a receptacle meeting UL Specification 773. It shall be rated for 1800 VA for ballast type loads and used to energize a contactor. It shall be designed to operate at the required voltage and at -20 degrees F ambient temperature. It shall have a turn-off time delay to prevent false turn-off due to lightning, stray lighting or flashing lights.

Provide 600 volt-rated three position maintained contact selector switch (automatic-off-manual) for override of photocell control.

Construction Methods:

Service conduit shall be installed in accordance with DelDOT standard specification and utility company requirements. It will be paid for separately under its respective unit bid price item.

Cabinets shall be installed on the concrete pad using the method of attachment as noted on the Plan details, Standard Construction details, or as directed by the Engineer.

Electrical equipment shall be installed as indicated on the Plans.

Method of Measurement:

The quantity of lighting cabinets shall be the actual number of lighting cabinets furnished and installed, including the cabinet, all electrical equipment, photo electric cell, and incidentals, complete in place, operational and accepted.

Basis of Payment:

The quantity of lighting cabinets will be paid for at the Contract unit price per each at the phasing and amperage specified; Item 747509 for 200 Amp Service and Item 747508 for 100 Amp Service. Price and payment will constitute full compensation for furnishing and installing the cabinet, internal electrical materials, photocell, and for all labor, equipment, tools and incidentals necessary to complete the item.

The cabinet base, conduits (except for sweeps included in the cabinet base), and required wiring shall be paid for separately under their respective bid items.

11/17/14

747514 - CABINET BASE TYPE F
747515 - CABINET BASE TYPE M
747516 - CABINET BASE TYPE P
747517 - CABINET BASE TYPE R

Description:

This work consists of constructing cabinet base Type F, M, P and R in accordance with the Standard Construction Details or applicable Plan Details and at locations as directed by Plans or the Engineer.

Materials:

Class B Concrete
3/4" x 10' sectional copperclad steel ground rods (2 ea)
5/8" Zinc plated or Stainless Steel Drop-in Anchors manufactured by Hilti Systems, Concrete Fastening Systems, or approved equal
5/8" x 1-1/2" galvanized hex bolts
3/4" acorn type ground clamps
PVC conduit sweeps

Construction Methods:

The base shall conform to the dimensions as indicated in the cabinet base detail on the Standard Construction Details or applicable Plan Sheets. A concrete apron is only required when installed in earth areas or as directed by the engineer. Conduits entering the base must enter only in the designated area. A minimum distance of 1 inch shall be maintained between conduits and a minimum distance of 2 inches between conduits and the ground rods.

A minimum of 8 foot of the ground rods must be driven into undisturbed soil through the 2 inch PVC sleeve. The PVC sleeve shall be driven into the ground so that the top of the sleeve will be flush with the concrete when the base is poured.

Method of Measurement:

The quantity of cabinet bases will be measured as the number of bases constructed in accordance with these specifications, complete in place, and accepted.

All conduit sweeps extending into the cabinet base as shown on the Plans or Standard Details as applicable shall be included in the price for each cabinet base..

Basis of Payment:

The quantity of cabinet bases will be paid for at the Contract unit price per each. Price and payment will constitute full compensation for all concrete, ground rods, labor, equipment, tools, conduit sweeps, and incidentals required to complete the work as shown on the standard details or applicable Plan sheets.

1/8/15

748502 - RAISED/RECESSED PAVEMENT MARKER

Description:

This work consists of furnishing and installing raised/recessed pavement markers in accordance with the Plans and these specifications.

Materials:

The cast iron housing shall meet the requirements of ASTM A 536-84, Grade 72-45-84.

The reflectors shall meet the requirements of ASTM D 4383-03.

For installation on interstates, freeways, and principal arterials, the pavement marker shall have red reflectorized material on the back side (the side not facing the direction of traffic).

Epoxy shall meet the requirements of AASHTO M237, Type IV.

The followings models have been tested and approved by the Department and shall be used:

The followings models have been tested and approved by the Department and shall be used:

1. Ennis Paint - Stimsonite Model 101LPCR with Model C40 reflective pavement markers.
2. Ray-O-Lite Model 300 Snowplowable Marker with Model 2004 Reflector.
3. Or Approved Equal.

Construction Methods:

Pavement shall be saw cut to match the bottom contour of the marker housing using a saw and blade suitable for the pavement material being sawed. The depth of the cut slot must allow the housing to be set in epoxy, with leveling lugs resting on the pavement surface, so that the front edge of marker is at or below the surface of the pavement. Excessive saw cuts must be repaired to the satisfaction of the Engineer. When cutting is complete, the slot shall be cleaned as recommended by the manufacturer of the epoxy material. The epoxy and pavement marker will be installed in the prepared contour slot in the pavement per the manufacturer's recommendations.

Placement shall be in accordance with the DE MUTCD.

Method of Measurement:

The quantity of raised/recessed pavement markers will be measured as the actual number installed and accepted.

Basis of Payment:

The quantity of raised/recessed pavement markers will be paid for at the Contract unit price per each. Price and payment will constitute full compensation for furnishing all materials, installation, saw-cutting, cleaning, disposal of discarded materials, for all labor, tools, equipment, all necessary incidentals associated with the item to complete the work.

07/26/2011

748506 - PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, WHITE/YELLOW, 4"
748507 - PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, WHITE/YELLOW, 6"
748508 - PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, WHITE/YELLOW, 8"
748509 - PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, WHITE/YELLOW, 12"
748510 - PERMANENT PAVEMENT STRIPING, SYMBOL/LEGEND, EPOXY RESIN PAINT
748535 - PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, BLACK, 4"
748536 - PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, BLACK, 6"
748537 - PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, BLACK, 8"
748538 - PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, BLACK, 10"
748539 - PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, BLACK, 12"
748540 - PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, BLACK, 16"
748548 - PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, WHITE/YELLOW, 5"
748549 -PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, WHITE/YELLOW, 10"
748557 - PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, BLACK, 3"
748559 - PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, BLACK, 5"
748568 - PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, BLACK, 9"
748569 - PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, BLACK, 14"

Description:

This work consists of striping layout,furnishing and applying white or yellow, epoxy reflectorized pavement markings or black epoxy contrast pavement markings at the locations and in accordance with the patterns indicated on the Plans, or as directed by the Engineer, and in accordance with these specifications.

The white/yellow epoxy marking material shall be hot-applied by spray methods onto bituminous and/or Portland cement concrete pavement surfaces as required by the Plans. Following an application of double drop glass beads of two sizes and upon curing, the resultant epoxy marking shall be an adherent reflectorized stripe of the specified thickness and width that is capable of resisting deformation by traffic. All marking materials shall be certified lead free and free of cadmium, mercury, hexvalent chromium, and other toxic heavy metals.

The black epoxy marking shall be a two-component, hot-spray applied epoxy resin pavement marking material to be used for pavement marking on Portland cement concrete pavement surfaces. Following an aggregate drop, and upon curing, it shall produce an adherent stripe of specified thickness and width capable of resisting wear from traffic. Black contrast pavement markings will be required on all Portland cement concrete pavements.

Materials Requirements:

A. White and Yellow Reflectorized Epoxy

1. Epoxy Composition Requirements:

The epoxy resin composition shall be specifically formulated for use as a pavement marking material and for hot-spray application at elevated temperatures. The type and amounts of epoxy resins and curing agents shall be at the option of the manufacturer, providing the other composition and physical requirements of this specification are met.

The epoxy marking material shall be a two-component (Part A and Part B), 100% solids type system formulated and designed to provide a simple volumetric mixing ratio (e.g. two volumes of Part A to one volume of Part B).

Component A of both white and yellow shall conform to the following requirements:

	% BY WEIGHT	
	WHITE:	**YELLOW:**
Pigments	Titanium Dioxide - 18% Min. (ASTM D476, Type II)	Organic Yellow - 6%-10%
Epoxy Resin	75% Min., 82% Max.	70% Min., 77% Max.

The entire pigment composition shall consist of either titanium dioxide and/or organic yellow pigment. No extender pigments are permitted. The white pigment upon analysis, shall contain a minimum of 16.5% TiO_2 (100% purity).

Epoxy Content-WPE (Component A) - The epoxy content of the epoxy resin will be tested in accordance with ASTM D1652 and calculated as the weight per epoxy equivalent (WPE) for both white and yellow. The epoxy content will be determined on a pigment free basis. The epoxy content (WPE) shall meet a target value provided by the manufacturer and approved by the Department's Material and Research Section (from now on will be addressed as Department). A $\pm$ 50 tolerance 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 tested in accordance with ASTM D2074-66 to determine its total amine value. The total amine value shall meet a target value provided by the manufacturer and approved by the Department. A $\pm$50 tolerance will be applied to the target value to establish the acceptance range.

Toxicity - Upon heating to application temperature, the material shall not exude fumes which are toxic or injurious to persons or property.

Viscosity - Formulations of each component shall be such that the viscosity of both components shall coincide (within 10%) at a recommended spray application.

2. Physical Properties of Mixed Composition:

Unless otherwise noted, all samples are to be prepared and tested at an ambient temperature of 73 ± 5 F. (23 ± 3 C).

a. Color. The white epoxy composition when applied at a minimum wet film thickness of 20$\pm$1 mils (500 µm) as applicable and allowed to dry, shall plot within the boundaries described by the four corner points listed in Tables 1 and 2 of ASTM D 6628-01 when measured in accordance with the test methods prescribed in Section 7 of ASTM D 6628-01.

The yellow epoxy composition when applied at a minimum wet film thickness of 20$\pm$1 mils (500 µm) as applicable and allowed to dry, shall plot within the boundaries described by the four corner points listed in Tables 1 and 2 of ASTM D 6628-01 when measured in accordance with the test methods prescribed in Section 7 of ASTM D 6628-01.

b. Directional Reflectance. The white epoxy composition (without glass spheres) shall have a daylight directional reflectance of not less than 84% relative to a magnesium oxide standard when tested in accordance with Method 6121 of Federal Test Method Standard No. 141.

The yellow epoxy composition (without glass spheres) shall have a daylight directional reflectance of not less than 55% relative to a magnesium oxide standard when tested in accordance with Method 6121 of Federal Test Method Standard No. 141.

c. Drying Time (Laboratory). The epoxy composition, when mixed in the proper ratio and applied at a 20$\pm$1 mils (500 µm) minimum wet film thickness, and immediately dressed with large reflective glass spheres (Federal Spec. Type 4)at a rate of 12 lb/gal (1.4 kg/l) of epoxy pavement marking materials, immediately followed by a second drop of AASHTO M-247 Type 1 glass spheres applied at a rate of 12 lb/gal (1.4 kg/L) of epoxy pavement marking material, shall exhibit a no-track condition in 15 minutes or less (ASTM D711). A Bird Applicator or any other doctor blade shall be used to produce a uniform film thickness.

d. Drying Time (Field). When installed at a minimum wet film thickness of 20$\pm$1 mils (500 or 625 um) and reflectorized with glass spheres, the maximum drying times shall correspond to these temperatures:

80	F (27 C)	10 minutes
70	F (21 C)	10 minutes
60	F (16 C)	15 minutes

50	F (10 C)	25 minutes
40	F (4 C)	45 minutes
35	F (2 C)	60 minutes

The composition shall dry to "no-tracking" in approximately 10 minutes, and after thirty (30) minutes shall show no damaging effect from traffic. Dry to no-tracking shall be considered as the condition where no visual deposition of the epoxy marking to the pavement surface is observed when viewed from a distance of 100 feet (30 meters), after a passenger car is passed over the line. Regardless of the temperature at the time of installation, the installation contractor shall be responsible for protection of the markings material until dry to a non-tracking state.

e. Abrasion Resistance. The wear index of the composition shall not exceed 82 when tested in accordance with ASTM C501 using a CS-17 wheel and under a load of 1000 grams for 1000 cycles.

f. Tensile Strength. The tensile strength of the epoxy composition shall not be less than 6000 psi (41 MPa) when tested in accordance with ASTM D638 using a Type IV specimen [0.125" ± 0.010" (3.18 ± 0.25 mm) thick]. Tests shall be conducted at an ambient temperature of 75 ± 5 F (24 ± 3 C). The testing machine shall operate at a speed of 0.20" (5.1 mm) per minute.

The total conditioning or drying period, from the time the epoxy composition is first mixed to the time of testing, shall not be less than 24 hours nor more than 96 hours.

Test specimens for tensile strength determination will be prepared as follows:

A 1/8 inch (3 mm) thick sheet of epoxy material is cast from a reservoir-type mold, fabricated from polyterrafluorethylene (PTFE), 1/8" deep x 10" x 10" (3 mm deep x 250 mm x 250 mm).

Prior to casting, the mold is sprayed with a suitable release agent. A sufficient amount of epoxy composition is mixed in the proper proportions (A:B) and poured level with the top of the mold. Care should be taken so as not to decrease or exceed the 1/8" (3 mm) thickness.

After a period of 1 to 4 hours, the material will have set into a semi-rigid sheet that is flexible enough to die-cut yet rigid enough to retain its shape. While the material is in this "plastic" state, five (5) specimens shall be die-cut and then placed on a flat, smooth, PTFE surface for the completion of the specified conditioning period.

g. Compressive Strength. The compressive strength of the epoxy composition shall not be less than 12,000 psi (83 MPa) when tested in accordance with ASTM D695 except that a compression tool shall not be necessary. The test specimen shall be a right cylinder [0.50 inch diameter by 1.0 inch length (12 mm diameter by 25 mm length)]. Tests shall be conducted at an ambient temperature of 75 ± 5 F (24 ± 3 C).

The total conditioning or drying period, from the time the epoxy composition is first mixed to the time of testing shall not be less than 24 hours nor more than 96 hours.

Test specimens for compressive strength determinations will be prepared as follows:

Five molds will be prepared from 1/2" (12 mm) I.D., 1/16" (1.5 mm) wall thickness acrylic tubing, cut in 1 1/2" (38 mm) lengths. After spraying the inside of the mold with a suitable release agent,[1] the cylindrical tubes are placed in a vertical position on a PTFE sheet base. A sufficient amount of epoxy composition is thoroughly mixed in the proper proportions (A:B) and poured into the mold to a depth of approximately 1 1/4" (32 mm). After a minimum of 72 hours curing, the specimens are removed from the molds and machined to a length of 1" ± 0.002" (25 mm ± 0.05 mm).

h. Hardness. The epoxy composition when tested in accordance with ASTM D2240 shall have a Shore D hardness of between 75 and 100. Samples shall be allowed to dry for not less than 24 hours nor more than 96 hours prior to testing.

B. Reflective Glass Spheres/Beads

Reflective glass spheres for drop-on application shall conform to the following requirements:

The glass spheres shall be colorless; clean; transparent; free from milkiness or excessive air bubbles; and essentially clean from-surface scarring or scratching. They shall be spherical in shape and at least 80% of the glass beads shall be true spheres when tested in accordance with ASTM D1155. At least 80% of the Type IV beads shall be true spheres as measured by the visual method.

The refractive index of the spheres shall be a minimum of 1.50 as determined by the liquid immersion method at 77 F (25 C).

The silica content of the glass spheres shall not be less than 60%.

The crushing resistance of the spheres shall be as follows: A 40 lb. (18 kg) dead weight, for 20 to 30 (850 µm to 600 µm) mesh spheres shall be the average resistance when tested in accordance with ASTM D1213.

The glass spheres shall have the following grading when tested in accordance with ASTM D1214.

M247 AASHTO Type 1 Glass Spheres

U.S. Standard Sieve	% Retained	% Passing
#20 (850µm)	0	100
#30 (600µm)	5-25	75-95
#50 (300µm)	40-65	15-35
#100 (150µm)	15-35	0-5
Pan	0-5	

Type 4 Large Spheres

U.S. Standard Sieve	% Retained	% Passing
#10 (2000 µm)	0	100
#12 (1680 µm)	0-5	95-100
#14 (1410 µm)	5-20	80-95
#16 (1190 µm)	40-80	10-40
#18 (1000 µm)	10-40	0-5
#20 (850 µm)	0-5	0-2
Pan	0-2	

The AASHTO M247 Type 1 glass spheres shall be treated with a moisture-proof coating. They shall show no tendency to absorb moisture in storage and shall remain free of clusters and hard lumps. They shall flow freely from dispensing equipment at any time when surface and atmosphere conditions are satisfactory for marking operations. The moisture-resistance of the glass spheres shall be determined in accordance with AASHTO M247 test method 4.4.1.

Type IV glass spheres shall be treated with an adhesion coating. They shall show no tendency to absorb moisture in storage and shall remain free of clusters and hard lumps. They shall flow freely from dispensing equipment at any time when surface and atmosphere conditions are satisfactory for marking operations. The adhesion coating property of the Type IV beads shall be tested in accordance with the dansyl-chloride test.

C. Black Epoxy Contrast Markings

Epoxy Resin Requirements: The two-component, 100% solids, paint shall be formulated and designed to provide a simple volumetric mixing ratio (e.g. 2 part component A to 1 part component B)

specifically for service as a hot-spray applied binder for black aggregate in such a manner as to produce maximum adhesion. The material shall be composed of epoxy resins and pigments only.

The paint shall be well mixed in the manufacturing process and shall be free from defects and imperfections that may adversely affect the serviceability of the finished product. The paint shall not thicken, curdle, gel, settle excessively, or otherwise display any objectionable properties after storage. Individual components shall not require mixing prior to use when stored for a maximum of 6 months.

The overall paint composition shall be left to the discretion of the manufacturer, but shall meet the following requirements:

Composition:	Component	Percent By Weight
	Carbon Black (ASTM D476 Type III)	7±2 percent, by weight
	Talc	14±2 percent, by weight
	Epoxy Resin	79±4 percent, by weight

D. Black Aggregate

The moisture resistant aggregate shall meet the gradation requirements (AASHTO T27) as follows:

Sieve Size	Percent Retained
#30	18-28%
#40	60-80%
#50	2-14%

The moisture resistant aggregate shall have a ceramic coating. The aggregate shall be angular with no dry dispensement pigment allowed.

Hardness:	The black aggregate hardness shall be 6.5-7 on Moh's Mineral Scale.
Porosity:	The black aggregate porosity shall be less than two (2) percent.
Moisture Content:	The black aggregate moisture content shall be less than a half (.5) percent.

E. Packaging and Shipment

Epoxy pavement marking materials shall be shipped to the job site 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. Test Number
e. Date of Manufacture
f. Date of expiration of acceptance (12 months from date of manufacture)
g. The statement (as appropriate)
   Part A - Contains Pigment & Epoxy Resin
   Part B - Contains Catalyst
h. Quantity
i. Mixing proportions, Application Temperature and Instructions
j. Safety Information
k. Manufacturer's Name and Address

Reflective glass spheres shall be shipped in moisture resistant bags. Each bag shall be marked with the name and address of the manufacturer and the name and net weight of the material.

F. The Department reserves the right to randomly take a one-quart sample of white, yellow and hardener, of the epoxy material or glass spheres without prior notice for testing to ensure the epoxy material meets specifications.

Epoxy Application Equipment:

Application equipment for the placement of epoxy reflectorized pavement markings shall be approved by the Department, prior to the start of work.

At any time throughout the duration of the project, the Contractor shall provide free access to his epoxy application equipment for inspection by the Engineer or his authorized representative.

In general, the application equipment shall be a mobile, truck mounted and self contained pavement marking machine, specifically designed to apply epoxy resin materials and reflective glass spheres in continuous and skip-line patterns. The application 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 Engineer may approve the use of a portable applicator in lieu of truck mounted accessories, for use in applying special markings only, provided such equipment can demonstrate satisfactory application of reflectorized epoxy markings in accordance with these specifications.

The applicator shall be capable of installing up to 20,000 lineal feet (6,100 lineal meters) of epoxy reflectorized pavement markings in an 8-hour day and shall include the following features:

1. The applicator shall provide individual material reservoirs, or space, for the storage of Part A and Part B of the epoxy resin composition; for the storage of water; and for the storage of reflective glass spheres.

2. The applicator shall be equipped with heating equipment of sufficient capacity to maintain the individual epoxy resin components at the manufacturer's recommended temperature for spray application and for heating water to a temperature of approximately 140 F (60 C).

3. The glass spheres shall be gravity dropped upon 20 mils (500 um) of epoxy pavement markings to produce a wet-night-reflective pavement marking. The large spheres (Federal Spec. Type 4) shall be applied at a rate of 12 pounds per gallon (1.4 kg/L) of epoxy pavement marking material, immediately followed by a second drop of AASHTO M-247 Type 1 glass spheres applied rate of 12 pounds per gallon (1.4 kg/L) of epoxy pavement marking material. This application rate and the following gradation shall conform to FHWA's FP-96: Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects (pages 757-761 Type 3 and Type 4 Beads).

4. The applicator shall be equipped with metering devices or pressure gauges, on the proportioning pumps. Metering devices or pressure gauges shall be visible to the Engineer.

5. The applicator shall be equipped with all the necessary spray equipment, mixers, compressors, and other appurtenances to allow for the placement of epoxy reflectorized pavement markings in a simultaneous sequence of operations as described below in Construction Details, D. Applications of Epoxy Reflectorized Pavement Markings of this Special Provisions.

Construction Details.

A. General: All pavement marking and patterns shall be placed as shown on the Plans or as directed by the Engineer.

Before any pavement markings work is begun, a schedule of operations shall be submitted for the approval of the Engineer. This schedule shall be submitted 2 weeks prior to the application of the striping.

At least five (5) days prior to starting striping the Contractor shall provide the Engineer with the epoxy manufacturer's written instructions for use. These instructions shall include but not be limited to: mixing ratios, application temperatures, and recommendations for use of water spray.

The application of pavement markings shall be done in the general direction of traffic. Striping against the direction of traffic flow shall not be allowed.

The Contractor shall be responsible for removing, to the satisfaction of the Engineer, tracking marks, spilled epoxy or epoxy markings applied in unauthorized areas.

The hot water spray shall not be used in conjunction with markings applications on any pavement surface, or on any existing durable type marking, unless specifically recommended by the manufacturer of the epoxy material.

B. Atmospheric Conditions: Epoxy pavement markings shall only be applied during conditions of dry weather and on substantially dry pavement surfaces. At the time of installation the pavement surface temperature shall be a minimum of 35 F (2 C) and the ambient temperature shall be a minimum of 35 F (2 C) and rising. The Engineer shall be the sole determiner as to when atmospheric conditions and pavement surface conditions are such to produce satisfactory results.

C. Surface Preparations: The Contractor shall clean the pavement or existing durable marking to the satisfaction of the Engineer.

Surface cleaning and preparation work shall be performed only in the area of the epoxy markings application.

At the time of application all pavement surfaces and existing durable markings shall be free of oil, dirt, dust, grease and similar foreign materials. The cost of cleaning these contaminants shall be included in the bid price of this item. Also, the item shall include the cost of removal of the curing component in the area of the epoxy markings application, if concrete curing compounds on new portland cement concrete surfaces have been used. Waterblasting will not be permitted for removal.

D. Application of White/Yellow Epoxy Reflectorized Pavement Markings: White/yellow epoxy reflectorized pavement markings shall be placed at the widths and patterns designated on the Contract Plans.

Markings operations shall not begin until applicable surface preparation work is completed, and approved by the Engineer.

White/yellow epoxy pavement markings shall be applied at a minimum uniform thickness of 20 mils (500 µm) on all Portland cement concrete and bituminous concrete pavement, including Stone Matrix Asphalt.

Large reflective glass spheres (Federal Spec. Type 4) shall be applied at the rate of 12 pounds per gallon (1.4 kg/L) of epoxy pavement marking material, immediately followed by a second drop of AASHTO M-247 Type 1 glass spheres applied at a rate of 12 pounds per gallon (1.4 kg/L) of epoxy pavement marking material. Glass spheres shall uniformly cover the length and width of the pavement marking.

E. Application of Black Epoxy Contrast Pavement Markings: Black epoxy contrast pavement markings shall be placed at the widths designated on the Contract Plans.

Markings operations shall not begin until applicable surface preparation work is completed, and approved by the Engineer.

Black epoxy contrast pavement markings shall be applied at a minimum uniform thickness of 20 mils (500 µm) on all Portland cement concrete surfaces followed by a single drop of graded black aggregate.

The width of black epoxy line shall be applied for the following situations:

Center Skip Line - On Portland cement concrete pavements a black contrast skip line shall be 10 feet (3 m) in length of the same width as the white epoxy reflectorized skip. It is to lead the white skip and stop at the beginning of the white skip. The black contrast skip is to have a single application of graded black aggregate.

Edge Lines -White Edge lines on Portland cement concrete pavements shall have a 3 inch black contrast line running parallel to the white edge line. The contrast line shall be to the inside or travel lane side of the edge line. The black contrast marking is to be applied with a single drop of graded black aggregate. Once it has cured sufficiently so as not to track, the reflectorized white line is to be applied along side of the contrast line and the two lines shall adjoin each other.

Dotted Line: All dotted lines on Portland cement concrete pavements shall have a base of black contrast markings which is 4 inches (100 mm) wider than the reflective white marking. The black contrast marking is to be applied first with a single drop of graded black aggregate. Once it has cured sufficiently so as not to track, the reflectorized white line is to be applied on top of it. The reflective line is to be centered along the black contrast line such that a minimum of 2 inches (50 mm) of black contrast marking is visible on either side of the reflective marking.

F. Defective Epoxy Pavement Markings: Epoxy reflectorized pavement markings, which after application and curing are determined by the Engineer to be defective and not in conformance with this specification, shall be repaired. Repair of defective markings shall be the responsibility of the Contractor and shall be performed to the satisfaction of the Engineer as follows:

1. Insufficient film thickness [(less than 20±1 mils (500 µm) as applicable] and line widths; insufficient glass bead coverage or inadequate glass bead retention.

   Repair Method: Prepare the surface of the defective epoxy marking by shot blasting, sand blasting, or water blasting. No other cleaning methods will be allowed. Surface preparation shall be performed to the extent that a substantial amount of the reflective glass spheres are removed and a roughened epoxy marking surface remains.

   Immediately after surface preparation remove loose particles and foreign debris by brooming or blasting with compressed air.

   Repair shall be made by re-striping over the cleaned surface, in accordance with the requirements of this specification and at a full 20±1 mils (500 µm) minimum line thickness as applicable.

2. Uncured or discolored epoxy (brown patches); insufficient bond to pavement surface (or existing durable marking).

   Uncured epoxy shall be defined as applied material that fails to cure (dry) in accordance with the requirements of this specification under MATERIALS, A, 2d. DRYING TIME (FIELD); or applied material that fails to cure (dry) within a reasonable time period under actual field conditions, as defined by the Engineer.

   Discoloration (brown patches) shall be defined as localized areas or patches of brown or grayish colored epoxy marking material. These areas often occur in a cyclic pattern and also, often are not visible until several days or weeks after markings are applied.

   Repair Method: The defective epoxy marking shall be completely removed and cleaned to the underlying pavement surface to the satisfaction of the Engineer.

   The extent of removal shall be the defective area plus any adjacent epoxy pavement marking material extending one foot (300 mm) any direction.

   After surface preparation work is complete, repair shall be made by re-applying epoxy over the cleaned pavement surface in accordance with the requirements of this specification.

3. Reflectivity for epoxy resin paint.

After satisfactory completion of all striping work and written notification from the Contractor, the Department shall test the striping to ensure it has the minimum reflectivity. The testing will be completed within 30 calendar days from notification. The Contractor may request that tests be conducted on completed phases or portions of the work. Approval of such a request will be at the discretion of the Engineer. Testing will be done using a LTL-X Retrometer (30 meter geometry). Five readings will be taken per line per mile (1.6 km). Projects less than 1 mile (1.6 km) in length will have a minimum of 5 readings per line. These readings will then be averaged for the overall project average.

The required average minimum initial reflectivity reading in millicandellas shall be:

White 450
Yellow 325

Any single reading shall not be less than 350 millicandellas for white and 250 millicandellas for yellow. Without exception, any pavement markings installed that does not meet the above average minimum initial reflectivity numbers shall be removed and replaced, at the installation contractor's expense.

Other defects not noted above, but determined by the Engineer to need repair, shall be repaired or replaced as directed by and to the satisfaction of the Engineer.

All work in conjunction with the repair or replacement of defective epoxy reflectorized pavement markings shall be performed by the Contractor at no additional cost to the State.

Method of Measurement:

The quantity of permanent pavement striping (white, yellow, or black epoxy resin paint) will be measured by the number of linear feet (meters) of pavement striping line and number of square feet (meter) of symbol installed on the pavement and accepted in accordance with the Plans.

Basis of Payment:

The quantity of permanent pavement striping (white, yellow, or black epoxy resin paint) payment will be paid for at the Contract unit price per linear foot (meter) for 3", 4", 5", 6", 8", 9", 10", 12", 14", 16" (75 mm, 100 mm, 125 mm, 150 mm, 200 mm, 225 mm, 250 mm, 300 mm, 350 mm, or 400 mm) line and the Contract unit price per square foot (meter) of symbol. The quantity of permanent pavement marking (white, yellow, or black epoxy resin paint) will be paid for at the Contract unit price per linear foot (meter) of line and the Contract unit price per square foot (meter) of symbol. Price and payment shall include striping layout, cleaning and preparing the pavement surface, and placing all materials, for all labor, tools, equipment and incidentals necessary to complete the work.

NOTE:

For information only:

The following manufacturers are known to us which manufacturer Epoxy Resin Paint for Pavement Striping. The Department does not endorse or require the use of any of the manufacturers listed below. However, a bidder wishes to use another manufacturer's product, it shall be submitted for review and approval prior to submitting a bid proposal. Should the product be deemed unacceptable by the Department, the successful bidder will be required to use only an approved product.

1. POLY CARB, Inc.
   33095 Bainbridge Road
   Solon, Ohio 44139
   Tel. 1-800-CALLMIX

2. IPS - Ennis Paint
   P.O. Box 13582
   Research Triangle Park, North Carolina 27709
   Tel. 1-877-477-7623

3. Epoplex
   One Park Avenue
   Maple Shade, NJ 08052
   Tel. 1-800-822-6920

4. Or an approved equal.

8/7/2013

748530 - REMOVAL OF PAVEMENT STRIPING

Description:

This work consists of removing pavement markings of all kinds including paint, tape, etc., in accordance with this special provision, notes on Plans and/or as directed by the Engineer. The Contractor shall coordinate with the Engineer for maintaining traffic during the operation, prior to starting the work.

Materials and Construction Methods:

Paint and Epoxy Resins:
Shot/abrasive grit blasting or water blasting equipment shall be used for removal of markings from pavement surfaces.

Alkyd Thermoplastic:
In addition to the removal techniques discussed for paint and epoxy, grinding (erasing machines) equipment may also be used for removal of markings from pavement surfaces.

The removal operation shall be performed in a manner that will not damage the pavement surface.

The Contractor shall collect and dispose of all shot/abrasive grit and pavement marking materials removed from the pavement surface. Washing or sweeping such material to the roadside will not be permitted.

After removal of striping on bituminous concrete asphalt sealer shall be used to cover any exposed aggregate or embedded paint at no additional cost.

Method of Measurement:

The quantity of pavement striping removal will be measured as the number of square feet (meters) of pavement striping removed and accepted. The area of lines will be calculated by multiplying the nominal width of line times the length and the area of symbols will be as specified in Subsection 748.10 of the Standard Specifications.

Basis of Payment:

The quantity of pavement striping removal will be paid for at the Contract unit price per square foot (meter) for "Removal of Pavement Striping". Price and payment shall be full compensation for furnishing all materials, removing the pavement markings, disposing of the removed marking material, covering up the exposed aggregate, and for all labor, equipment, tools and incidentals necessary to complete the work.

Note:

There will be no measurement and payment for removal of pavement markings placed incorrectly by the Contractor.

5/21/2013

748541 - PREFORMED RETROREFLECTIVE THERMOPLASTIC PAVEMENT MARKINGS, 4”
748542 - PREFORMED RETROREFLECTIVE THERMOPLASTIC PAVEMENT MARKINGS, 6"
748543 - PREFORMED RETROREFLECTIVE THERMOPLASTIC PAVEMENT MARKINGS, 8"
748544 - PREFORMED RETROREFLECTIVE THERMOPLASTIC PAVEMENT MARKINGS, 12”
748545 - PREFORMED RETROREFLECTIVE THERMOPLASTIC PAVEMENT MARKINGS, 16"
748546 - PREFORMED RETROREFLECTIVE THERMOPLASTIC PAVEMENT MARKINGS, SYMBOL/LEGEND
748553 - PREFORMED RETROREFLECTIVE THERMOPLASTIC PAVEMENT MARKINGS, BIKE SYMBOL
748554 - PREFORMED RETROREFLECTIVE THERMOPLASTIC PAVEMENT MARKINGS, PEDESTRIAN SYMBOL
748555 - PREFORMED RETROREFLECTIVE THERMOPLASTIC PAVEMENT MARKINGS, HANDICAP SYMBOL

Description:

This work consists of furnishing and installing preformed retroreflective thermoplastic pavement marking with a preapplied Federal Specification Type IV glass bead coating throughout its entire cross section on bituminous asphalt pavement at the locations and in accordance with the patterns on the Plans, or as directed by the Engineer.

The preformed retroreflective markings shall conform to the size and dimensions as shown in the Federal “Standard Highway Signs” book found at: http://mutcd.fhwa.dot.gov/SHSe/pavement.pdf as referred to in the Delaware Manual on Uniform Traffic Control Devices, Part 3, Markings.

Materials:

General: Only materials listed on the Department’s Approved Pavement Markings Material List will be used for this item. The preformed retroreflective markings shall be fusible to bituminous asphalt pavement by means of the normal heat of a propane type of torch. Adhesives, primers or sealers are not necessary prior to the preformed retroreflective markings application on bituminous asphalt pavement.

The preformed retroreflective markings shall conform to pavement contours, breaks and faults through the action of traffic at normal pavement temperatures. The markings shall have resealing characteristics and be capable of fusing to itself and previously applied worn hydrocarbon and/or alkyd thermoplastic pavement markings.

The preformed retroreflective markings shall be capable of application on bituminous asphalt pavement wearing courses during the paving operation in accordance with the manufacturer's instructions. After application the markings shall be immediately ready for traffic. The preformed retroreflective markings shall be suitable for use for one year after the date of receipt when stored in accordance with the manufacturer's recommendations.

The preformed retroreflective thermoplastic markings shall not be brittle and must be sufficiently cohesive and flexible at temperatures exceeding 50ºF (10ºC) for one person to carry without the danger of fracturing the material prior to application.

Composition: The retroreflective pliant rosin ester thermoplastic pavement markings shall consist of a homogeneous mixture of high quality polymeric thermoplastic binders, pigments, fillers and glass beads. The thermoplastic material must conform to AASHTO M249-79(86) with the exception of the relevant differences due to the material being preformed, and identified herein.

Intermix Glass Beads: The preformed retroreflective material shall contain a minimum of 30% glass spheres which shall conform to AASHTO M247-81 Type 1. Glass spheres shall have a minimum of 80% true spheres overall.

Top Beads: To provide the required retroreflectivity, the preapplied factory top coating of glass beads shall be a combination of both Federal Spec. Type IV and AASHTO M247-81 Type I beads. Federal Spec. Type IV beads shall be evenly disbursed across the entire surface of the product at a minimum rate of 4 lb. (1.8 kg) per 100 ft^2 (9.3 m^2) and the AASHTO at 3 lb.(1.4 kg) per 100 ft^2 (9.3 m^2). In combination, the total glass bead coverage shall be 7-8 lb. (3.2-3.6 kg) per 100 ft^2 (9.3 m^2). The AASHTO M247-81 Type I beads shall have a minimum of 80% true spheres overall and the Federal Spec. Type IV beads shall be 80% true spheres on the 12 and 14 sieves and shall be no less than 75% true spheres on the remaining sieves.

Retroreflectivity: After satisfactory completion of all striping work and written notification from the contractor, the Department shall test the striping to ensure it has the minimum reflectivity. The testing will be completed within 30 calendar days from notification. Testing will be done using a Delta LTL 2000 Retrometer (30 meter geometry). The required minimum initial reflectivity reading in millicandellas shall be:

White 300
Yellow 200
Blue 200

Skid Resistance: The surface of the preformed retroreflective thermoplastic markings shall provide a pre-appled minimum skid resistance value of 45-51 BPN and a post-applied minimum skid resistance value of 45-55 BPN when tested according to ASTM E303-74.

Thickness: The thickness of the supplied material shall have a minimum average thickness of .090" (90 mils) for all Longitudinal lines and a thickness of .125" (125 mils) for all transverse lines and symbols/legends.

Tensile Strength and Elongation: The preformed retroreflective thermoplastic material shall have a minimum tensile strength of 150 lb. per square inch (1054 kg per square mm) of cross section, at .002" (2.28 mil) thickness, when tested according to ASTM D638-76 except that a sample 6" by 1" (150 mm by 25 mm) shall be tested at a temperature between 70ºF and 80ºF (21ºC and 27ºC) using a jaw speed of 10" to 12" (250 mm to 300 mm) per minute. The sample shall have a maximum elongation of 20% at break when tested by this method.

Flexibility: The preformed retroreflective thermoplastic marking material shall have flexibility at 50ºF such that when a 1" by 6" (25 mm by 150 mm) sample is bent through an arc of 90 degrees at a uniform rate in 10 seconds (9 degrees per second) over a 1" (25 mm) mandrel, no cracking occurs in the test sample. The sample must be conditioned prior to testing at 50ºF±2 degrees (10ºC) for a minimum of four hours. At least two specimens tested must meet the flexibility requirements at 50ºF (10ºC) for a passing result.

Environmental Resistance: The applied markings shall be resistance to deterioration due to exposure to sunlight, water, oil, diesel fuels, gasoline, pavement oil content, salt and adverse weather conditions.

Effective Performance Life: When properly applied, in accordance with manufacturer's instructions, the preformed retroreflective pavement markings shall be neat and durable. The markings shall remain skid resistant and show no lifting, shrinkage, tearing, roll back or other signs of poor adhesion for a period of one winter season.

Oil/grease Resistant Test: The preformed retroreflective thermoplastic material shall not dissolve or smear after rubbing a small amount of motor oil on a small piece of the thermoplastic material for two minutes.

Bond Strength: The material shall exhibit a bond strength to Portland Cement Concrete (PCC) equal or exceed 180 psi when tested at room temperature (73.4±3ºF) (23ºC) in accordance to ASTM Standard Test Method for Bond Strength of thermoplastic marking Material D4796-88. Place a coarse brick in a 400ºF (204ºC) oven for 5 minutes. Prepare a 4 square inch test specimen. Place the test specimen on the brick and further heat in the 400ºF (204ºC) oven for 15 minutes. The test specimen is then allowed to cool to room temperature and prepared for testing.

Low Temperature Cracking (Stress) Resistance for Extended Period: The material shall be tested according to AASHTO T250 Section 7 with Section 7.2.3 modified for and extended cold temperature 15 degrees ±3°F (-9.4±2°C) exposure period 72 hours. Any cracking shall constitute failure of the material for PCC road surfaces.

Impact Resistance (Gardner Falling Weight): A 2" by 7.5" (50 by 190 mm) specimen shall be applied on a course concrete brick. Using a Gardner Impact Tester, a 2 lb (.91 kg) weight is dropped from a height of 80" (2032 mm). The specimen when tested at room temperature 73.4±3°F (23°C) should show no sign of cracking. (Test procedure is in accordance with ASTM D5420-93).

Packaging: The flexible preformed retroreflective thermoplastic marking materials, for use as transverse or longitudinal markings as well as legends, arrows and symbols shall be available in flat form material or in rolls. Flat material shall be supplied in maximum of 4' (1.2 m) lengths up to 2' (.6 m) in width. The material shall be packed in suitable cartons clearly labeled for ease of identifying the contents.

Construction Methods:

The markings shall be applied in strict accordance with the manufacturer's recommendations on clean and dry surfaces. Marking configurations shall be in accordance with the "Delaware Manual on Uniform Traffic Control Devices, Part 3, Markings."

The preformed retroreflective thermoplastic material shall be fusible to the pavement by means of a propane torch recommended by the manufacturer. Preheating the surface to remove any latent moisture will be done just prior to the placement and installation of the Symbol/ Legend.

No markings shall be placed when the ambient temperature is below 40°F (4°C). The material shall be kept in a location above 55°F (13°C) until just before application.

The supplier shall provide technical services as may be required.

Method of Measurement:

The quantity of pavement striping (748541-748545) will be measured by the number of linear feet (linear meters) of 4”, 6”, 8”, 12”, or 16” pavement striping line placed and accepted. The quantity of symbol/ legend (748546) will be measured by the number of square feet (meters) of symbol/legend placed and accepted. The quantity of bike symbol, pedestrian symbol, and handicap symbol (748551-748553) will be measured as each placed and accepted. The dimensions for the symbol/legends are as follows:

Bike Rider with Helmet shall be 3’ X 5’.
Pedestrian shall be 4’ X 8’.
Handicap Symbol shall be 40” X 40”.

Basis of Payment:

The quantity of pavement striping payment will be paid for at the Contract unit price per linear foot (linear meter) for 4”, 6”, 8”, 12” and 16” (100 mm, 150 mm, 200 mm, 300 mm, and 400 mm) line. The quantity of symbol/legend will be paid for at the Contract unit price per square foot (meter). The quantity of bike symbol, pedestrian symbol, and handicap symbol will be paid for at the Contract unit price per each. Price and payment shall include cleaning and preparing the pavement surface, and placing all materials, for all labor, tools, equipment and incidentals necessary to complete the work.

Warranty:

The Contractor shall warrant to the Department that the installed retroreflective preformed thermoplastic pavement markings are free of defects, as hereafter defined, for a period of one winter season beginning at the initial acceptance of the marking installation by the Department. The initial acceptance of the marking installation will occur upon the satisfactory correction of all deficiencies noted in the marking installation during the Final Inspection of the project. The markings shall be warranted against failure due to blistering, excessive cracking, bleeding, staining, discoloration, oil content of the pavement materials, smearing and spreading under heat, deterioration due to contact with grease deposits, oil, diesel fuel, or

gasoline drippings, chipping, spalling, poor adhesion to the pavement materials, vehicular damage, and wear from normal maintenance activities including snow plowing.

The Contractor shall repair all defective areas identified by the Department after initial installation or during the Warranty Period. All repairs shall begin immediately following the notice to the Contractor by the Department unless weather limitations prevent the corrective work. Should the contractor not commence work within the period stated in the notice, weather permitting, and pending severity, the Department reserves the right to remedy the condition and charge the contractor for the work. Any corrective work shall be as recommended by the manufacturer of the marking material and approved by the Department. The Department shall be given notification before the Contractor begins corrective work to allow for inspection of the operation. All costs associated with the repair work shall be the responsibility of the contractor. These costs shall include, but are not limited to, removal, material, maintenance of traffic, etc.

2/28/09

749500 – SIGN PANEL
749578 - EXTRUDED SIGN PANEL GROUND MOUNTED TYPE III SHEETING (FEDERAL)

Description:

This work consists of furnishing all materials, fabrication, and erection of new extruded aluminum sign panels, complete with demountable copy, connections to supports, and other incidentals as are shown on the Plans, or described in the special provisions to be used for all federally funded projects.

The item shall also include removing and transporting of the existing sign panels before fabricating and erecting new sign panels, if such requirement is specified on the Plans.

Design:

Sign panels and their connections to supports shall be designed for applicable loadings and allowable stresses specified for supports. All panels, stiffeners and subframing shall conform with any pertinent requirements set forth in the AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaries, and Traffic Signals" with subsequent revisions. No method of stiffening will be allowed which would require rivets, bolts, screws, or nuts perforating the message face. The Contractor shall submit detail drawings showing the details for fabrications of the panels and support connections for prior approval.

Extruded Aluminum:

Extruded aluminum sign panels shall have demountable copy. After installation of the signs is completed, they will be inspected. If specular reflection is apparent on any sign, its positioning shall be adjusted by the Contractor, as directed by the Engineer.

Sign Panel Size: Sizes of sign panels having demountable copy have been based on the 3M Company spacing charts. All letters shall be placed in accordance with manufacturer's spacing charts. Overall horizontal and vertical dimensions shall be in 6" (150 mm) increments.

Materials:

The overhead sign sheeting shall be wide angle, prismatic, retroreflective sheeting. The coefficients of retroreflection, Ra, shall not be less than the minimum values specified in the following table when tested in accordance with ASTM E 810. This table contains “core” values as found in ASTM D 4956. The 0.1 observation angle is not required for this item.

Minimum Coefficient of Retroreflection R_A
(Candelas per lux per square meter)

TABLE 3 Type IX Sheeting[A]							
Observation Angle	Entrance Angle	White	Yellow	Orange	Green	Red	Blue
0.1 [A]	-4	660	500	250	66	130	30
0.1 [B]	+30	370	280	140	37	74	17
0.2	-4	380	285	145	38	76	17
0.2	+30	215	162	82	22	43	10
0.5	-4	240	180	90	24	48	11
0.5	+30	135	100	50	14	27	6.0
1.0	-4	80	60	30	8.0	16	3.6
1.0	+30	45	34	17	4.5	9.0	2.0

[A] Minimum Coefficient of Retroreflection(R_A)$cd \cdot lx^{-1} \cdot m^{-2}$
[B] Values for 0.1 observation angles are supplementary requirements that shall apply only when specified by the purchaser in the contract or order.

The ground mounted sign sheeting shall meet or exceed the following values. The coefficients of Retroreflection shall be determined in accordance with ASTM E-810. This table contains "core" values as found in ASTM D 4956. The 0.1 observation angle is not required for this item.

TABLE 7 Type III Sheeting[A]								
Observation Angle	Entrance Angle	White	Yellow	Orange	Green	Red	Blue	Brown
0.1 [B]	-4	300	200	120	54	54	24	14
0.1 [B]	+30	180	120	72	32	32	14	10
0.2	-4	250	170	100	45	45	20	12
0.2	+30	150	100	60	25	25	11	8.5
0.5	-4	95	62	30	15	15	7.5	5.0
0.5	+30	65	45	25	10	10	5.0	3.5

[A] Minimum Coefficient of Retroreflection(R_A) cd/fc/ft²($cd \cdot lx^{-1} \cdot m^{-2}$)
[B] Values for 0.1 observation angles are supplementary requirements that shall apply only when specified by the purchaser in the contract or order.

WARRANTY

The sheeting manufacturer shall submit with each lot or shipment, a certification that states the material supplied will meet all the requirements listed herein.

Field Performance Requirements:

The retroreflective sheeting will be considered unsatisfactory if it has deteriorated due to natural causes to the extent that: (1) the sign is ineffective for its intended purpose when viewed from a moving vehicle under normal day and night driving conditions; or (2) the coefficient of retroreflection is less than the minimum specified for that sheeting during that period listed.

85% of values listed in Table 7 Type III after 10 years
80% of values listed in Table 3 Type IX after 12 years.

All measurements shall be made after sign cleaning according to sheeting manufacturer's recommendations.

Sheeting Manufacturer's Replacement Obligation:

Where it can be shown that retroreflective signs supplied and used according to the sheeting manufacturer's recommendations, have not met the performance requirements of this specification the sheeting manufacturer shall cover restoration costs as follows for sheeting shown to be unsatisfactory during:

The entire 12 years (Type IX) and 8 years (Type III): the sheeting manufacturer will replace the sign in it's entirety inclusive of the sign panel, sign sheeting, labor, and M.O.T required to restore the sign surface to its original effectiveness.

Extruded Aluminum:

Extruded Aluminum Sign Panels and Edge Strip. Extruded aluminum sign panels and edge strip shall conform to B221, alloy 6063 T6.

Hardware: hardware shall be clear anodized, conforming to one of the following: B209, alloy 2024 T4; B211, alloy 2024 T4, 6262 T9, 6061 T6, 7075 T6 or 2017 T4.

Extruded Aluminum:

The front faces of the sign panels shall be degreased by one of the following methods:

1. Vapor degreasing by total immersion in a saturated vapor of trichlorethylene or perchloroethylene. Trademark printing shall be removed with lacquer thinner or by a controlled alkaline cleaning system.

2. Alkaline degreasing by total immersion in a tank containing alkaline solutions controlled and titrated to the solution manufacturer's specification. Rinse thoroughly with clean running water.

Immersion time shall depend upon the amount of grease or dirt present and the gage of the metal, and shall be sufficient to effect complete removal of all corrosion, white rust, and dirt.

Following degreasing, the front faces shall be etched by one of the following methods:

1. Acid etching in a 6 to 8 percent phosphoric acid solution at 100 F (38 C), or proprietary acid etching solution. Rinse thoroughly with cold, then hot running water.

2. Alkaline etching in an approved alkaline etching material that is controlled by titration. The etching time, temperature, and concentration shall be as specified by the solution manufacturer. Smut shall be removed with an acidic chromium compound type solution as specified by the solution manufacturer, and shall be rinsed thoroughly with clean running water.

The surface etch shall provide a clean mat, or non-glare finish, suitable for the application of the retroreflective sheeting. This finish shall also be suitable for the uncovered reverse sides of the signs. Any protective film or coating applied to resulting from chemical action on the aluminum surface shall be light, tight, and free from all powdery residue.

As an alternate to the above etching systems, any one of the following metal preparation systems, employing a chemical conversions coating, may be used providing it complies fully with the recommendations and specifications furnished by the respective preparation manufacturer:

1. "Alodine" 1200 or 1200S, by Amchem Products, Inc.

2. "Bonderite" 723 with Process Specification No. 249, by Parker Rust Proof Company.

3. "Chromicoat", by Oakite Products, Inc.

4. Other approved system(s), producing a conversion coat meeting the requirements of Military Specification MIL-C-5541.

Alternate coats shall be light, tight, and free from any powdery residue.

After degreasing and etching, the panels shall be dried by the use of forced, hot air.

Panels shall not be handled except by device or clean canvas gloves, from the time degreasing is started to the time of application of retroreflective sheeting, nor shall contaminants be permitted to come into contact with the panels during that period.

Construction Methods:

Sign Face Finishing: All retroreflective sheeting, backgrounds, letters, numerals, symbols, and borders shall be clean-cut and sharp, and the messages on all signs shall be as indicated on the plans. Application of retroreflective sheeting to aluminum panels shall be in accordance with sheeting manufacturer's recommendations. Retroreflective sheeting shall be color matched and marked. The height of characters and the alphabet series to be employed for the signs shall conform to the Plans and their references. The alphabet series used on the sign panels shall be those of the publication titled "Standard Alphabets for Highways Signs" of the Federal Highway Administration. The working drawings prepared by the Contractor shall clearly indicate the proposed spacing of the letters and the locations and arrangements of symbols and borders. After the panel has been degreased and etched, the retroreflective sheeting shall be applied by a method described elsewhere in these Special Provisions.

No sheeting shall be applied when the temperature is less than 50 F (10 C).

Whenever it is necessary to construct the background of a sign face with two or more pieces of retroreflective sheeting, they must be carefully matched for color prior to application and sign fabrication, to provide uniform appearance and brilliance, day and night. Each full width section of retroreflective sheeting mounted adjacent to another full width section taken consecutively from the same roll shall be rotated and mounted 180 degrees with respect to that adjacent section. This rule shall also be observed as a guide when partial width sheets of retroreflective sheeting are used.

Non-conformance may result in non-uniform shading and an undesirable contrast between adjacent widths of applied sheeting which will render signs unacceptable. The entire background of each sign shall be uniform in color, brilliance, texture, and general appearance as seen in the daytime and under typical automobile illumination at night. No more sections of retroreflective sheeting shall be used for backgrounds than is necessary; remnants, scraps, and odd sized pieces of sheeting shall not be used in the fabrication of any signs manufactured for this contract. Joints between retroreflective sheeting sections shall either butt or overlap no more than 3/8" (9.5 mm). Horizontal joints between retroreflective sheeting sections shall not be allowed.

Sign Panel Erection: Signs shall be slip-sheeted, packed, and shipped in such manner as to ensure arrival at their respective places of erection in an undamaged condition. All signs arriving at the erection site(s) in a condition which in the opinion of the Engineer, renders them unsuitable for use, shall be removed and replaced by the Contractor at his sole expense. Sign Panels shall not be shipped for erection in such a manner that results in horizontal joints of the retroreflective sheeting.

It is not anticipated that there will be any sign panels which are required to be mounted whose messages will be inappropriate to the guiding of traffic at the time of sign erection. However, in the event that the Engineer determines that certain sign messages are inappropriate, the panels of such signs shall be covered by an opaque material, until such time as the sign messages become appropriate. The covering material and the manner of securing the material to the sign panel(s), shall meet with the approval of the Engineer. The Engineer will indicate to the Contractor which signs, if any, must be covered, and when to remove the covers.

Sign Covers: Sign covers shall be 10 ounce (280 g) cotton duck conforming to ASTM D-320, Army Duck, and dyed to a dark green approximating the green for sign backgrounds.

Identification Tags: The Contractor shall furnish and place identification tags or decals which state the Contract number, month and year of erection on the lower reverse side of the panel, near the point closest to the roadway shoulder.

Method of Measurement:

The quantity of sign panels will be measured as the actual number of square feet (meters) of front sign face surface area of all sign panels constructed, installed and accepted. The area will be computed from the maximum width and height dimensions of each sign panel, as shown on the Plans, or on the approved sign panel shop drawings, (verified by field measurements). All sign panels will be considered either square or rectangular in shape, as the case may be, and no area deductions will be made for rounding of corners.

Basis of Payment:

The quantity of sign panel will be paid for at the Contract unit price per square foot (meter). Price and payment will constitute full compensation for furnishing, fabricating, and erecting sign panels complete in place and accepted, with retroreflective materials, copy, symbols, borders, connections to supports, degreasing, etching, covering and uncovering sign messages where necessary, and for all labor, materials, tools, equipment, and incidentals required to complete the item.

Unless otherwise indicated on the Plans, the cost of removing and transporting to the nearest highway maintenance yard the existing sign panels and accessories shall also be included under this item if such requirement is indicated on the Plans.

4/11/07

749503 - VARIABLE MESSAGE SIGN (VMS) SUPPORT STRUCTURES

Description:

This item shall consist of:

1. Constructing a Drilled Shaft foundation with temporary or permanent casing as selected by the Contractor
2. Furnishing, assembling and installing a Sign Support Structure.

The VMS Board will be installed by others.

This item shall be constructed and installed in accordance with; these special provisions, the locations, notes and details on the plans, and as directed by the Engineer.

Working Drawings

Shop drawings shall be submitted for the support structure in accordance with Standard Specification Section 105.

Materials:

(a) VMS Board (by Others)

The VMS Board along with controller, controller software, electronics and all power and communication cables shall be provided and installed by others. Power and communication connections from the VMS Board to the Sign Support Structure to the cabinet will also be provided by others.

(b) Steel Pipe

Steel pipe shall be certified by mill test report to meet ASTM Specification A 53, Type S, Grade B with the exception that AP15L, Grade B may be used when the specified wall thickness is greater then ½". Only Electrical Resistance Welded (ERW) manufactured single seam pipe is permitted. However, when the required pipe size is greater than 24", double seam pipe may be used. A mill test report must be provided, certified and signed by the pipe manufacturer, containing physical and chemical properties and the manufacturer process used to produce the pipe.

(c) Other Steel Components

Caps for the ends of chords and tops of post shall be steel conforming to ASTM A 36 (AASHTO M 183) and shall be hot dip galvanized in accordance with ASTM A 123 (AASHTO M 111) Specification.

Steel for structural angles, plates, and bars shall conform to the requirements of ASTM A 36 (AASHTO M 183), Grade 36 or ASTM A 709 (AASHTO M 270), Grade 50. All steel shall meet the testing requirements for notch toughness (Charpy testing, zone #2) and requirements of Section 605 of standard specification.

(d) Fasteners

Chord splice assembly fasteners shall be high strength steel conforming to ASTM A 325 (AASHTO M 164) and shall be hot dip galvanized as per ASTM A 153, Class C as specified in plans.

All other fasteners shall be stainless steel conforming to ASTM A 320, Grade B8, Class 1 Specification or as specified in plans.

(e) Galvanizing (Zinc Coating)

All structural steel that is not stainless shall be hot-dipped galvanized in accordance with ASTM A123.

After fabrication and completion of any welded connections, each steel section shall be hot dip galvanized according to the requirements of ASTM Specification A 123 (AASHTO M 111). A single dip galvanizing process is preferred if size permits.

Apply hot-dip galvanized coating to iron and steel plates, pipe, tube, and structural shapes according to ASTM A 123.

Apply hot-dip galvanized coating to iron and steel hardware according to ASTM A 153. Repair hot dipped galvanized coating on iron and steel plates, pipe, tube, structural shapes, and hardware according to ASTM A 780.

(f) Concrete

Portland Cement Concrete for the drilled shaft and concrete grout pad shall conform to the requirements of Section 812, Portland Cement Concrete, of the Standard Specifications, Class B concrete.

(g) Reinforcement Steel

All reinforcement steel shall conform to the requirements of Section 603 and ASTM A 615, Grade 60, epoxy coated.

(h) Anchor Bolts, Nuts and Washer

Steel anchor bolts, nuts and washers shall conform to ASTM Specification F 1554, Grade 55. The anchor bolts shall be hot dip galvanized as per ASTM Specification A 153 (AASHTO M 232), Class C.

(i) Drilled Shaft Steel Casing

Use material as specified in ASTM A 252, Grade 2 (use smooth, non-corrugated steel pipe). Ensure that the casing is capable of withstanding handling and driving stresses and the pressures of the concrete and surrounding earth. Use a casing with an inside diameter that is at least as large as the indicated shaft size. The Contractor may increase the size of the casing to facilitate construction operations at no cost to the Department.

(j) Conduit and Sweeps

Conduit within the concrete drilled shaft foundation and steel structure shall be included in the price bid for item 749503. The material shall be Schedule 80 PVC.

(k) Ground Rod

A ¾ inch ground rod shall be installed as shown on the plans. The ground rod shall be copper clad, approved by the Underwriter's Laboratory and supplied with clamps for connecting the grounding conductor to the rod.

Construction Methods:

(a) As shown on the plans and as follows:

General: Prepare and submit detailed shop drawings for review and acceptance. Drawings shall be stamped by a PE registered in the state of Delaware. Material and workmanship not previously inspected will be inspected on the work site. Remove rejected material from the work site. Satisfactorily restore the site to its original condition, as directed, including the disposal of excess or unsuitable material. Contractor to verify sign and structure clearances.

Fabrication: Ensure that the steel fabricating plant is certified under the AISC Quality Certification Program. Before fabrication, submit a copy of the proposed welding procedures to the Engineer for approval. Follow the approved welding procedures, and ensure that welders are qualified according to ANSI/AWS D1.1 or ANSI/AWS D1.2, as appropriate.

After fabrication and welding, hot-dip galvanize the steel assemblies as specified in "Galvanizing (Zinc Coating) Section". After galvanizing, but before shipment to the Project, return the truss and posts to the fabricator for final shop assembly to verify camber, alignment, and contact of splice mating surfaces.

Shipping and Handling: Notify the Engineer at least 3 days before shipping to the Project or galvanizer so that a final quality inspection can be performed. The Engineer will seal all materials approved for shipping and provide written approval to the fabricator.

Ensure that members are loaded, hauled, and unloaded so that they are not deformed or damaged. Store structural materials above the ground on platforms, skids, or other supports. Keep the structural materials free from accumulation of dirt, oil, acids, or other foreign matter.

Any damage to galvanizing that occurs during shipping, handling or erection shall be repaired with a liquid galvanizing repair. Such repair material shall be submitted to the Engineer for approval prior to use.

Quality Control and Acceptance: Notify the Engineer, in writing, 15 days in advance of beginning work at the fabrication shop, so that arrangements for inspection may be made.

Perform at least the minimum specified number of quality control inspections according to the applicable ANSI/ AASHTO/ AWS specification, and any other tests and inspections necessary to control the quality of the work. The Engineer will perform non-destructive testing quality assurance inspections following the non-destructive testing quality control (QC) inspection performed by the fabricator.

Ensure that all quality control inspectors are AWS Certified Welding Inspectors, qualified according to the provisions of AWS QC1.

Inspect and test according to ANSI/ AASHTO/ AWS D1.1 Welding Code and the following:

Perform magnetic particle testing at a frequency of 10 percent of the number of welds per unit. For cantilever sign support structures, perform magnetic particle testing at a frequency of 100 percent on all chord splice assembly welds and post base welds.

Before shipping, assemble the completed and accepted truss units in the shop and check the truss span for dimensions, straightness, alignment, and camber. Measure the camber with the truss units on their sides.

(b) Drilled Shaft

1. Installation Plan

Submit the installation plan. Do not begin constructing the drilled shaft until the Engineer approves the Plan.

2. Location and Alignment

Construct the drilled shaft within 3 inches of plan position in the horizontal plane at the elevation of the top of the shaft. Ensure that the vertical alignment of a shaft excavation does not vary from the plan alignment by more than 1/8 inch per foot of depth.

3. Excavation Log

Maintain an excavation log during shaft excavation that includes the following:

i. Description and approximate top and bottom elevation of each soil or rock material encountered during shaft excavation.

ii. Elevations at which seepage or groundwater flow are encountered.

iii. The type of tools used for the excavation.

iv. Changes in the type of tools used for excavation.

v. Ensure that discrepancies noted on the log by the Engineer are resolved by the end of each day. Provide 2 copies of the final log to the Engineer within 24 hours after a shaft excavation is completed and approved.

vi. Reuse excavated material if possible.

4. Constructing Using Casings

Construct drilled shafts using casings for this project. The Contractor may either place casings in a predrilled hole or advance casings through the ground by twisting, driving, or vibrating. The Contractor shall submit, in the installation plan, details of the proposed casing method (including casing lengths and diameters) and the proposed procedures of casing installation to the Engineer for review.

Ensure that casings are clean, round, straight, and free of weld breaks and holes that would allow passage of water or plastic concrete. With Engineer approval, the Contractor may provide casings larger in diameter than shown on the Plans. The Contractor may elect to use Temporary or Permanent casings. The bid price shall include the cost of the selected casing method.

i. **Temporary Casings**. Telescoping, pre-drilling with slurry, and over-reaming to beyond the outside diameter of the casing may be required to install casing.

Remove temporary casing before completing concrete placement in the drilled shaft. Before withdrawing the casing, ensure that the level of plastic concrete in the casing is at least 5 feet above either the hydrostatic water level in the formation or the level of drilling fluid in the annular space behind the casing, whichever is higher. As the casing is withdrawn, maintain an adequate level of concrete within the casing so that fluid trapped behind the casing is displaced upward and discharged at the ground surface without contaminating or displacing the shaft concrete.

If the Contractor removes a specified diameter or length of casing and substitutes a longer or larger diameter casing through caving soils, the Contractor shall stabilize the excavation using slurry or backfill before the new casing is installed.

If temporary casings become bound or fouled during shaft construction and cannot be practically removed, the Department will designate the drilled shaft defective. Submit working drawings for approval proposing corrective measures. Do not begin corrective measures until the Department approves the working drawings.

ii. **Permanent Casing**. The Contractor may elect to use permanent casing. Ensure casings are continuous between the top and bottom elevations shown on the Plans. After installation is complete, cut off the permanent casing at the specified elevation.

After installing the casing, repair damage to coated surfaces of the casing exposed to the air by applying an organic zinc prime coat from the same manufacturer as the shop-applied inorganic zinc prime coat.

5. Removing Obstructions

Remove surface and subsurface obstructions at drilled shaft locations. The Contractor may need to use special procedures and tools when the drilled shaft excavation cannot be advanced using conventional augers fitted with soil or rock teeth, drilling buckets or under-reaming tools. Special procedures and tools may include: chisels, boulder breakers, core barrels, air tools, hand excavation, temporary casing, and increasing the hole diameter. Any form of blasting is prohibited.

6. Excavation Cleaning and Verification

Unless otherwise approved by the Engineer, ensure that at least 50 percent of the base of each shaft has less than 1/2 inch of sediment at the time of concrete placement. Ensure that the maximum depth of sediment or debris at any place on the base of the shaft does not exceed 1-1/2 inches.

In the presence of the Engineer, determine the cleanliness of the bottom of the shaft by the use of sounding. After final cleaning, determine the dimensions, depth, and alignment as directed by the Engineer.

7. Reinforcement Steel Cages and Conduits

Immediately after the shaft excavation has been inspected and approved, place the pre-assembled reinforcement steel cage, consisting of longitudinal and transverse bars, spirals, cage stiffeners, spacers, centralizers, and other necessary appurtenances into the drilled shaft hole. Remove internal stiffeners as the cage is placed in the drilled shaft hole. Install any conduits (as shown of the Contract Drawings) into the drilled shaft hole before placing concrete.

Use concrete spacers or other approved noncorrosive spacing devices at sufficient intervals near the bottom, and at intervals not exceeding 10 feet up the shaft, to ensure concentric spacing for the entire cage length. If the size of the spacers is not shown on the Plans, provide spacers that will create a minimum 3-inch annular space.

Provide cylindrical concrete supports to ensure that the bottom of the cage is maintained at the specified distance above the base.

Provide and install 2 ea Schedule 80 PVC (3 inch diameter) conduit sweeps in each drilled shaft. Where this conduit is not to be extended to a junction box or cabinet base, terminate the lower end of each sweep 3 feet from the face of the drilled shaft and 18 inches below grade, and cap with a standard PVC pipe cap. The upper end of each sweep shall be extended above the drilled shaft for a sufficient distance to terminate at the level of the bottom of the handhole in the sign support post or at a maximum of 2 inches below such level. Terminate the sweep by ground bonding bushing (with closure disk in conduit not to be extended).

8. Concrete Placement Time Limitations

Place concrete continuously from the bottom to the top elevation of the shaft.

Ensure that the concrete placement is completed within 2 hours. The Engineer may allow the concrete placement time to exceed 2 hours if the Contractor demonstrates that the slump of the concrete will not be less than 4 inches during the entire time of concrete placement.

9. Concrete Placement Methods

The Contractor may request 1 additional set of cylinders to be taken for determining strength for early removal. If additional cylinders are requested, notify the Engineer at least 24 hours before placing.

When using a concrete pump to place concrete for the drilled shaft, provide a standby pump that is immediately available if there is a pump failure.

Check the elevation of the top of the steel cage before, during, and after concrete placement. If the final upward displacement of the rebar cage exceeds 2 inches or if the downward displacement exceeds 6 inches per 20 feet of shaft length, the Engineer will reject the drilled shaft. Correct the shaft to the satisfaction of the Engineer.

Set anchor bolts into a template to maintain alignment and elevation. Secure in position to prevent displacement while placing concrete. Before placing the concrete, place reinforcement steel and conduit as specified in Section 812. Ensure that concrete placement complies with the limitations specified. Place concrete as specified. Cure concrete as specified.

i. **Tremie Method**. Ensure that tremie tubes are of sufficient length, weight, and diameter to discharge concrete at the shaft base elevation. Ensure that the inside and outside surfaces of the tremie are clean and smooth to allow the flow of concrete during concrete placement and an unimpeded withdrawal of the tremie tube after concrete placement. Ensure that the tremie tube's inside diameter is at least 6 times the maximum size of aggregate used in the concrete mix. Do not use tremie tubes less than 10 inches in diameter. Ensure that the tremie tube thickness is adequate to prevent crimping or sharp bends. Do not use tremie tubes that have aluminum parts that will come in contact with concrete. Ensure that the tremie tube is watertight.

   Do not begin placing concrete underwater until the tremie is placed to the shaft base elevation. The Contractor may use valves, bottom plates, or plugs to ensure concrete discharge begins

within one tremie diameter of the base. Remove plugs from the excavation or construct them using a material that will not cause a defect in the shaft if not removed. Construct the discharge end of the tremie to allow the free radial flow of concrete during placement operations.

Ensure that the tremie tube discharge end is immersed at least 5 feet in concrete at all times after starting the flow of concrete. Maintain a continuous flow of the concrete at a positive pressure differential to prevent water or slurry intrusion into the shaft concrete.

If the tremie tube discharge end is removed from the plastic concrete and discharges concrete above the rising concrete level, the Engineer will consider the drilled shaft defective. To correct this defect, the Contractor may: remove the reinforcement cage and concrete, complete necessary sidewall removal directed by the Engineer, and replace the shaft; or, the Contractor may re-plug the tremie tube, recharge with concrete, and insert a minimum of 5 feet below the existing top level of concrete before continuing placing concrete.

ii. **Pumped Method**. Ensure that pump lines have a minimum diameter of 4 inches and are constructed with watertight joints.

Ensure that the discharge end remains at least 5 feet below the surface of the plastic concrete. When lifting the pump line during concreting, temporarily reduce the line pressure until the discharge end has been repositioned at a higher level in the excavation.

Ensure that waste concrete overflows the full top circumference of the casing evenly. Waste concrete is the top 24 inches of the initial concrete placed, plus the height of additional volume of waste concrete deposited in the shaft where concrete placement was halted and restarted, plus any additional amount necessary to produce full strength, non-segregated concrete at the plan shaft top level. Continue placing concrete until the waste concrete is pushed upward and ejected completely out of the top of the casing and wasted; or, place an additional 24 inches of concrete above the planned shaft top level and allow to cure in place for removal later. Remove waste concrete at the top of the shaft to maintain a uniform appearance and to meet the specified dimensions of the shaft.

Do not channel or bleed off waste concrete using notches, holes, or cuts in the casing top. The Contractor may remove or pump out plastic concrete in the casing that is above the top elevation of the drilled shaft after ejecting waste concrete to the top elevation.

10. Approval

The Engineer may reject drilled shafts because of damage; incorrect location, misalignment, or failure to install the drilled shaft to the proper bearing stratum.

Do not place sign structure on drilled shaft until the concrete in the shaft reaches a minimum of 90 percent of the required 28-day compressive strength.

(c) Erection Plan

At least 15 days before erecting posts and trusses, submit a plan to the Engineer showing the proposed equipment to be used. Include calculations and lift points to maintain the truss assembly in plumb position during placement, detailed erection instructions and drawings of all structures, and the proposed scheme for traffic control during the erection of the posts and trusses.

The Contractor shall plan his work so that no more than one lane at a time will be closed during construction.

(d) Erecting Posts, Trusses and Tower Structures

Straighten any deformed structural material before being laid out, punched, drilled, or otherwise worked on in the shop. The Engineer will reject structural material with sharp kinks or bends. Verify bolt alignment before erecting towers. Do not erect posts and tower shafts on the completed drilled shaft until approved by the Engineer. Install high-strength steel bolts as specified in plan.

1. Trusses

Connect the truss abutting chord splices according to Subsection 11.5.6 of the *AASHTO LRFD Bridge Construction Specifications*.

Provide 2 working platforms that allow the bolt assembly tightening from opposite sides of the structure. Provide 2 impact wrenches. Sequentially tighten by initiating and progressing the tightening of the bolts in a pattern whereby a 180-degree opposite side repetition is maintained. Sequentially tighten each bolt and nut to the same calibrated increment.

2. Posts

Clean and lubricate threads of anchor bolts and nuts before installing post. Ensure that the top of the concrete drilled shaft is free of dirt or other foreign materials. Install the top and bottom bolt assemblies as shown on the Plans.

After erecting the posts and tightening all nuts as outlined above, add a second nut to each anchor bolt and adjust snug tight. After installing the second nut, ensure all nuts are in a snug tight condition. Snug tight is defined as the tightness that exists when all surfaces on the joint are in firm contact with one another.

Fully tighten anchor bolts by turning the nuts an additional 30 to 45 degrees. Progress by sequentially tightening the nuts on opposite side of the base plate (180 degrees apart).

After installing and adjusting all nuts, pour concrete grout pad and install rodent screen if shown on Contract Drawings.

Measurement and Payment:

Payment for the VMS sign structure support shall be made at the Contract unit price bid per Each which price and payment will constitute full compensation for furnishing all materials and fittings; for placing all materials including concrete, concrete grout pad, steel, steel reinforcements, fasteners, anchor bolts, bolts, nuts, washers, drilled shaft, and ground rod; for galvanizing all specified structural components; for all concrete and steel; for a minimum of two conduit sweeps extending into the drilled shaft and to the cabinet or junction well on one end and the handhole on the other end; for excavating for the drilled shaft; for the casings used for the drilled shaft, compacting around the drilled shaft, and disposing of surplus materials; and for all labor, equipment, tools, and incidentals necessary to complete the item.

11/17/14

749687 - INSTALLATION OR REMOVAL OF TRAFFIC SIGN ON SINGLE SIGN POST

Description:

This work consists of installing or removing traffic sign(s) on a single post or other type of pole at the locations indicated on the Plans or as directed by the Engineer. This specification also includes installation of posts in boring holes constructed under other items.

A single sign totaling more than 9 square feet, or with any dimension, length or width, greater than or equal to 48 inches shall be installed on multiple sign posts under Item 749690 - Installation or Removal of Traffic Sign on Multiple Sign Posts.

Materials:

The Department will provide all sign materials to be used on this project. The Contractor shall contact the DelDOT Sign Shop Supervisor with project plans and quantity sheets at 302-760-2581. Sign fabrication orders require a minimum of four (4) weeks for completion. Orders placed with less than 4 weeks lead-time will result in a delay. Any delay caused by inadequate lead-time due to a late order will be the sole responsibility of the Contractor. The Contractor shall pick-up the sign materials from the DelDOT Sign Shop and deliver them to the job site without any damage to the sign materials.

Construction Methods:

The Contractor shall pick-up necessary signs, sign posts, hardware, and extensions from the Department and install the signs in the locations indicated on the Plans in accordance with the Delaware MUTCD or as directed by the Engineer. The Contractor shall be responsible for obtaining all necessary utility clearances before the signs may be installed. Signs and plaques shall be mounted no lower than the minimum mounting height specified in the Delaware MUTCD. Signs and plaques shall be mounted no higher than one foot above the minimum mounting height specified in the Delaware MUTCD. Any excess sign post protruding above the top of the top sign shall be cut off and removed. For sign removals, the sign posts shall have all nuts, bolts, and other connectors removed. The disturbed ground shall be graded and backfilled accordingly. The Contractor is responsible for disposal of all signing material removed from the project

Method of Measurement:

The number of single sign installations or removals will be measured as the actual number of signs installed or removed and accepted.

Basis of Payment:

The quantity of single sign post installations or removals will be paid for at the Contract unit price per each. Price and payment will constitute full compensation for installing or removing signs and sign materials, pick-up and delivery of sign materials, grading disturbed areas, and for all labor, equipment, tools, and incidentals required to complete the work. Signs that are not installed in accordance with the Delaware MUTCD or signs installed in the incorrect location shall be moved at no additional cost to the Department.

5/28/2013

749688 - INSTALLATION OF 4" DIAMETER HOLE, LESS THAN OR EQUAL TO 6" IN DEPTH
749689 - INSTALLATION OF 4" DIAMETER HOLE, GREATER THAN 6" IN DEPTH

Description:

This work consists of boring a hole 4" in diameter averaging 6" in depth into existing P.C.C. surfaces for installing single or multiple sign posts at the locations indicated on the Plans or as directed by an Engineer.

Materials:

The Contractor shall provide the equipment necessary to bore a 4" hole into concrete surfaces, while maintaining the stability of the surrounding P.C.C. The depth of the bored hole shall be to the top of the subbase material.

Construction Methods:

The holes shall be bored into pavement or P.C.C. islands, medians, or sidewalk using a mechanical hole borer for such work or other methods approved by the Engineer. The hole shall be 4" in diameter. Holes bigger or smaller than 4" shall be corrected at the Contractor's expense.

Method of Measurement:

The number of 4" holes in diameter bored will be measured as the actual number of holes bored and accepted.

Basis of Payment:

The quantity of holes bored as required above will be paid for at the Contract unit price per each. Price and payment will constitute full compensation for boring holes at the required depth, and for all labor, equipment, tools, and incidentals required to complete the work.

Note:

The cost for installing holes and PVC sleeves for sign posts in newly constructed P.C.C. islands, medians, or sidewalks shall be incidental to the P.C.C. item. Holes in bituminous surfaces are considered incidental to the sign installation.

1/8/15

749690 - INSTALLATION OR REMOVAL OF TRAFFIC SIGN ON MULTIPLE SIGN POSTS

Description:

This work consists of installing or removing traffic sign(s) on multiple sign posts at the locations indicated on the Plans or as directed by the Engineer. This specification also includes installation of posts in holes installed under other items.

A single sign totaling more than 9 square feet, or with any dimension, length or width, greater than 48 inches shall be mounted on two (2) posts. Signs with a length greater than or equal to 78 inches shall be mounted on three (3) sign posts.

Materials:

The Department will provide all sign materials to be used on this project. The Contractor shall contact the DelDOT Sign Shop Supervisor with project plans and quantity sheets at 302-760-2581. Sign fabrication orders require a minimum of four (4) weeks for completion. Orders placed with less than 4 weeks lead-time will result in a delay. Any delay caused by inadequate lead-time due to a late order will be the sole responsibility of the Contractor. The Contractor shall pick-up the sign materials from the DelDOT Sign Shop and deliver them to the job site without any damage to the sign materials.

Construction Methods:

The Contractor shall pick-up necessary signs, sign posts, hardware, and extensions from the Department and install the signs in the locations indicated on the Plans in accordance with the Delaware MUTCD or as directed by the Engineer. The Contractor shall be responsible for obtaining all necessary utility clearances before the signs may be installed. Signs and plaques shall be mounted no lower than the minimum mounting height specified in the Delaware MUTCD. Signs and plaques shall be mounted no higher than one foot above the minimum mounting height specified in the Delaware MUTCD. Any excess sign post protruding above the top of the top sign shall be cut off and removed. For sign removals, the sign posts shall have all nuts, bolts, and other connectors removed For sign removals, the sign posts shall have all nuts, bolts, and other connectors removed. The disturbed ground shall be graded and backfilled accordingly. The Contractor is responsible for disposal of all signing material removed from the project..

Method of Measurement:

The number of sign installations or removals will be measured as the total square foot of the sign(s) installed or removed and accepted.

Basis of Payment:

The quantity of sign installations or removals will be paid for at the Contract unit price per square foot. Price and Payment will constitute full compensation for installing or removing signs and sign materials, pick-up and delivery of sign materials, grading disturbed areas, and for all labor, equipment, tools, and incidentals required to complete the work. Signs that are not installed accordance with the Delaware MUTCD or signs installed in the incorrect location shall be moved at no additional cost to the Department.

5/28/2013

753501 - INSTALLING SANITARY SEWER, PVC 8"
753503 - INSTALLING SANITARY SEWER, PVC 12"
753505 - INSTALLING SANITARY SEWER, PVC 18"
753510 - INSTALLING SANITARY SEWER (FORCE MAIN), PVC 8"

Description:

This work consists of furnishing all materials and installing 8", 12", and 18" sanitary sewer lines as shown on the plans and meeting the requirements of the applicable DelDOT Standard Specifications, and Technical Specifications.

Any requirements included in the Technical Specifications that are not addressed on the plans or by these Special Provisions, shall be performed in accordance with the applicable sections of the Technical Specifications. The Contractor is advised to obtain and be fully acquainted with the applicable specifications of the Owner.

The Owner of the sewer line on this project is the Kent County, Delaware, Department of Public Works and the Technical Specifications are titled, "Department of Public Works, Kent County Delaware, Pump Station 8 Replacement and Relocation, Technical Specification, August 2012" and are included in this contract as Appendix A to the Special Provisions.

General Requirements: All work shall be subject to inspection and subsequent approval/disapproval of the Engineer and the representative of the Owner of the utility; and the Contractor shall be required to correct the discrepancies at his/her expense.

Included in this work are the connections of existing sanitary sewer services to the sanitary sewer work being performed under this contract in the vicinity of Proposed Sanitary Manholes 5 (plan sheet S-03) and 9 (plan sheet S-01) and one Existing Sanitary Manhole (plan sheet S-04). Connections to the existing 6" line near Sanitary Manhole 7 and to the existing 36" line near sta 22+00 on sewer line plan sheet S-07 are to be paid for under item 753516 (Sanitary Sewer System). All modifications to such services, as required by the present Standards and Specifications of the Owner and all relocations of such services necessary to avoid conflicts with utilities and highway drainage facilities are included in the work. Since the exact locations of the conflicts cannot be determined prior to trench excavation operations, the Contractor must coordinate and schedule any required relocation efforts of each sanitary sewer connection on an individual basis with the utility Owner and the property owner.

It is of prime importance that the Contractor, in the performance of his/her work, does not disrupt the operation of the existing sanitary sewer facilities in any manner or at any time, without the expressed prior approval of the Owner. The Contractor shall construct, maintain and remove, following construction, such temporary bypasses as may be required during construction to maintain sanitary sewer facilities in service.

Any and all emergency repairs required during the period of this Contract shall be the responsibility of the Contractor. In the event the Owner is unable to contact the Contractor for the immediate emergency repair items of work, or in the event the Contractor does not take action when contacted within a reasonable length of time, the Owner of the utility reserves the right to attend to any and all emergency repair work items and to resubmit the costs directly to the Contractor for complete payment.

Specifications:

DelDOT Standard Specification Sections 208.04, 209.04, 812.02, 812.03 (Class B), and 821.03

Technical Specification Sections 02530

Kent County Standard Detail Sheet MISC-05 and PS-04

Contract Drawings

These Special Provisions

Materials:

Material requirements are as listed in the plan notes. Any items not addressed shall be referred to the Technical specification requirements.

Warning tape for sanitary sewer or force main shall be printed polyethylene plastic tape with a metallic core, manufactured specifically for warning and identification of buried utility lines. The tape shall be of a roll type, 6" minimum width, and color coded for sewer (green), with warning and identification imprinted in bold black letters continuously and repeatedly over entire length of tape. The code and letter color shall be permanent and unaffected by moisture and other substances contained in trench backfill materials. Imprinted on the tape shall be "Sanitary Sewer", or a similar message as approved by the Engineer.

Concrete for the thrust blocks, cradles, and clean-outs shall meet the requirements of Section 812, Class B of the Delaware Standard Specifications. Thrust blocks, cradles, and clean-outs shall be constructed in accordance with the Plan Details or as directed.

Borrow Type C for backfilling shall conform to the requirements of Section 209.04 of the DelDOT Standard Specifications.

Pipe bedding shall meet the requirements of Graded Aggregate, Type B in accordance with Section 821.03 of the DelDOT Standard Specifications

Unless shown otherwise on the Plans or required by the owner, all commercial, industrial, and residential connections shall be constructed of the same class of material as the sewer mains to which they are connected. Minimum grade and size of the lateral pipes shall be as required by the Owner's Standards and Specifications.

Construction Methods:

All pipes shall be thoroughly cleaned before they are laid and shall be kept clean until the completed work is accepted.

Sheeting, shoring, or an approved steel trench box shall be installed to meet all applicable OSHA requirements.

The excavation and backfill for the pipe shall be performed in accordance with the applicable requirements of DelDOT Standard Specification Section 208 including backfill requirements of Section 208.04. The trench width shall be as detailed on the plans. Type C borrow, or existing material meeting Type C borrow, shall be placed for the entire depth of trench up to the bottom of patching materials under existing and proposed roadways and shoulders. In areas outside of the roadway or proposed roadway including shoulders, Type C material shall be placed at least one foot above the top of the sewer line. Excavated material may be used for backfill above the Type C borrow in areas outside of roadway and shoulders provided it is dry and free of organic material.

The pipe shall be installed at the locations and to the lines, grades, and dimensions shown on the Plans or as directed by the Engineer.

During backfill of the sewer or force main the Contractor shall install the specified warning tape at a depth of 8" to 12" below finished grade or as directed and approved by the Engineer/Owner. Additionally, plastic imarkers in accordance with Kent County Standard detail sheet PS-04 shall be installed over all force main bends.

No pipe shall be laid upon a foundation into which frost has penetrated or at any time when the Engineer shall deem that there is danger of the formation of ice or the penetration of frost at the bottom of the excavation, unless the minimum length of open trench and promptness of refilling are observed.

Pipe placed inside steel casings will be measured and paid for at the linear foot bid price for “Installing Sanitary Sewer” under the applicable size and type of pipe.

Concrete Cradles shall be constructed in accordance with the plans and Kent County Standard Detail Sheet MISC-05. They shall be installed between the end of a casing pipe and a manhole structure when such distance is 5 feet or less.

Prior to constructing the tie-ins under this section, the Contractor shall coordinate with Kent County and be prepared with tanker trucks and pumps to handle any excess flow during the transition. Kent County personnel must be satisfied with the equipment and tanker trucks provided on site before allowing the tie-in. Any excess flow in tankers shall be delivered to the wastewater treatment facility located south of Frederica, DE.

Acceptance Testing:

Prior to the request for inspection by the Engineer, it shall be the Contractor's responsibility to examine all completed pipe lines to insure that they are laid to the proper alignment and grade and free from foreign material. After this has been done to the satisfaction of the Engineer, he/she will order tests to be made on all portions of the sewers built under the Contract.

The Contractor shall cooperate and furnish all assistance necessary to perform the tests as specified herein and as further required and directed by the Engineer and the representative of the Owner.

Acceptance Test for Gravity Lines (per Section 180-25 of the Kent County, DE code) -

(1) All branch fittings and ends of lateral stubs shall be securely plugged to withstand the internal test pressures. The section of line being tested shall also be securely plugged at each manhole. All stoppers shall be adequately braced when required.

(2) Air shall be slowly supplied to the plugged pipe line until the internal air pressure reaches 4.0 pounds per square inch greater than the average back pressure of any groundwater that may submerge the pipe. At least two minutes shall be allowed for temperature stabilization before proceeding further.

(3) The rate of air loss shall then be determined by measuring the time interval required for the internal pressure to decrease from 3.5 to 2.5 pounds per square inch.

(4) The line shall be considered acceptable if the time, T, in seconds, required for the 1.0 psi pressure drop is not less than the following:

$$T = 0.0850\ DK/Q = 28.33\ DK$$

Where:

$K = 0.000419DL$, but not less than 1.0

Q = rate of loss of 0.003 cu. ft/min/sq ft. on internal surface

D = pipe diameter, in.

L = length of line being tested, ft.

(5) No connection shall be made until the final inspection and County TV inspection tests have been performed.

Acceptance Test for Force Main -

Testing requirements for Force Mains are included in Technical Specification Section 02530.

The Contractor shall furnish all equipment and personnel to conduct the tests specified herein and/or any proposed by the Owner of the utility.

The Contractor shall not make connections to existing sanitary sewers until after the final inspection and tests have been approved. All material and labor required for tests, including caps and plugs shall be furnished by the Contractor and the cost thereof included in the prices bid for installing sanitary pipe. Water for leakage test shall be furnished by the Contractor.

Method of Measurement and Basis of Payment:

Payment for installing sanitary sewer and/or sanitary sewer services of respective diameter(s) as required by the Contract, measured along the centerline from end-to-end, shall be paid for at the Contract unit price per linear foot (linear meter) for "Installing Sanitary Sewer", of the size(s) and type(s) required by the Contract, which price and payment will constitute full compensation for furnishing and installing sanitary sewer

pipes, warning tape, plastic markers, bends, fittings, valves, valve boxes, wyes, clean-outs, adapters, couplings, saddles, plugs, stoppers, caps, concrete thrust blocks, buttresses, joint restraints, concrete cradles, aggregate pipe bedding, etc. as detailed on the plans and in the specifications.

Measurement will be made through the final installed lengths of pipes, bends, wyes, etc. along all runs. At points of entry into structures, the pipe measurement shall be made to the inside face of manhole wall, except the 18" PVC pipe entering the Wet Well which will terminate at the PVC to Ductile iron pipe connection. Exiting the Meter Vault, payment for the 8" PVC Force Main will begin at the Ductile Iron to PVC transition coupling located one foot outside the Meter Vault. The Ductile Iron to PVC transition entering the Wet Well, all piping within the Wet Well, between the Wet Well and Meter/Valve Vault, within the Meter/Valve Vault, and exiting the Meter/Valve Vault (effluent side) including the Ductile Iron to PVC transition coupling is to be paid as part of Lump Sum Item 763687 (Pump House; see Plan Sheet M-02).

Also included in the price per linear foot are furnishing and installing sheeting and/or shoring, temporary support of existing Utilities if needed, marking tape, force main markers, pipe excavation, Type C backfill, backfilling, dewatering, disposal of excess soil, furnishing necessary pumps and tanker trucks while conducting tie-ins, hauling excess flow to the treatment plant south of Frederica, DE, pipe testing and all related costs; and for all labor, tools, equipment, and incidentals to complete the work and make the sewer system functional.

Costs to abandon and/or tie-in to existing sewer lines near Proposed Sanitary Manholes 5 and 9 and at one Existing Sanitary Manhole are to be incidental to the linear foot price bid for the “Install Sanitary Sewer” items. This also includes any flowable fill required to abandon existing pipes.

Casing pipes, manholes, air release/vacuum relief valves and manhole combinations, tie-ins to the existing 6 inch and 36 inch lines, and the pumping station will be paid for separately under their respective bid items.

1/8/15

753516 - SANITARY SEWER SYSTEM

Description:

This work consists of furnishing all materials and installing 6" Force Main Connections as shown on Sanitary Sewer Plan Sheet S-02 Details, Transitioning and Capping the 8" PVC to 12" DIP Force Main shown on Sanitary Sewer Plan Sheet S-07, and installing one 6" Service Lateral Stub with Cleanout and Mainline Connection between Manholes MH 2 and MH 3A as shown on the plans, meeting the requirements of the applicable DelDOT Standard Specifications, and the contract Technical Specifications.

Any requirements included in the Technical Specifications that are not addressed on the plans or by these Special Provisions, shall be performed in accordance with the applicable sections of the Technical Specifications. The Contractor is advised to obtain and be fully acquainted with the applicable specifications of the Owner.

The Owner of the sewer line on this project is the Kent County, Delaware, Department of Public Works and the Technical Specifications are titled, "Department of Public Works, Kent County Delaware, Pump Station 8 Replacement and Relocation, Technical Specification, August 2012" and are included in this contract as Appendix A to the Special Provisions.

General Requirements:

All work shall be subject to inspection and subsequent approval/disapproval of the Engineer and the representative of the Owner of the utility; and the Contractor shall be required to correct the discrepancies at his/her expense.

Included in this work are the connections of all existing commercial, industrial and residential sanitary sewer services to the sanitary sewer work being performed under this contract. All modifications to such services, as required by the present Standards and Specifications of the Owner and all relocations of such services necessary to avoid conflicts with utilities and highway drainage facilities are included in the work. Since the exact locations of the conflicts cannot be determined prior to trench excavation operations, the Contractor must coordinate and schedule any required relocation efforts of each sanitary sewer connection on an individual basis with the utility Owner and the property owner.

It is of prime importance that the Contractor, in the performance of his/her work, does not disrupt the operation of the existing sanitary sewer facilities in any manner or at any time, without the expressed prior approval of the Owner. The Contractor shall construct, maintain and remove, following construction, such temporary bypasses as may be required during construction to maintain sanitary sewer facilities in service.

Any and all emergency repairs required during the period of this Contract shall be the responsibility of the Contractor. In the event the Owner is unable to contact the Contractor for the immediate emergency repair items of work, or in the event the Contractor does not take action when contacted within a reasonable length of time, the Owner of the utility reserves the right to attend to any and all emergency repair work items and to resubmit the costs directly to the Contractor for complete payment.

Specifications:

DelDOT Standard Specification Sections 208.04, 209.04, 812.02, 812.03 (Class B), and 821.03

Technical Specification Section 02530

Kent County Standard Detail Sheets CO-03, CO-07, PS-04, and PS-05

Contract Drawings

These Special Provisions

Materials:

Material requirements are as listed in the plan notes. Any items not addressed shall be referred to the Technical Specification requirements.

Warning tape for sanitary sewer or force main shall be printed polyethylene plastic tape with a metallic core, manufactured specifically for warning and identification of buried utility lines. The tape shall be of a roll type, 6" minimum width, and color coded for sewer (green), with warning and identification imprinted in bold black letters continuously and repeatedly over entire length of tape. The code and letter color shall be permanent and unaffected by moisture and other substances contained in trench backfill materials. Imprinted on the tape shall be "Sanitary Sewer", or a similar message as approved by the Engineer.

Concrete for the thrust blocks and clean-outs shall meet the requirements of Section 812, Class B of the Delaware Standard Specifications. Thrust blocks and clean-outs shall be constructed in accordance with the Plan Details or as directed.

Borrow Type C for backfilling shall conform to the requirements of Section 209.04 of the DelDOT Standard Specifications.

Pipe bedding shall meet the requirements of Graded Aggregate, Type B in accordance with Section 821.03 of the DelDOT Standard Specifications

Unless shown otherwise on the Plans or required by the owner, all commercial, industrial, and residential connections shall be constructed of the same class of material as the sewer mains to which they are connected. Minimum grade and size of the lateral pipes shall be as required by the Technical Specifications.

Construction Methods:

The work includes excavating, furnishing and installing PVC and Ductile Iron Force Main pipe, reducers, increasers, adapters, bends, joint restraints, plugs, concrete thrust blocks, cleanouts, and any other necessary materials to successfully tie an existing force main into the proposed new gravity sanitary sewer line in the vicinity of Sanitary Manhole 7 (Sanitary Sewer Plan Sheet S-02), to prepare the tie-in from the proposed new PVC force main to an existing ductile iron force main at approximately station 21+93 (Sanitary Sewer Plan Sheet S-07), and to install a 6" Service Lateral Stub with Cleanout and Mainline Connection (Sanitary Sewer Plan Sheet S-03). Backfill, backfilling, testing the lines, cutting and capping existing or new lines as shown on the plans is also included in this item.

On Plan Sheet S-02, only the work related to the 6 and 10 inch PVC force mains entering Sanitary Manhole 7 and all bends, increaser, joint restraints, force main markers, thrust blocks and caps are included in this item. The 8" and 12" PVC lines and Manhole 7 will be paid for under their respective bid items.

On Plan Sheet S-03, only the work related to installing a 6" Service Lateral Stub Pipe with Cleanout and Mainline Connection is included in this item.

On Plan Sheet S-07, only the work from the adapter (8" PVC Force Main to 8" DIP Force Main at sta 21+47) to the 12" DIP force main tie-in point at approximately station 21+93 and all DIP force main pipe, bends, increasers, joint restraints, force main markers, thrust blocks and caps are included in this pay item. The 8" PVC to 8" DIP adapter and 8" to 12" DIP increaser are included in this item. Payment under Item 753510 (8" PVC Force Main) will terminate at the 8" PVC to DIP adapter. Removal of the existing 12" DIP cap or plug is included in this item as well.

Lengths of pipes shown on the plans are estimated only. The Contractor is responsible to layout the tie-in areas in the field and fabricate the bends and pipe lengths required to properly tie-in to other pipes, fittings, and/or manholes as required and approved by the Engineer.

All pipes and connecting materials shall be thoroughly cleaned before they are laid and shall be kept clean until the completed work is accepted.

Sheeting, shoring, or an approved steel trench box if required shall be installed to meet all applicable OSHA requirements.

The excavation and backfill for the pipe and connections shall be performed in accordance with the applicable requirements of DelDOT Standard Specification Section 208 including backfill requirements of Section 208.04. The trench width shall be as detailed on the plans. Type C borrow, or existing material meeting Type C borrow, shall be placed for the entire depth of trench up to the bottom of patching materials under existing and proposed roadways and shoulders. In areas outside of the roadway or proposed roadway including shoulders, Type C material shall be placed at least one foot above the top of the sewer line. Excavated material may be used for backfill above the Type C borrow in areas outside of roadway and shoulders provided it is dry and free of organic material.

During backfill of the sewer or force main the Contractor shall install the specified warning tape at a depth of 8" to 12" below finished grade or as directed and approved by the Engineer/Owner.

No pipe or connections shall be placed upon a foundation into which frost has penetrated nor at any time when the Engineer shall deem that there is danger of the formation of ice or the penetration of frost at the bottom of the excavation, unless the minimum length of open trench and promptness of refilling are observed.

Prior to constructing the tie-ins under this section, the Contractor shall coordinate with Kent County and be prepared with tanker trucks and pumps to handle any excess flow during the transition. Kent County personnel must be satisfied with the equipment and tanker trucks provided on site before allowing the actual tie-in. Any excess flow in the tankers shall be delivered to the wastewater treatment facility located south of Frederica, DE.

Acceptance Testing:

Prior to the request for inspection by the Engineer, it shall be the Contractor's responsibility to examine all completed pipe lines and connections to insure that they are laid to the proper alignment and grade and free from foreign material. After this has been done to the satisfaction of the Engineer, he/she will order tests to be made on all portions of the sewers built under the Contract.

The Contractor shall cooperate and furnish all assistance necessary to perform the tests as specified herein and as further required and directed by the Engineer and the representative of the Owner.

Acceptance Test for Gravity Lines (per Section 180-25 of the Kent County, DE code) -

(1) All branch fittings and ends of lateral stubs shall be securely plugged to withstand the internal test pressures. The section of line being tested shall also be securely plugged at each manhole. All stoppers shall be adequately braced when required.

(2) Air shall be slowly supplied to the plugged pipe line until the internal air pressure reaches 4.0 pounds per square inch greater than the average back pressure of any groundwater that may submerge the pipe. At least two minutes shall be allowed for temperature stabilization before proceeding further.

(3) The rate of air loss shall then be determined by measuring the time interval required for the internal pressure to decrease from 3.5 to 2.5 pounds per square inch.

(4) The line shall be considered acceptable if the time, T, in seconds, required for the 1.0 psi pressure drop is not less than the following:

$$T = 0.0850\ DK/Q = 28.33\ DK$$

Where:

K = 0.000419DL, but not less than 1.0

Q = rate of loss of 0.003 cu. ft/min/sq ft. on internal surface

D = pipe diameter, in.

L = length of line being tested, ft.

(5) No connection shall be made until the final inspection and County TV inspection tests have been performed

Acceptance Test for Force Main -

Testing requirements for Force Mains are included in the Technical Specifications in Section 02530.

The Contractor shall furnish all equipment and personnel to conduct the tests specified herein and/or any proposed by the Owner of the utility.

The Contractor shall not make connections to existing sanitary sewers until after the final inspection and tests have been approved. All material and labor required for tests, including caps and plugs shall be furnished by the Contractor and the cost thereof included in the prices bid for installing sanitary pipe. Water for leakage test shall be furnished by the Contractor.

Method of Measurement and Basis of Payment:

Payment for the "Sanitary Sewer System" item includes furnishing and installing all materials to tie-in the existing 6" PVC Force Main to Sanitary Manhole 7 as detailed on plan sheet S-02, to install the 6" Service Lateral Connection, Stub Pipe, and Cleanout as detailed on plan sheet S-03, and to prepare the tie-in to the existing 12" Ductile Iron Force Main shown on plan sheet S-07. Price and payment will constitute full compensation for furnishing and installing (or removing if required) sanitary sewer pipes, bends, fittings, wyes, adapters, couplings, saddles, plugs, stoppers, caps, increasers, reducers, concrete thrust blocks, buttresses, cleanout materials including frame and cover, joint restraints, aggregate pipe bedding, pipe testing, etc. as detailed on the plans and in the specifications.

Also included in the Lump Sum price are furnishing and installing sheeting and/or shoring, temporary support of existing Utilities if needed, marking tape, force main markers, pipe excavation, Type C backfill, backfilling, dewatering, disposal of excess soil, furnishing necessary pumps and tanker trucks while conducting tie-ins, hauling excess flow to the treatment plant south of Frederica, DE, testing and all related costs; and for all labor, tools, equipment, and incidentals to complete the work and make the sewer system functional.

Costs to abandon and/or tie-in to existing sewer lines, manholes and/or services at the two designated locations, including the lines described in the plans under "Sequence of Construction" are to be included in the Lump Sum bid for the "Sanitary Sewer System" item. This item also includes any flowable fill required to abandon existing pipes.

11/17/14

759511 - FIELD OFFICE, SPECIAL II

Description:

This Field Office, Special II item is a field office complex the work of which consists of erecting, furnishing, equipping, maintaining, and removing one (1) double wide modular field office unit, its entrance, and its adjacent parking area and one (1) single wide modular field office unit, its entrance, and its adjacent parking area. These field office units may be situated in different locations. The Contractor shall submit a specific location layout drawing and construction details for each field office, its entrance, and its parking area for approval by the Engineer. Each field office and its parking area shall be for the exclusive use of Department Officials, Engineers, Consultants, and Inspectors.

Each field office structure shall be free of asbestos and/or other hazardous materials. Each field office, its entrance, and its parking area shall be constructed and installed in accordance with all applicable city, county, state, and federal codes. The Contractor shall be responsible for obtaining all required licenses and permits for installation and placement of each field office, its entrance, and its parking area. The costs of obtaining such licenses and permits are to be incidental to the "Field Office, Special II" Item. Each field office shall be available for use by the Department continuously throughout the duration of the project.

Construction of and Equipment for the Field Offices:

The double wide field office shall be new and have a minimum floor space of 1,200 square feet with minimum exterior dimensions of 50'-0" length by 24'-0" width and the single wide field office shall be new and have a minimum floor space of 600 square feet with minimum exterior dimensions of 50'-0" length by 12'-0" width. The floor to ceiling height of each field office shall be nominal 8'-0". The exterior walls, ceiling, and floor of each field office shall be insulated. Each field office shall be of weather-proof construction, tightly floored and roofed, constructed with an air space above the ceiling for ventilation, supported above the ground, safely secured to its support if the support is an inground anchored foundation or otherwise by tie-downs to the ground, and fully skirted with rigid watertight covering overlapping the bottom of the exterior siding to the existing ground.

The Contractor shall provide entries to each field office by constructing a stair and deck platform with canopy at each exterior door. These entries shall be fabricated using treated dimension lumber, be constructed with hand and safety railing, be designed to last the life of the Contract, and conform to the requirements of the Architectural Accessibility Board and other federal, state and local boards, bodies and/or courts having jurisdiction in the Contract limits.

The Contractor shall construct and maintain an all-weather parking area adjacent to each field office of at least 6000 square feet and having a minimum of 12 functional parking spaces striped for full size cars. An entrance shall be constructed to each field office from its point of access to its parking area as determined by its approved location layout drawing and construction details, the cost to be incidental to the "Field Office, Special II" Item. All weather pathways from the parking area to the entrances of each field office shall also be constructed and maintained. This parking area and entrance pathways shall have a minimum of 2" type "C" warm mix on top of minimum 6" graded aggregate subbase. Snow and/or ice shall be removed from the entrance, the parking area, and the entrance pathways of each field office within 12 hours after each occurrence. Costs for furnishing, placing, and maintaining the aggregate base and warm mix, and for snow and/or ice removal, to be incidental to the "Field Office, Special II" Item.

The ground area 30'-0" from around the perimeter of each field office shall be landscaped and maintained. If the earthen grounds do not have a stand of weed free grass, the surface of this area shall be loosened to a depth of 4" and a satisfactory seedbed shall be prepared free of debris and extraneous matter. The area shall be seeded to a healthy stand of grass or sodded, after which the area shall be watered, mowed, and trimmed a minimum of three times a month during the growing seasons. Cost for this landscaping and maintenance is incidental to the "Field Office, Special II" Item.

Each field office shall have full carpeting, kitchenette facilities, and interior and exterior paneling, lighting, and plumbing fixtures. Each field office shall have a minimum of two (2) exterior doors, each door having a passage and a deadbolt lock. These door locks shall be keyed and at least 2 complete sets of keys shall be supplied to the Engineer's representatives. The exterior doors of each field office shall be insulated or have

storm doors. Each field office shall have a minimum of six (6) windows, each window having a minimum glass area of 1,150 square inches and a horizontal mini-blind covering the full glass area. The windows of each field office shall be insulated or have storm windows, shall be equipped with a locking device, and shall have screens installed and repaired when damaged.

At least one (1) outside water service connections shall be provided at each field office. Each water connection shall have a 3/4" frost proof hose bib with vacuum breaker and shall include 100 linear feet of 5/8" minimum diameter reinforced, industrial or commercial grade, soft rubber hose per connection. Each field office shall be provided with sufficient natural and artificial light and shall be adequately heated and cooled to provide comfortable working conditions.

Each field office shall have satisfactory lighting, electrical outlets, heating equipment, and exhaust fan and air-conditioning connected to an operational power source. Plan and drawing areas shall have individual fluorescent lights situated over their worktables. Replacement fluorescent lights shall be furnished as required. Electrical current, water, and any fuel for heating equipment shall be furnished and the cost of such shall be borne by the Contractor. Maintenance of the heating, exhaust fan, and air-conditioning equipment for each field office shall be provided for by validated service contracts for the length of the Contract. These service contracts shall allow a Department authorized project person to deal directly with the service organization to request repair.

The Contractor shall furnish and maintain two fire extinguishers and provide one lighted "Exit" sign for each exterior passage door of the field offices. Fire extinguisher(s) may be chemical or dry power and shall be UL Classification 10-B:C(min.) and shall be suitable for Types A:B:C fires. A commercial or industrial type first aid and safety kit suitable for project conditions and hazards (including snakebite) shall be provided and maintained to full capacity on a monthly basis in each field office.

The Contractor shall provide an alarm system in each field office for security with electronic, direct connection to a security service provider. The security systems shall have interior motion, window, and entrance detectors and built in manual fire alarms. All windows of each field office shall be covered with steel bar grids as a deterrent to forced entry. The Contractor shall provide validated monitoring and service contracts for the length of the Contract for each field office. These contracts shall allow a Department authorized project person to deal directly with the security service provider to request service and/or repair.

The Contractor shall furnish and maintain in each field office an adequate supply of cold potable water, a minimum 23 cubic foot new refrigerator, and a minimum 900-watt new microwave oven. Maintenance of the potable water supply equipment, refrigerator, and microwave shall be provided for by validated service contracts for the length of the Contract. These service contracts shall allow a Department authorized project person to deal directly with the service organization to request repair.

Suitable indoor toilet facilities, conforming to the requirements of the State and Local Boards of Health or of other bodies or courts having jurisdiction in the area, shall be provided for each field office. When separate facilities for men and women are not available or required, a sign with the wording "Rest Room" {letter heights of 1" minimum} shall be placed over the doorway and an adequate positive locking system shall be provided on the inside of the doorway to insure privacy. The facility(s) shall be maintained by the Contractor to be clean and in good working condition and shall be stocked by the Contractor with adequate lavatory and sanitary supplies at all times during the period of the Contract.

For each field office the Contractor shall be responsible for performing or for making arrangements for all necessary telephone connections and/or for their maintenance; for providing a new telephone equipment system, for payment of all connections and the new telephone system equipment and its installation; and for final disconnection of the telephones.

The telephone system for the field offices shall have a total of 5 lines consisting of 4 direct single lines with call forward busy feature and 1 dedicated facsimile line. All lines shall be capable of making unlimited local and long distance calls. The telephone system shall have 4 phone sets with privacy feature, (1 set which may be for wall mounting), all for the official and exclusive use of the Engineer and other representatives of the Department. Location of telephone lines shall by as directed by the Engineer. Arrangement shall be made to allow a Department authorized project person to deal directly with the telephone company to report outages and/or request repair. The Contractor shall arrange for the installation and initial setup of the specified telephone system. Initial installation and setup costs shall be the responsibility of the Contractor as will all subsequent monthly billings, for the field office telephone system.

The field office internet system shall be a broadband connection capable of download speeds of at least 100 Megabits per second and upload speeds of at least 10 Megabits per second. The internet connection shall be capable of attaching to a wireless networking hub/router, which is also to be provided by the Contractor to allow for connection of multiple PCs as outlined further in this Specification. Cost of installation, setup, and all subsequent monthly billings shall be the responsibility of the Contractor.

For all utilities, the Contractor shall be responsible for performing or for making arrangements for all necessary utility connections and/or for their maintenance; for payment of all utility connections, installations, service fees and bills; and for final disconnection of utilities.

The field office interiors shall be furnished by the Contractor. The Contractor shall provide new and maintain the following office furnishings, all which are to be approved by the Engineer prior to installation in the field office complex. Placement of these furnishings shall be as directed by the Engineer. These furnishings consist of 4 drafting tables with sufficient drawers for standard size plans, either attached to the tables or in cabinet form, each drafting table to have an ergonomic design spring back stool with five leg base having wheel casters, 9 full size office desks each with filing drawer and fully adjustable ergonomic design swivel chair with armrests and five leg base having wheel casters, 1 computer station with acoustical panels having minimum 60 NRC rating for privacy screen and fully adjustable ergonomic design swivel chair with armrests and five leg base having wheel casters, 1 large conference table for a minimum of 12 people with surrounding chairs with armrests, 4 folding tables minimum 6'-0" by 3'-0" each with ergonomic design straight back chair with armrests, 1 work table, 1 supply cabinet, 1 or more clothes closets of ample size to meet inspection manpower requirements, 4 rough plan racks, 2 legal size filing cabinets with 4 drawers, 4 legal size fire-resistant filing cabinets with lock and key with 4 drawers and meeting fire underwriters' approval for not less than one hour test, 2 stackable steel flat file cabinets for 43" by 32" size plan sheets each cabinet having 5 drawers with full suspension, rear hood, and hinged front depressor, 2 book shelves minimum 3'- 6" by 4'- 6" each, 3 vertical surface legal size three compartment pockets, 2 dry erase boards minimum 4' by 3' each with markers and erasers, and 2 cork bulletin boards minimum 3' by 2'. These office furnishings will remain the property of the Contractor at the conclusion of the project.

For each field office, the Contractor shall also furnish new and maintain the following office equipment, all which are to be approved by the Engineer prior to installation. The required equipment will enable the Department to synchronize project record keeping and office functions. The equipment shall be delivered in working and useable condition:

8 heavy-duty calculators having extra-large 12-digit fluorescent display, full size keyboard with contoured keys, two-color ribbon printer, and AC powered;

1 Canon Color imageRUNNER C3080i or Xerox WorkCentre WC7830 or approved equal all-in-one copier which includes color scanner, color printer, and fax. Copier to have high speed wireless and network capability. Copier shall have all necessary software and cables for proper operation and shall be connected to high speed wireless and connected for use to share on a local network. Copier to have zoom and preset reduction and enlargement features, automatic two (2) sided copying, automatic document feeder with minimum 30 sheet capacity with automatic stapling capacity;

1 micro cassette recorder, having fast playback, voice-activated system, three-digit tape counter, silent auto-stop and pause, two tape speeds, one-touch and follow-up, built-in condenser microphone, cue and review, and rechargeable with combination battery charger/AC adapter;

1 telephone answering machine having all-digital recording, 14 minute message capacity, selectable message time, voice prompt assistance, day/time stamp, call screening, two-digit LED message indicator, toll saver, power failure memory back-up, and message interrupt from any station; and

3 compact digital cameras with 10 megapixels or greater, maximum dimensions of 3" x 5" x 3", built in flash, autofocus, video mode LCD for review of images, LCD viewfinder acceptable, removable memory compatible with compact flash, or secure digital (SD) or secure digital high capacity (SDHC), ISO compatible with 100, 200, 400 standard of quality of better, and memory cards supported by camera of 8 GB or better;

1 Canon Vixia HF M300, Panasonic HDC SD60, Samsung HMX-R10 or approved equal digital video camera, 1080p, CMOS optical sensor, digital format H.264, digital photo mode, camcorder sensor

resolution 3.2 mega-pixels or greater, SD memory expansion card for still images, connection type, HDMI, USB, component video/audio output;

1 heavy duty 3-hole punch with minimum 40 sheet capacity;

1 extra heavy duty stapler with anti-jam feature having capacity up to 200 sheets; and

1 comb binding machine with manual punching capacity of 10 sheets having a minimum binding capacity of 150 sheets.

Consumables as required to manage the business of the project for each field office shall be provided for all office equipment for the length of the Contract. These consumables shall be furnished on request and shall include but not be limited to paper, tapes, ribbons, rolls, toner, cleaning kits, microcassette tapes and batteries, answering machine cassettes, camera batteries and memory sticks and/or discs, DVD and CD R/RW media, etc.

Maintenance of all office equipment in each field office shall be provided for by a validated service contract for the length of the Contract. This service contract shall allow a Department authorized project person to deal directly with the service organization to request repair.

Computer Requirements for Each Field Office:

Each field office shall have three (3) Intel or AMD computer Systems which will be furnished and maintained by the Contractor for use by the Engineer, the cost to be incidental to the "Field Office, Special II" Item. The specified computer systems will synchronize the construction management functions of the Department to monitor, report, and perform the accounting of the project work. The computer systems and all their related equipment specified below shall be furnished new and remain the property of the Contractor at the conclusion of the Contract. A detailed listing of the proposed computer systems and all their related equipment to be provided by the Contractor shall be submitted for approval by the Engineer prior to furnishing the Computer Systems. The Computer Systems shall be Laptop Computer Systems each with docking station, unless otherwise determined by the Engineer. In each field office the three (3) Computer Systems shall consist of:

Central Processing Unit (CPU) Lap Top

Intel or AMD processor, (2.0 GHz) or better with integrated USB 2.0/3.0 and wireless networking included,

Minimum 4.0GB RAM with expansion capability to at least 8.0GB, and

Microsoft "Windows® 7 Professional, Service Pack 1" (or later version as approved by the Engineer) operating system;

Memory (Storage)

CD/DVD +/- RW with double layer write capability, and 500GB hard drive minimum. Included software shall support double layer media writing and automatic backup of data;

Bluetooth

Bluetooth 4.0;

Network Card & Wireless Connectivity

Integrated 10/100/1000BASE-T Ethernet LAN
802.11b/g/n WLAN

Monitor (LCD/LED)

Laptop - shall have 15.4” display minimum;

Color Graphics Card

Card must be PCI Express interface with 512MB onboard video memory having, DirectX 11.0 compatible, and have a minimum resolution of at least 1280x800 with at least 32 bit color, and video control hardware and software;

Keyboard & Mouse

Integrated Keyboard or full-size (Bluetooth) equivalent keyboard. Mouse shall be full size and wireless (Bluetooth);

Printers

1 Color Inkjet or approved equal printer with high speed wireless and network capability. Printer shall have all necessary software and cables for proper operation and shall be connected to high speed wireless and connected for use to share on a local network:

Software

The latest version programs for application management (operating system), word processing, spreadsheet, and anti-virus shall be provided with all user manuals. Upgrades, maintenance, and full technical support by the manufacturer shall be provided for the length of the Contract. The required software will enable the Department to synchronize accounting and record keeping functions between the project, District, and Department offices. A list of programs to be provided shall be submitted to the Engineer for approval. Software, other than for application management and anti-virus, is to be delivered unopened to the Department's administrative office. All software is to be compatible with and for use to run on "Windows® 7 Professional, Service Pack 1" or later version as approved by the Engineer. The required applications software follows and is to be latest version unless noted:

spreadsheet - "Microsoft Excel 2010" or later version approved by the Engineer,

suite - "Microsoft® Office 2010 Professional" or later version as approved by the Engineer,

antivirus - "Norton 360 Premier edition" (or later version approved by the Engineer), and

software supporting creation of DVD +/- R/RW disks (supporting double layer media writing) and DVDR and DVDRW disks using DVDRW drive, for example: Ahead Nero, Roxio DVD/CD Creator, or some equivalent product. Note: software commonly included as part of the standard CDRW upgrade/standalone package is acceptable if included with the unit;

Related Equipment

Wireless networking hub/router, 802.11bgn or better, (or other high speed internet access) with all associated hardware (adapters, cables, etc) and software to enable wireless networking (or other high speed internet access) and internet connection sharing for all office computers and printers,

An electrical outlet with dedicated circuit for the main computer unit,

An optical mouse with proper driving software having complete Microsoft emulation,

An internal 56/28.8/14.4 fax modem with MNP5 error checking and complete Hayes emulation having high-speed 14.4 fax capability and regular data transmission between 2400 and 56 baud, with the latest version proper driving software,

Necessary cables for proper operation,

An uninterruptible power supply (UPS) units for protection from power loss or fluctuation, minimum of 6 outlets, adequate to provide a minimum of 30 minutes backup power for an orderly shut down of the computer system with software and connections for automatic system shutdown,

24 bit Sound Blaster compatible PCI soundcard with quality desktop speakers,

A combination surge, spike, and noise protection device with receptacles for all peripherals (may be in combination with the UPS power supply),

A wrist rest suitable for use with the furnished keyboard,

Cleaning kits for disk drives,

An anti-glare filter with grounding wire suitable for use with the furnished monitor, and

All cards, hardware, and operating, anti-virus, and equipment software to be fully installed and operational;

Maintenance and Service

Maintenance of all specified equipment and components shall be provided for by a validated service agreement for the length of the Contract. Maintenance (upgrades, replacement, full technical support) for each software application shall be provided for by validated maintenance agreement for the length of the Contract. These agreements shall allow an authorized project person to deal directly with the service organization to request repair or the maintenance organization to request assistance; and

Supplies

Consumables as required to manage the business of the project shall be provided for the Microcomputer Systems in each field office for the length of the Contract. These consumables shall be furnished on request and include zip drives and memory stick media, DVDR and DVDRW media compatible supporting operational minimum to maximum speed of the DVD/RW drive unit, cut sheet paper and labels compatible with the printers, hardware and screen cleaners, and toner cartridges.

Maintenance Requirements for Each Field Office:

Maintenance of each field office including its entrance and adjacent parking area, for the time required, shall consist of maintenance and/or replacement of all provided items, security system, furniture and equipment, computer systems, providing lavatory supplies, providing trash containers and waste baskets, providing entrance mats at each door, providing replacement items for lighting fixtures, maintaining all utilities, providing vermin and pest control by professional exterminator(s), providing satisfactory and sanitary janitorial and waste disposal services twice a week, providing cleanup of trash and debris on the parking lot and landscaped area once a week, and shall be included in the monthly unit cost. The Contractor shall provide and deliver for each field office a current copy of all validated field office equipment and computer maintenance, service, assistance and/or monitoring agreements and/or contracts as mentioned hereinabove to the Department's administrative office on or before the first day each field office is ready for use.

Method of Measurement:

This item will not be measured but will be paid for on a monthly basis. Partial months will be paid at the rate of 0.033 months per day.

Basis of Payment:

The field office complex will be paid for on a unit price bid per month, which price shall be full compensation for performing the work specified and the furnishing of all materials, labor, tools, equipment and incidentals necessary to maintain each field office, their entrance, and their adjacent parking area and restore each field office area, entrance, and adjacent parking area to match their original site condition. No separate payment will be made for costs involved for removing hazardous material or underground tanks to install these field offices, their entrances, and their parking areas. One (1) unit of payment will constitute erecting, furnishing, equipping, maintaining, and removing one (1) double wide field office and one (1) single wide field office and their entrances and parking areas. Payment will be made only for the actual number of months that the field office complex is acceptably provided by the Contractor. The field offices, their entrances, and their parking areas shall be ready for use not later than forty-five (45) calendar days after the date of the fully executed Contract and before construction operations begin.

760507 - PROFILE MILLING, BITUMINOUS CONCRETE
760508 - PROFILE MILLING, CONCRETE

Description:

This work consists of furnishing a pavement-milling machine or cold planer and planing the existing bituminous concrete pavement or P.C.C. Pavement at the locations and to the nominal depths shown on the Plans and/or as directed by the Engineer to obtain a smooth profile on the existing roadway surface. Unless otherwise noted on the Plans or specifications the Contractor shall reuse, salvage and/or dispose of the milled material.

Equipment:

The milling equipment shall be a commercially designed and manufactured milling machine capable of performing the work in a manner satisfactory to the Engineer. The machine shall be power-operated and self-propelled, shall have sufficient power, traction and stability to remove a thickness of material to a specified depth. In addition, the machine must accurately and automatically establish profile grades by referencing the existing pavement surface. This shall be accomplished by means of 1.) a ski of 30 (9 m) minimum length with an accuracy of ±0.125 in 30 (3 mm in 9 m) or 2.) a minimum of three (3) ultra sonic, non-ground contacting sensors with an accuracy of ±0.100 in 25 (2.5 mm in 7.5 m). If noted on the Plans, a profile grade shall be established independent of the existing pavement surface. In such case the machine shall be capable of following the independent grade line (e.g. string line). The machine shall have an automatic system for controlling grade elevation and cross slope. The machine shall also be equipped with a means to effectively control dust generated by the cutting operation.

Construction Methods:

The surface resulting from the planing operation shall be in accordance with notes and details on the Plans and shall be characterized by uniform, discontinuous longitudinal striations and shall not be gouged or torn. Imperfections exceeding 5/16" (8 mm) at any point along the surface as a result of missing teeth or faulty operation shall be removed by approved methods.

Before opening the milled surface to traffic, all loose material shall be removed from the surface with a power vacuum sweeper.

Whenever the milling operation causes water to pond or lay within the wheelpaths of the roadway the Contractor shall alleviate this problem by cutting bleeders into the shoulder or median to provide positive drainage. Cost for such work will be incidental to this item.

If the road is to remain open to traffic, longitudinal vertical drop-offs in excess of 2" (50 mm) at lane lines or at the centerline shall not be left overnight.

Transverse faces at the beginning and end of the milling operation existing at the end of a work period shall be tapered 20:1 or flatter in a manner approved by the Engineer to avoid a hazard for traffic.

Surface material that cannot be removed by cold planing equipment because of physical or geometrical restraints shall be removed by other methods acceptable to the Engineer.

If independent grade reference is required, it shall be designated in the Plans and/or Contract documents and elevations shall be provided by the Plans or at the direction of the Engineer.

If a severe bump exist in the pavement surface extra effort shall be taken at these locations to improve the profile. Manual changes to the cutter head may be needed at these locations to achieve this. It is the intent to remove bumps and irregularities in the pavement and produce a smooth milled surface for hot-mix resurfacing.

If the existing bituminous surface is over concrete the intent is to remove all of the existing bituminous material to the top of the concrete surface unless otherwise directed by the Plans or the Engineer. If milling to remove open graded hot mix, the milling operation must remove all of the open graded hot mix from the roadway surface.

Method of Measurement:

The quantity of pavement milling will be measured as the number of square yards per inch (square meters per 25 mm) of depth as shown on the Plans or established by the Engineer. The nominal depth shown on the Plans and initially set on the milling machine, even though it will vary automatically during profiling, will be the depth measured and paid.

Basis of Payment:

The quantity of pavement milling will be paid for at the Contract unit price per square yard per inch (square meter per 25 mm) of depth. Price and payment will constitute full compensation for furnishing an accepted pavement-milling machine and operator, for removal and disposal of the milled material or delivery to a designated site, for transporting equipment, for all labor, tools equipment and incidentals necessary to complete the item.

10/25/13

763501 - CONSTRUCTION ENGINEERING

1) **Description:**

This work consists of construction lay out including; stakes, lines and grades as specified below. Subsection 105.10 Construction Stakes, Lines and Grades of the Standard Specifications is voided.

Based on contract plans and information provided by the Engineer, the Contractor shall stake out right-of-way and easements lines, limits of construction and wetlands, slopes, profile grades, drainage system, centerline or offset lines, benchmarks, structure working points and any additional points to complete the project.

The Engineer will only establish the following:

(a) Original and final cross-sections for borrow pits.
(b) Final cross-sections: Top and bottom pay limit elevations for all excavation bid items that are not field measured by Construction inspection personnel. The Contractor shall notify the Engineer when these pay limit elevations are ready and allow for a minimum of two calendar days for the Engineer to obtain the information.
(c) Line and grade for extra work added on to the project plans.

2) Equipment. The Contractor shall use adequate equipment/instruments in a good working order. He/she shall provide written certification that the equipment/instrument has been calibrated and is within manufacturer's tolerance. The certification shall be dated a maximum of 9 months before the start of construction. The Contractor shall renew the certification a minimum of every 9 months. The equipment/instrument shall have a minimum measuring accuracy of [3mm+2ppmxD] and an angle accuracy of up to 2.0 arc seconds or 0.6 milligons. If the Contractor chooses to use GPS technology in construction stakeout, the Contractor shall provide the Engineer with a GPS rover and Automatic Level for the duration of the contract. The GPS rover shall be in good working condition and of similar make and model used by the Contractor. The Contractor shall provide up to 8 hours of formal training on the Contractor's GPS system to a maximum of four Engineer's appointees (DELDOT Construction Inspectors). At the end of the contract, the Engineer will return the GPS rover to the Contractor. If any of the equipment/instruments are found to be out of adjustment or inadequate to perform its function, such instrument or equipment shall be immediately replaced by the Contractor to the satisfaction of the Engineer. Choosing to use GPS technology does not give the contractor authority to use machine control.- Construction Engineering (GPS) Machine Control Grading shall only be used if noted in the General Notes in the plan set outlining the available files that will be provided to the Contractor and "the Release for delivery of documents in electronic form to a contractor" are signed by all parties prior to delivery of any electronic files. Only files designated in the General Notes shall be provided to the contractor. If machine control grading is allowed on the project see the "machine control" section of this specification. GPS technology and machine control technology shall not be used in the construction of bridges.

3) Engineering/Survey Staff. The Contractor shall provide and have available for the project an adequate engineering staff that is competent and experienced to set lines and grades needed to construct the project. The engineering personnel required to perform the work outlined herein shall have experience and ability compatible with the magnitude and scope of the project. Additionally, the Contractor shall employ an engineer or surveyor licensed in the State of Delaware to be responsible for the quality and accuracy of the work done by the engineering staff. When individuals or firms other than the Contractor perform any professional services under this item, that work shall not be subject to the subcontracting requirements of Subsection 108.01 of the Standard Specifications. The Contractor shall assume full responsibility for any errors and/or omissions in the work of the engineering staff described herein. If construction errors are caused due to erroneous work done under Construction Engineering the Contractor accepts full responsibility, no matter when the error is discovered. Consideration will not be given for any extension of contract time or additional compensation due to delays, corrective work, or additional work that may result from faulty and erroneous construction stakeout, surveying, and engineering required by this specification.

Construction Methods:

4) Performance Requirements:

(a) Construction Engineering shall include establishing the survey points and survey centerlines; finding, referencing, offsetting the project control points; running a horizontal and vertical circuit to verify the precision of given control points. Establishing plan coordinates and elevation marks for culverts, slopes, subbase, subsurface drains, paving, subgrade, retaining walls, and any other stakes required for control lines and grades; and setting vertical control elevations, such as footings, caps, bridge seats and deck screed. The Contractor shall be responsible for the preservation of the Department's project control points and benchmarks. The Contractor shall establish and preserve any temporary control points (traverse points or benchmarks) needed for construction. Any project control points (traverse points) or benchmarks conflicting with construction of the project shall be relocated by the Contractor. The Contractor as directed by the Engineer must replace any or all stakes that are destroyed at any time during the life of the contract. The Contractor shall re-establish centerline points and stationing prior to final cross-sections by the Engineer. The Vertical Control error of closure shall not exceed 0.035 ft times [Square root of number of miles in the level run] (0.01 m times [square root of number of kilometers]). The Horizontal Control precision ratio shall have a minimum precision of 1:20,000 feet (1 meter per 20,000 meters or 1:20,000) of distance traversed prior to adjustment.

(b) The Contractor shall perform construction centerline layout of all roadways, ramps and connections, etc. from project control points set by the Engineer. The Contractor using the profiles and typical sections provided in the plans shall calculate proposed grades at the edge of pavement or verify information shown on Grades and Geometric sheets.

(c) The Contractor shall advise the Engineer of any horizontal or vertical alignment revisions needed to establish smooth transitions to existing facilities. The Contractor must immediately bring to the attention of the Engineer any potential drainage problem within the project limits. The Engineer must approve any proposed variation in profile, width or cross slope.

(d) The Contractor shall establish the working points, centerlines of bearings on bridge abutments and on piers, mark the location of anchor bolts to be installed, check the elevation of bearing surfaces before and after they are ground and set anchor bolts at their exact elevation and alignment as per Contract Plans. Before completion of the fabrication of beams for bridge superstructures, the Contractor shall verify by accurate field measurements the locations both vertically and horizontally of all bearings and shall assume full responsibility for fabricated beams fitting and bearing as constructed. After beam erection and concurrently with the Department project surveyors or their designated representative, the Contractor shall survey top of beam elevations at a maximum of 10-ft (3.0-meter) stations and compute screed grades. These shall be submitted to the Engineer for review and approval before the stay in place forms are set. Construction stakes and other reference control marks shall be set at sufficiently frequent intervals to assure that all components of the structure are constructed in accordance with the lines and grades shown on the plans. The Contractor will be responsible for all structure alignment control, grade control and all necessary calculations to establish and set these controls.

(e) The Contractor, using contract plans, shall investigate proposed construction for possible conflicts with existing and proposed utilities. The Contractor shall then report such conflicts to the Engineer for resolution. All stakes for utility relocations, which will be performed by others, after the Notice to Proceed has been given to the Contractor, shall be paid for under item 763597 - Utility Construction Engineering.

(f) The Contractor shall be responsible for the staking of all sidewalk and curb ramp grades in accordance with the plans and the Departments Standard Construction Details. The Contractor shall review the stakeout with the Engineer prior to construction. The Engineer must approve any deviation from plans, Department Standard Construction Details and Specifications in writing. The Contractor shall be responsible for any corrective actions resulting from problems created by adjustments if they fail to obtain such approval.

(g) If wetland areas are involved and specifically defined on the Plans the following shall apply:

i. It is the intent of these provisions to alert the Contractor, that he/she shall not damage or destroy wetland areas, which exist beyond the construction limits. These provisions will be strictly

enforced and the Contractor shall advise his/her personnel and those of any Subcontractor of the importance of these provisions.

ii. All clearing operations and delineation of wetlands areas shall be performed in accordance with these Special Provisions. Before any clearing operation commences the Contractor shall demarcate wetlands at the Limits of Construction throughout the entire project as shown on the Plans labeled as Limits of Construction or Wetland Delineation to the satisfaction of the Engineer.

iii. The material to be used for flagging the limits of construction shall be orange vinyl material with the wording "Wetland Boundary" printed thereon. In wooded areas, the flagging shall be tied on the trees, at approximate 20-foot (6.1 meter) intervals through wetland areas. In open field and yard areas that have been identified as wetlands, 3 foot (one meter) wooden grade stakes shall be driven into the ground at approximate 20 foot (6.1 meter) intervals and tied with the flagging.

iv. If the flagging has been destroyed and the Engineer determines that its use is still required, the Contractor shall reflag the area at no cost to the Department. If the Contractor, after notification by the Engineer that replacement flagging is needed, does not replace the destroyed flagging within 48 hours, the Engineer may proceed to have the area reflagged. The cost of the reflagging by the Engineer will be charged to the Contractor and deducted from any monies due under the Contract.

v. At the completion of construction, the Contractor shall remove all stakes and flagging.

vi. The Contractor shall be responsible for any damages to wetlands located beyond the construction limits, which occurs from his/her operations during the life of the Contract. The Contractor shall restore all temporarily disturbed wetland areas to their preconstruction conditions. This includes restoring bank elevations, streambed and wetland surface contours and wetlands vegetation disturbed or destroyed. The expense for this restoration shall be borne solely by the Contractor.

(h) Whenever the Engineer will be recording data for establishment of pay limits, the Contractor will be invited to obtain the data jointly with the Engineer's Survey Crew(s) in order to agree with the information. If the Contractor's representative is not able to obtain the same data, then the information obtained by the Engineer shall be considered the information to be used in computing the quantities in question.

5) Submittals. All computations necessary to establish the exact position of all work from the control points shall be made and preserved by the Contractor. All computations, survey notes, electronic files, and other records necessary to accomplish the work shall be made available to the Department in a neat and organized manner at any time as directed by the Engineer. The Engineer may check all or any portion of the stakeout survey work or notes made by the Contractor and any necessary correction to the work shall be made as soon as possible. The Contractor shall furnish the Engineer with such assistance as may be required for checking all lines, grades, and measurements established by the Contractor and necessary for the execution of the work. Such checking by the Engineer shall not relieve the Contractor of his/her responsibility for the accuracy or completeness of the work. Copies of all notes must be furnished to the engineer at the completion of the project.

The Contractor shall submit any of the following at the Engineer's request:

(a) Proposed method of recording information in field books to ensure clarity and adequacy.
(b) A printout of horizontal control verification, as well as coordinates, differences and error of closure for all reestablished or temporary Control Points.
(c) A printout of vertical control verification, with benchmark location elevation and differences from plan elevation.
(d) Sketch of location of newly referenced horizontal control, with text printout of coordinates, method of reference and field notes associated with referencing control - traverse closure report.
(e) Description of newly established benchmarks with location, elevation and closed loop survey field notes - bench closure report
(f) All updated electronic and manuscript survey records.
(g) Stakeout plan for each structure and culvert.
(h) Computations for buildups over beams, screed grades and overhang form elevations.
(i) A report showing differences between supplied baseline coordinates and field obtained coordinates, including a list of preliminary input data.
(j) Any proposed plan alteration to rectify a construction stakeout error, including design calculations, narrative and sealed drawings.
(k) Baseline for each borrows pit location.
(l) Detailed sketch of proposed overhead ground mounted signs or signals showing obstructions that may interfere with their installation.
(m) Copies of cut sheets.

Machine Control Grading

This Section of the specification shall only be used if machine control is authorized for use on the project.

Description:

This specification contains the requirements for grading operations utilizing Global Positioning Systems (GPS).

Use of this procedure and equipment is intended for grading the subgrade surface; it is not intended for the use in constructing final surface grades.

The Contractor may use any manufacturer's GPS machine control equipment and system that results in achieving the grading requirements outlined in section 202 of the standard specifications. The Contractor shall convert the electronic data provided by the Department into the format required by their system. The Department will only provide the information outlined in this document and no additional electronic data will be provided. The Contractor shall perform at least one 500 foot test section with the selected GPS system to demonstrate that the Contractor has the capabilities, knowledge, equipment, and experience to properly operate the system and meet acceptable tolerances. The engineer will evaluate and make the determination as to whether additional 500 foot test sections are required. If the Contractor fails to demonstrate this ability to the satisfaction of the Department, the Contractor shall construct the project using conventional surveying and staking methods.

Materials:

All equipment required to perform GPS machine control grading, including equipment needed by DelDOT to verify the work, shall be provided by the Contractor and shall be able to generate end results that are in accordance with the requirements of Division 200 - EARTHWORK of the Standard Specifications.

Construction:

a. DelDOT Responsibilities:

1. The Department will set initial vertical and horizontal control points in the field for the project as indicated in the contract documents, (plans set). If the Contractor needs to establish new control points they shall be traversed from existing control points and verified to be accurate by conventional surveying techniques.

2. The Department will provide the project specific localized coordinate system.

3. The Department will provide data in an electronic format to the Contractor as indicated in the General Notes.

    a. The information provided shall not be considered a representation of actual conditions to be encountered during construction. Furnishing this information does not relieve the Contractor from the responsibility of making an investigation of conditions to be encountered including, but not limited to site visits, and basing the bid on information obtained from these investigations, and the professional interpretations and judgments of the Contractor. The Contractor shall assume the risk of error if the information is used for any purpose for which the information is not intended.

    b. Any assumption the Contractor makes from this electronic information shall be at their risk. If the Contractor chooses to develop their own digital terrain model the Contractor shall be fully responsible for all cost, liability, accuracy and delays.

    c. The Department will develop and provide electronic data to the Contractor for their use as part of the contract documents in a format as indicated in the General Notes. The Contractor shall independently ensure that the electronic data will function in their machine control grading system.

4. The Files that are provided were originally created with the computer software applications MicroStation (CADD software) and INROADS (civil engineering software). The data files will be provided in the native formats and other software formats described below. The contractor shall perform necessary conversion of the files for their selected grade control equipment. The Department will furnish the Contractor with the following electronic files:

   a. CAD files
      i. Inroads -Existing digital terrain model (.DTM)
      ii. Inroads -Proposed digital terrain model (.DTM)
      iii.Microstation -Proposed surface elements - triangles

   b. Alignment Data Files:
      i. ASCII Format

5. The Engineer shall perform spot checks of the Contractor's machine control grading results, surveying calculations, records, field procedures, and actual staking. If the Engineer determines that the work is not being performed in a manner that will assure accurate results, the Engineer may order the Contractor to redo such work to the requirements of the contract documents, and in addition, may require the Contractor to use conventional surveying and staking, both at no additional cost to the Department.

B. Contractor's Responsibilities

1. The Contractor shall provide the Engineer with a GPS rover and Automatic Level, for use during the duration of the contract. At the end of the contract, the GPS rover and Automatic Level will be returned to the Contractor. The Contractor shall provide a total of 8 hours of formal training on the Contractor's GPS machine control system to the Engineer and up to three additional Department appointees per rover.

2. The Contractor shall review and apply the data provided by the Department to perform GPS machine control grading.

3. The Contractor shall bear all costs, including but not limited to the cost of actual reconstruction of work, that may be incurred due to application of GPS machine control grading techniques. Grade elevation errors and associated corrections including quantity adjustments resulting from the contractor's use of GPS machine control shall be at no cost to the Department.

4. The Contractor shall convert the electronic data provided by the Department into a format compatible with their system.

5. The Contractor's manipulation of the electronic data provided by the Department shall be performed at their own risk.

6. The Contractor shall check and if necessary, recalibrate their GPS machine control system at the beginning of each workday in accordance with the manufacturer's recommendations, or more frequently as needed to meet the requirements of the project.

7. The Contractor shall meet the accuracy requirements as detailed in the Standard Specifications.

8. The Contractor shall establish secondary control points at appropriate intervals and at locations along the length of the project. These points shall be outside the project limits and/or where work is performed. These points shall be at intervals not to exceed 1000 feet. The horizontal position of these points shall be determined by conventional survey traverse and adjustments from the original baseline control points. The conventional traverse shall meet or exceed the Department's Standards. The elevation of these control points shall be established using differential leveling from the project benchmarks, forming a closed loop. A copy of all new control point information including closure report shall be provided and approved by the Engineer prior to construction activities. The Contractor shall be responsible for all errors resulting from their efforts and shall correct deficiencies to the satisfaction of the Engineer and at no additional cost to the Department.

9. The Contractor shall provide stakes at all alignment control points, at every 500 foot stationing, and where required for coordination activities involving environmental agencies and utility companies at the Contractor's expense. Work that is done solely for utility companies and that is beyond the work performed under item 763501 - Construction shall follow and be paid for under item 763597 -Utility Construction Engineering.

10. The Contractor shall at a minimum set hubs at the top of finished grade at all hinge points on the cross section at 500 foot intervals on the main line and at least 4 cross sections on side roads and ramps as directed by the engineer or as shown on the plans. Placement of a minimum of 4 control points outside the limits of disturbance for the excavation of borrow pits, Stormwater Management Ponds, wetland mitigation sites etc. These control points shall be established using conventional survey methods for use by the Engineer to check the accuracy of the construction.

11. The Contractor shall preserve all reference points and monuments that are identified and established by the Engineer for the project. If the Contractor fails to preserve these items the Contractor shall reestablish them at no additional cost to the Department.

12. The Contractor shall provide control points and conventional grades stakes at critical points such as, but not limited to, PC's, PT's, superelevation points, and other critical points required for the construction of drainage and roadway structures.

13. No less than 2 weeks before the scheduled preconstruction meeting, the Contractor shall submit to the Engineer for review a written machine control grading work plan which shall include the equipment type, control software manufacturer and version, and proposed location of the local GPS base station used for broadcasting differential correction data to rover units.

14. The Contractor shall follow the guidelines set forth in the "Geometric Geodetic Accuracy Standards and Specifications for Using GPS Relative Positioning Techniques" and follow a minimum of Second Order Class 1, (2-I) classification standards.

Automated equipment operations have a high reliance on accurate control networks from which to take measurements, establish positions, and verify locations and features. Therefore, a strong contract control network in the field which is the same or is strongly integrated with the project control used during the design of the contract is essential to the successful use of this technology with the proposed Digital Terrain Model (DTM). Consistent and well designed site calibration for all machine control operations (as described below under *Contract Control Plan*) are required to ensure the quality of the contract deliverables. The Contract Control Plan is intended to document which horizontal and vertical control will be held for these operations. Continued incorporation of the Base Station(s) as identified in the Contract Control Plan is essential to maintaining the integrity of positional locations and elevations of features. The Contract Control Plan shall be submitted to the Department for review and approval by the Departments Survey Section 3 weeks prior to the start of any machine control work. The Contractor shall operate and maintain all elements of the Machine Grade Control continuously once the operations begin until otherwise approved by the Engineer.

Contract Control Plan:

The Contractor shall develop and submit a Contract Control Plan for all contracts which use Machine Control Grading. Contract control includes all primary and secondary horizontal and vertical control which will be used for the construction contract. Upon the Contractor's completion of the initial survey reconnaissance and control verification, but prior to beginning primary field operations, the Contractor shall submit a Contract Control Plan document (signed and sealed by the Delaware licensed Land Surveyor or Delaware Professional Engineer who oversees its preparation) for acceptance by the Engineer, which shall include the following:

1. A control network diagram of all existing horizontal and vertical control recovered in the field as contract control.

2. Include a summary of the calculated closures of the existing control network, and which control has been determined to have been disturbed or out of tolerance from its original positioning.

3. An explanation of which horizontal and vertical control points will be held for construction purposes. If necessary include all adjustments which may have been made to achieve required closures.

4. An explanation of what horizontal and vertical control (including base stations) was set to accomplish the required stakeout or automated machine operation. Include how the position of these new control points was determined.

5. Describe the proposed method and technique (technology and quality control) for utilizing the control to establish the existing and/or proposed feature location and to verify the completed feature location and/or measured quantity.

6. A listing of the horizontal and vertical datums to be used and the combined factor to be used to account for ellipsoidal reduction factor and grid scale factor.

7. If the Contractor chooses to use machine control as a method of measuring and controlling excavation, fill, material placement or grading operations as a method of measuring and controlling excavation, fill, material placement or grading operations, the Contractor Control Plan shall include the method by which the automated machine guidance system will initially be site calibrated to both the horizontal and vertical contract control, and shall describe the method and frequency of the calibration to ensure consistent positional results.

8. Issues with equipment including inconsistent satellite reception of signals to operate the GPS machine control system will not result in adjustment to the "Basis of Payment" for any construction items or be justification for granting contract time extension.

Method of Measurement:

The quantity of Construction Engineering will not be measured.

Basis of Payment:

Payment will be made at the Lump Sum price bid for the item "Construction Engineering". The price bid shall include the cost of furnishing all labor, equipment, instruments, stakes and other material necessary to satisfactorily complete the work as herein described under this item for all roads and structures that are a part of the contract. Adjustment in payment will be made for the deletion or addition of work not shown in the contract documents.

Monthly payment will be made under this item in proportion to the amount of work done as determined by the Engineer.

3/27/15

763503 - TRAINEE

Description:

The item shall consist of providing training in the construction crafts in accordance with the requirements stated in the General Notices of this proposal under the Standard Federal Equal Employment Opportunity Construction Contract Specifications (Executive Order 11246).

Basis of Payment:

The payment for the item shall be made at a fixed rate of $.80 per hour toward the hourly rate of the trainee.

5/2/02

763508 - PROJECT CONTROL SYSTEM DEVELOPMENT PLAN
763509 - CPM SCHEDULE UPDATES AND/OR REVISED UPDATES

Description:

The Contractor Shall plan, schedule and construct the Project by using a Critical Path Method Project Schedule (CPM) meeting the requirements of these specifications. Use the CPM for coordinating and monitoring the Work specified in the Contract Documents including all activities of Subcontractors, vendors, suppliers, utilities, railroads, the Department, and all other parties associated with the construction of the Contract. Include all Work in the CPM; including but not limited to submittals, major procurement, delivery, and construction activities. Include all activities, including bid items, quantified in the Contract Documents. Base the CPM upon the entirety of the Contract Documents. Utilize CPM software that generates files compatible with Primavera P6 Project Management Release: 7.0.0.

Scheduling Representative:

Designate a scheduling representative prior to submission of the Original Critical Path Method Project Schedule (OCPM). The scheduling representative is the person primarily responsible for development and maintenance of the CPM schedule; the Contractor's representative in all matters regarding the schedule; and the Contractor's designated attendee for all schedule related meetings. The scheduling representative shall also be knowledgeable of the status of all parts of the Work throughout the duration of the Project. Replacement of the scheduling representative will require written approval from the Engineer.

Submit the qualifications of the scheduling representative to the Engineer for approval. This approval is required before the OCPM will be accepted. The scheduling representative shall have at least three years of verifiable experience for preparing and maintaining CPM project schedules on Contracts of similar size and complexity.

Critical Path, Project Completion Date, and Float:

The critical path is defined as the series of activities in a CPM that has the longest path in time. The submitted activity sequence and durations must generate a CPM with only one critical path. Divide Project wide activities such as Maintenance of Traffic, Construction Engineering, or Temporary Erosion Control that, by their nature, generate long durations and complement other activities into "establish" and "conclude" activities to prevent this type of Work from occupying a significant portion of the critical path.

The project start date, or initial data date, of the original CPM shall be the first chargeable day of Work. Nonproductive Work and administrative activities may begin and/or end prior to the project start date. The Original CPM must use all of the Contract Time and contain a critical path containing exactly zero float. Early completion schedules are not permitted. The schedule ending date of the Original CPM that uses all of the Project Time is the contract completion date.

Total Float is the difference between the schedule's finish date and the contract completion date. Free float is the difference in time between an activity's early finish and late finish. Free float is a shared commodity for the use of the Department and the Contractor and is not for the exclusive use or benefit of either party. Both parties have the full use of free float until depleted.

Submittal of the OCPM; the Start of Work and the Schedule of Record:

Complete and submit the proposed original CPM schedule (OCPM) database and the written narrative (WN) within 30 calendar days after Contract is Awarded. The WN is a description of any elements of the Schedule that deviate from the proposed construction sequence shown in the Contract Documents. Submit the OCPM in CPM format fully compatible with Primavera P6 Project Management Release: 7.0.0 by email or CD ROM as a single compressed database in CPM format.

The Engineer will complete the review of the OCPM within 30 calendar days after submittal. If required, a Joint Review Conference will be convened at which time the Engineer and Contractor may make corrections and adjustments to the proposed OCPM. If a revision is necessary due to the Engineer's review or

the Joint Review Conference, submit the proposed revision within seven calendar days after receiving the Engineer's review comments or within seven calendar days after the date of the Joint Review Conference, whichever is the latest. Make revisions in accordance with the requirements for the OCPM. The Engineer will respond to the revised OCPM within seven calendar days after receipt. Clearly identify each submittal and resubmittal for clarity by labeling "2nd Draft", "3rd Draft", etc.

Do not start any Work until the OCPM is accepted. If the Engineer is ready to issue a Notice to Proceed but the OCPM is not yet accepted, the Engineer may issue the NTP and start Contract Time, but forbid Work to begin until the OCPM is accepted. The Engineer may partially accept a OCPM and allow Work to begin if the required corrections to the OCPM are minor, but the Engineer will not accept submittals that do not show the complete schedule. The Engineer will not pay any estimates until the OCPM is partially accepted. Once the OCPM is partially accepted, the Engineer will pay the first estimate. If the Contractor fails to make a good faith effort to address the Engineer's comments before the second estimate is due for payment, the Engineer will not pay the second estimate until a good faith effort is made by the Contractor to comply. The Engineer may not withhold an estimate payment if, within the estimate period in question, the Engineer has failed to provide timely review comments in response to the Contractor's submittal. The Engineer may, however, withhold the payment of subsequent estimates if the Contractor fails to make a good faith effort to address the Engineer's comments. Upon issuance of the Notice to Proceed, the start date utilized in the OCPM will be adjusted to comply with the first chargeable day of Work. Any delay in starting Work caused by the acceptance of the OCPM by the Engineer will not be considered as a basis for any adjustment in the Contract amount or time. For Contracts that have fast-tracked starts, the Engineer and the Contractor may agree to alter the response times and approval dates listed above. Upon notification that the OCPM has been accepted, the corrected copy will become the CPM of record. The CPM of record shall be the Contractor's work plan for completing the entire Contract as specified in the Contract Documents.

Requirements for the OCPM:

The format of the OCPM database shall be the precedence diagram method with days as the planning unit and shall be based on Calendar Days. Use the Department's partially predetermined coding structure (CS) that is furnished by the Engineer.

Activity Sequencing. Activity sequence must be logical and representative of the Contractor's order of the Work. Successors and predecessors determine the schedule logic or activity sequence. A given activity cannot start until all of the given activity's predecessors have been completed. Use only finish to start dependency relationships (links); do not use lag times without approval from the Engineer. The Engineer may request that the Contractor resequence the activities to reflect realistic job logic. When scheduling using multiple resources, each resource unit shall have a corresponding activity. Durations of activities include all the time necessary to complete the activity including, but not limited to, Contractor's non-work periods (other than those shown on the calendars), reasonably foreseeable inclement weather, weekends and holidays. Base schedule calculations on retained logic, contiguous durations, and total float as finish float.

Activity Resources. Sequence activities to reflect resource apportionment. Logically connect and code each activity to reflect the crew (resource) performing the operation. Submit a summary list of crews, their crew codes, and their operation(s) with each schedule submission, unless unchanged. Identify responsibility for each activity. Identify Subcontractors, DBE's, utilities and Work performed by others that affects the Schedule.

*Breakdown and Durations of Activities***.** An individual activity is required for each construction element or each activity not under the control of the Contractor that affects the sequence or progress of the Work. The Engineer reserves the right to require additional breakdown of the Work activities at any time. Each activity must be identified by a name, symbol and coding, and shall have a duration, sequence, responsibility and resource(s). Choose activity names that are descriptive and identify single construction elements. Activity symbols, or ID's, shall be unique and systematic.

Activity types must be either "task", "start milestone", or "finish milestone". Do not use "hammock" type activities. Date constraints, float and duration constraints, and/or flags for activities are not permitted.

Assign a reasonable duration to each activity representative of its scope. Durations may not exceed 14 calendar days unless approved by the Engineer. Determine the duration of each activity by using productivity rates based on Calendar Days.

Include the preparation and approval of Working Drawings as activities. Include phasing (staging) milestones as activities. Correlate phasing milestones with the sequence of construction provided in the Contract Documents. Use a separate start and finish milestone activity to delineate each phase (stage).

*Utility Work***.** Include all Work performed by utilities on the Project as activities in the OCPM. Include each utility item of Work shown in the Contract's Utility Statement as an activity. Durations for utility activities shall be the same as the durations shown in the Utility statement for each activity unless otherwise approved by the Engineer.

*Calendars***.** Assign a calendar to each activity in the schedule. Use a minimum of 6 calendars, when applicable: (1) Full Schedule; (2) Permit Requirements; (3) Winter Condition; (4) Concrete Work; (5) Asphalt Paving Work; and (6) Nighttime Asphalt Paving Work. Use additional calendars if needed. Calendar non-work periods shall reflect the average Delaware weather history for the jobsite and the restrictions identified in the Contract Documents. The Contractor may choose perform Work during an activity's calendar non-work period at no additional cost to the Department if weather conditions are favorable for such Work and the Work does not violate a set forth in the Contract Documents. The maximum allowable non-work period for each calendar is set forth below. The Contractor may choose to shorten non-work periods at his/her discretion.

CALENDAR	MAXIMUM NON-WORK PERIOD
Full Schedule	None
Winter Condition	December 1 through March 15
Concrete Work	December 1 through March 15
Asphalt Paving	November 15 through March 15
Nighttime Asphalt Paving	October 15 through April 30

Written Narrative (WN). Provide a written narrative (WN) as part of the OCPM explaining the following:

(a) Relationships between activities not obviously identified
(b) Equipment usage and limitations.
(c) Manpower usage and limitations.
(d) Use of additional shifts and overtime.
(e) Activity codes, abbreviations, and activity identification system.
(f) All calendars utilized in the CPM and the basis of determining each non-work period
(g) All abbreviations.
(h) Use of calendars.
(i) Any other conditions that affect the schedule and are not readily discernible in the database.

CPM Updates:

Provide monthly updates to the CPM of record. Meet with the Engineer once a month prior to submitting the update to review the status of the schedule's activities. Prepare an updated list of activities showing all of the actual start and actual finish for each of the schedule's activities so that both parties can agree on the dates. Use the dates that were agreed upon in the meeting to status the CPM of record and submit the updated schedule to the Engineer for approval. Assign a unique file name to each update (Number/version). The data date of the update shall be the next day after the end of the update period. As part of the monthly update, submit a written description that identifies any delays or disruptions to the schedule experienced during the period of an update, any change in manpower or equipment, and any potential delays to the completion date of the schedule.

Do not include any revisions to the CPM without prior approval. Failure to submit complete updates in a timely manner may result in the withholding of estimates by the Engineer. The Engineer agrees to refrain from withholding estimates unless the Contractor is habitually late in providing updates, is more than four weeks late in submitting an update or has failed to submit an update that is part of a resolution to a serious problem that must be addressed immediately.

Revisions to the Schedule of Record:

Revisions are defined as any changes to the database other than status updates, log entries and moving the data date. Discuss any proposed revisions to the CPM verbally with the Engineer. If the revision is minor

in nature, the Engineer may allow the revision to be included on the next Update of the CPM. If the Engineer determines that the revision is not minor in nature, submit the proposed revision for review and approval prior to deviating from the approved CPM. When a revision to the CPM is required due to changes in the Contract initiated by the Engineer, immediately contact the Engineer to discuss the changes. The Engineer may allow a deviation from the approved CPM for specific mitigating activities.

The Engineer may direct the Contractor to revise the schedule of record at the Contractor's expense if: the critical path has less than minus ten (-10) Calendar Days of total float due to the Contractor's failure to perform the Work in accordance with the schedule; the Contractor requests to re-sequence the Work; and/or the Contractor has performed a significant amount of Work out of sequence. The Engineer may direct the Contractor to revise the schedule for any other reason; and such a revision will be paid at the unit cost for a CPM Revision.

The Engineer will review and respond to the proposed revision within 7 Calendar Days after receipt. Resubmit, if required, within seven calendar days after receipt of the Engineer's review comments. The Engineer reserves the right to reject any proposed revision that adversely impacts the Department, utilities, or other concerned parties.

Extensions of Contract Time and/or Incentive/Disincentive Dates.

Make requests for extension of Contract time in writing and subject to the notice and timeliness of submission provisions as provided for elsewhere in the Contract. Requests for an extension of Contract time or change in an incentive/disincentive date will be evaluated by the Engineer's analysis of the CPM of record and any proposed revision submitted. Include in the request a written narrative of the events that impacted the schedule and a detailed explanation of why the Contractor cannot meet the requirements of the schedule of record. Only delays to activities that affect the Contract completion date or will be considered for an extension of Contract time. Only delays to activities that affect the completion duration of an incentive/disincentive period will be considered for an extension of an incentive/disincentive completion date.

The extension of the specified Contract completion date or incentive/disincentive date will be based upon the number of Calendar Days the Contract completion date or incentive/disincentive date is impacted as determined by the Engineer's analysis. The Engineer and Contractor may agree to defer the analysis of a potential impact to the schedule until the completion of the activities that are affected. Such a deferment does not relieve the Contractor of his/her duty to identify potential impacts to the schedule in the applicable schedule updates.

All requests for extensions of Contract Time must be supported by the most recent CPM Update. If, within a reasonable period of time, the Contractor fails to make a good faith effort to produce an acceptable CPM update and uses an unacceptable CPM update to support a request for a time extension, the Contractor loses the right to receive that time extension; and/or the right to receive compensation for that delay caused in whole or in part by the Engineer.

Final As Built Schedule.

Submit a final CPM Schedule database within 14 Calendar Days of Substantial Completion. Failure to submit a final CPM Schedule may result in the withholding of estimates by the Engineer.

Method of Measurement:

The Project Control System will be measured in two items. The item, "Project Control System Development Plan" will be lump sum. The item "CPM Schedule Updates and/or Revised Updates" will be measured one each per update that is submitted and accepted.

Basis of Payment:

The item, "763508 – Project Control System Development Plan" will be paid at the Contract's lump sum bid price on the next monthly estimate after completion of the requirements of the Project Control System Development Plan, which includes the approval of the Original CPM Schedule. Price and payment will constitute full compensation for preparing the CPM database, acquiring the necessary software, attending all scheduling meetings with the Department, submitting and resubmitting all documents and for all labor, tools, equipment and incidentals necessary to complete the Work.

The item, "763509 – CPM Schedule Updates and/or Revised Updates" will be paid at the Contract unit price per each approved CPM schedule update as described above. Price and payment will constitute full compensation for preparing, submitting and resubmitting all CPM updates, for attendance at all scheduling meetings with the Department, for preparing and reviewing a list of actual start and actual finish dates with the Engineer, and for all labor, tools, Equipment and incidentals necessary to complete the Work.

2/11/2015

763597 - UTILITY CONSTRUCTION ENGINEERING

Description:

Utility Construction Engineering consists of providing construction and right-of-way/easement information to utility companies performing work (as defined in the Utility Statement) within the project limits. This may include but not necessarily be limited to staking right-of-way/easement lines, tops of cuts, bottoms of slopes, clear zones, drainage facilities, fill and cut grades, and other features that will enable utility companies to coordinate their work and correctly locate/relocate their facilities. Engineering/surveying required for utility work bid as part of the Contract is included in item 763501.

It is the intent of this item to cover engineering/surveying work that is done solely for utility companies and that is beyond the work performed under item 763501 - Construction Engineering. Work covered under Utility Construction Engineering will generally fall into two categories:

1. Engineering/surveying work that is not necessary for construction of the project, i.e. staking the clear zone line, providing cut/fill grades at proposed utility pole locations, staking back of drainage structures, and staking right-of-way lines where construction of the project (exclusive of utilities) is obviously well within the right-of-way.

2. Engineering/surveying work that is necessary for construction, but has to be provided for utility companies well in advance of the Contractor's need and will likely need to be redone later. This can essentially be any of the Construction Engineering work that when done early cannot be reasonably expected to remain undisturbed until needed for construction of the project (non-utility).

The Engineer must approve all requests for Utility Construction Engineering before the work begins. To this end, the Contractor should instruct utility companies to submit their requests to the Engineer. The Engineer will decide if the requested work meets the criteria for Utility Construction Engineering or is normal Construction Engineering and pass the requests along with his/her decisions to the Contractor. When the Engineer determines that the requested work qualifies as Utility Construction Engineering, the Department will reimburse the Contractor on a per hourly basis for each and every hour the Contractor's survey crew is in the field actively engaged in performing the Utility Construction Engineering work. The survey crew size shall be adequate to efficiently perform the work required and shall meet the approval of the Engineer. Office work associated with Utility Construction Engineering will be considered as incidental to the item.

The personnel engaged in and the equipment used for Utility Construction Engineering shall meet the requirements as described in item 763501 - Construction Engineering.

Method of Measurement:

The quantity of Utility Construction Engineering will be measured as the actual number of hours the Contractor's survey crew is in the field actively engaged in utility construction engineering work.

Basis of Payment:

The quantity of Utility Construction Engineering will be paid for at the Contract unit price per hour. Price and payment will constitute full compensation for furnishing all labor, equipment, instruments, stakes and other materials necessary to complete the work.

02/28/09

763626 - DIESEL FUEL COST PRICE ADJUSTMENT

I. Description: This section defines the criteria for payments to the Contractor to reflect increases or decreases in the cost of diesel fuel consumed in the performance of applicable construction work. To have the Diesel Fuel Cost Price Adjustment provisions apply to this project, a properly completed Diesel Fuel Cost Price Adjustment Option form must be submitted to the Department with the Bidder's bid proposal. If a properly completed Diesel Fuel Cost Price Adjustment Option form is not provided by the bidder, the Department will consider the option to apply the Diesel Fuel Cost Price Adjustment provisions for the project to be declined. No further opportunity to elect Diesel Fuel Cost Price Adjustment for the project will be made available.

a. General. These price adjustment provisions apply to contract items in the contract schedule of prices as grouped by category. Specific pay items to be adjusted are attached as an appendix to this Special Provision. General category descriptions and the fuel usage factors which are applicable to each are as follows:

1. Categories

1.a. Category A: Earthwork. The combined total of the applicable item plan quantities must exceed 5,000 CY.

1.b. Category B: Subbase and Aggregate Base Courses. The combined total of the applicable item plan quantities must exceed 500 tons.

1.c. Category C: Flexible Bases and Pavements. The combined total of the applicable item plan quantities must exceed 500 tons.

1.d. Category D: Rigid Bases and Pavements. The combined total of the applicable item plan quantities must exceed 5,000 CY.

1.e. Category E: Structures. Contract items will be based upon the total square foot price for each structure including any associated items of work, i.e. items not grouped under Categories A thru D.

2. Diesel Fuel Usage Factors – ENGLISH UNITS

Category	Factor	Units
A – Earthwork	0.34	Gallons per CY
B – Subbase and Aggregate Base Courses	0.62	Gallons per ton
C – Flexible Bases & Pavements	2.98	Gallons per ton
D – Rigid Bases & Pavements	0.98	Gallons per CY
E – Structures	8.00	Gallons per $1,000 of work performed

3. Quantity Conversion Factors – ENGLISH UNITS

Category	Conversion	Factor
B	SY to ton	90 lbs/Inch of depth/SY
C	SY to ton	112.5 lbs/Inch of depth/SY
D	SY to CY	Inches of depth/36

II. The posted index price will be the monthly price most recent data published by the U.S. Department of Energy, U.S. Energy Information Administration. The source information for the posted price for Central Atlantic (PADD 1B) No 2 Diesel Ultra Low Sulfur (0-15 ppm) Retail Prices (Dollars per Gallon) may be viewed at the following website:

http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=EMD_EPD2DXL0_PTE_R1Y_DPG&f=M

The release date for the U.S. Department of Energy, U.S. Energy Information Administration average price data occurs the first Monday of the following month, i.e. October prices are released the first Monday of November and used as the November Price Index.

The price index, FB, is the index price posted by the Department, determined as specified above, on the project advertisement date.

PRICE INDEX (FB) FOR DIESEL FUEL

PER GALLON (PER LITER) = $ 3.151

The price index, FP, will be the index price posted by the Department, determined as specified above, for the month during which the Notice to Proceed (NTP) is issued, and every 90 calendar days thereafter.

III. Price Adjustment Criteria and Conditions. The following criteria and conditions will be considered in determining a price adjustment for diesel fuel cost fluctuations.

a. Price Adjustment Calculation. When the ratio FP/FB is calculated to be less than 0.95 or calculated to be greater than 1.05, the Department will adjust unit bid price prices in accordance with the following formula:

AUP = (FP-FB)(F)+(UBP)
where:
AUP = Adjusted Unit Price
FP = Fuel Price Index for the month in which prices are adjusted for applicable construction work.
FB = Fuel Price Index in the Bid Proposal
F = Diesel Fuel Usage Factor
UBP = Unit Bid Price specified in the Contractor's Bid Proposal

b. Payment of Adjusted Unit Prices. The unit bid prices of work items affected by the fuel escalation will be adjusted by work order, either up or down, at Notice to Proceed and every 90 Calendar Days thereafter.

c. Expiration of Contract Time. If the Contractor exceeds the authorized allotted completion time, the adjusted item prices on the last authorized allotted work day shall be the prices used during the time liquidated damages are assessed. However, if the posted price for diesel fuel goes down, the item prices shall be adjusted downward accordingly

d. Final Quantities. Upon completion of the work and determination of final pay quantities, an adjusting work order will be prepared to reconcile any difference between estimated quantities previously paid and the final quantities. In this situation, the value for FP used in the price adjustment formula will be the average of all FP's previously used for computing price adjustments.

e. Inspection of Records. The Department reserves the right to inspect the records of the prime contractor and its subcontractors and material suppliers to ascertain actual pricing and cost information for the diesel fuel used in the performance of applicable items of work.

f. Extra Work. When applicable items of work, as specified herein, are added to the contract as Extra Work in accordance with the provisions of Section 110.03, no price adjustment will be made for fluctuations in the cost of diesel fuel consumed in the performance of the extra work, unless otherwise approved by the Engineer. The current price for diesel fuel is to be used when preparing required backup data for extra work to be performed at a negotiated price. For extra work performed on force account basis, reimbursement for material and equipment along with specified overhead and profit markups will be considered to include full compensation for the current cost of diesel fuel.

g. Subcontractors. Any Price Increases or Price Rebates that are calculated based on items of work performed by subcontractors will be added to or deducted from payments due to the Contractor

in the appropriate pay period. The Contractor shall then accurately record on the appropriate CN-91 or CN-103 form the additions or deductions into adjusted contract value. The Contractor shall make payment to the subcontractor(s) who actually performed the work in accordance with DelCode Title 17, Chapter 8.

Appendix---Item 763626 Diesel Fuel Cost Adjustment

	Item No./s
Category A: Earthwork Excavation & Embankment, Borrow (total qty must exceed 5000 CY)	202000, 204000, 207000, 208000, 209001, 209002, 209003, 210000, 212000
Category B: Subbase and Agg. GABC, PTB, Soil Cement Base (total qty must exceed 500 T)	302007, 302008, 608000
Category C: Flexible Bases and Pavements Warm Mix Asphalts (total qty must exceed 500 T)	401810, 401813, 401819, 401821, 401823, 401824, 401825, 401827, 401830, 402000
Category D: Rigid Bases and Pavements Concrete, P.C.C. Patching (total qty must exceed 5000 CY)	N/A
Category E: Structures Bridges, Large P.C.C. Structures	602002, 602004, 602009, 602013, 602015, 602017, 602506, 602553, 602615, 604000, 605002, 605501, 605511, 605600, 605664, 606503, 618042, 618047, 622002, 622500, 720587

11/10/11

763655 - STEEL COST PRICE ADJUSTMENT

.01 Description: The Department will adjust monthly progress payments up or down as appropriate for cost changes in steel used on specific items of work identified in the contract in accordance with this provision.

The following steel items will be eligible for consideration under this provision:

1. structural steel (rolled beams, plate girders, diaphragms, plate bearings, etc.);
2. reinforcing steel (plain & epoxy coated);
3. overhead sign structures;
4. guardrail, posts;
5. standard sign or lighting supports;
6. railing;
7. steel encasement pipe;
8 steel piles (end bearing or friction);
9. steel strand (used for pre-tensioned or post-tensioned finished elements); and
10. sheet piles.

Inventoried materials from the listing of eligible items and fasteners of any kind are specifically excluded for consideration. Fasteners include but are not limited to, bolt, nuts, washers, rivets, and welding rods.

The requirements of this provision shall apply only to material cost changes that occur between the date of bid opening and the date the material is shipped to the fabricator. To be eligible for this price adjustment, the Contractor is required to place purchase order(s) for eligible steel items for price adjustment identified in the contract within 30 days after final execution of the contract by the Department. All items eligible must be submitted and used on the project for any item to be eligible for adjustment.

For steel items to be eligible for adjustment, once shipped to the fabricator, the items shall be specifically stored, labeled, or tagged, recognizable by color marking, and identifiable by project for inspection and audit verification.

This provision allows for price adjustment for embedded steel used for pre-tensioned or post-tensioned precast components where furnishing steel is included in the unit price of the finished bid item. Steel used for post-tensioned or pre-tensioned elements shall be evaluated for price adjustment in the same manner as other steel material eligible under the requirements of this provision except that adjustment shall only apply to the tonnage or poundage of steel strand used in the pre-tensioned or post-tensioned element.

This provision shall only apply to material cost changes of steel that occur between the date of bid opening and the date the material is shipped to the Contractor, subcontractor or supplier/fabricator placing the steel into the finished component.

Submit material price quotes, bid papers, or other documentation satisfactory to the Department within 15 days after the date of the Award letter for the bid items the Contractor is requesting a steel price adjustment. This documentation shall support the completion of the form establishing the average price per pound for the eligible steel bid item. The Contractor must use the format as shown with this provision; no other format for presenting this information will be permitted. Certification is required that all items of documentation are original and were used in the computation of the amount bid for the represented eligible pay items for the month bids were opened. The documentation will be used to support the base line material price ("Base Price") of the steel item only. No adjustment will be made for changes in other components of the contract unit bid price, including, but not limited to, fabrication, shipping, storage, handling, and erection.

Failure to submit specifically required information such as purchase order, price data, bill of lading, material information or other requested information as noted herein will result in the Contractor not being eligible for price adjustment of steel items.

Price adjustment of each qualifying item under consideration will be subject to the following condition:

There must be an increase or decrease in the cost of eligible steel materials in excess of 10% up to a maximum of 60% from the Base Price when compared with the latest published price index ("Price Index") in effect at the time material is shipped to the fabricator.

The Price Index the Department is using is based on The U.S. Department of Labor, Bureau of Labor Statistics, Producers Price Index (PPI) which measures the average price change over time of the specific steel eligible item from the perspective of the seller of goods. The specific PPI to be used to adjust the price for the eligible steel items is shown in the table below. **Please note**: The PPI is subject to revision four months after original publication, therefore, price adjustments and payments will not be made until the index numbers are finalized.

The following table indicates the PPI steel category index items and the corresponding I.D. numbers to which the steel items will be compared:

Steel Item	**Bureau of Labor Statistics PPI Series I. D. Number WPU#**
Reinforcing steel (plain & epoxy coated) Steel Strand (Pre-tensioning & Post-tensioning)	WPU101704 (http://data.bls.gov/pdq/SurveyOutputServlet?years_option=all_years&output_view=data&periods_option=all_periods&output_format=text&reformat=true&request_action=get_data&initial_request=false&data_tool=surveymost&output_type=column&series_id=WPU101704)
Plate girders & rolled beams (Standard & High strength, diaphragms, plate bearings, etc.) Steel piling (H-pile, pipe piles & sheet piles)	Average of WPU1017 & WPU101 (http://data.bls.gov/pdq/SurveyOutputServlet?series_id=WPU1017&data_tool=XGtable & http://data.bls.gov/pdq/SurveyOutputServlet?series_id=WPU101&data_tool=XGtable)
Steel encasement pipe Overhead sign structures, posts, poles, guardrail, sign or lighting supports, & railing	WPU101706 (http://data.bls.gov/pdq/SurveyOutputServlet?years_option=all_years&output_view=data&periods_option=all_periods&output_format=text&reformat=true&request_action=get_data&initial_request=false&data_tool=surveymost&output_type=column&series_id=WPU101706)
Guardrail	Average of WPU1017 & WPU101707 (http://data.bls.gov/pdq/SurveyOutputServlet?series_id=WPU1017&data_tool=XGtable & http://data.bls.gov/pdq/SurveyOutputServlet?years_option=all_years&output_view=data&periods_option=all_periods&output_format=text&reformat=true&request_action=get_data&initial_request=false&data_tool=surveymost&output_type=column&series_id=WPU101707)

The price adjustment will be determined by computing the percentage of change in index value beyond 10% above or below the index on the bid date to the index value on the date the steel material is shipped to the fabricator (Please see included sample examples). Weights and date of shipment must be documented by a bill of lading provided to the Department. The final price adjustment dollar value will be determined by multiplying this percent increase or decrease in the index (after 10%) by the represented quantity of steel shipped by the Base Price per pound subject to the limitations herein.

A = B x P x Q	
Where:	
A =	Steel price adjustment in lump sum dollars
B =	Average weighted price of steel submitted with bid on project in $/lb
P =	Adjusted percentage change in PPI average from shipping date to bid date minus 10% (0.10) threshold
Q =	Total quantity of steel in pounds shipped to fabricator for the specific project

Delays to the work caused by steel shortages may be justification for a contract time extension but will not constitute grounds for claims for standby equipment, extended office overhead, or other costs associated with such delays.

The need for application of the adjustments herein to extra work will be determined by the Engineer on an individual basis and, if appropriate, will be specified on the Change Order.

This price adjustment is capped at 60%. This means the maximum "P" value for increase or decrease that can be used in the above equation is 50% (60%-10% threshold).

Calculations for price adjustment will be shown separate from the monthly progress estimate and will not be included in the total cost of work for determination of progress or for extension of contract time.

Any apparent attempt to unbalance bids in favor of items subject to price adjustment may result in rejection of the bid proposal.

.02 Method of Measurement:

Price increase/decrease will be computed as follows:

Sample Calculation of a Price Adjustment (increase)			
Project bid on	Tuesday, April 28, 2009		
Project has structural steel in the amount of:		**450,000**	Lbs
Orders placed in timely manner and according to contract.			
Contractor's F.O.B. supplier price for the structural steel in bid:		**$ 0.28**	/lb
Adjusted** BLS Producers Price Index most recently published average at time of bid:			**157.0**
** final change after 4 months			
All steel shipped to fabricator in same month, October 2009.	October-09		
Adjusted BLS Producers Price Index (PPI) most recently published average for month of October:			173.7
Adjustment formula is A = B X P X Q			
Where:	A =	Steel price adjustment in lump sum dollars	
	B = $ 0.28	Average weighted price of steel submitted with bid on project in $/lb = $0.28	
	P = 0.0064	Adjusted percentage change in PPI average from shipping date to bid date minus 10% threshold = (173.7-157.0)/157.0 – 0.10 = 0.0064	
	Q = 450,000	Total quantity of steel shipped to fabricator in October 2004 for this project in lb = 450,000 lb	
	A = $ 802.55	0.28 x 0.0064 x 450,000	
	A = $ 802.55	Lump Sum adjustment paid to Contractor	

Sample Calculation of a Price Adjustment (decrease)		
Project bid on April 27, 2009.		
Project has structural steel.	**450,000**	Lbs
Orders placed in timely manner and according to contract.		
Contractor's F.O.B. supplier price for the structural steel in bid:	**$ 0.28**	/lb
Adjusted** BLS Producers Price Index most recently published average at time of bid:		**173.7**
** final change after 4 months		
All steel shipped to fabricator in same month, October 2009.	October-09	
Adjusted BLS Producers Price Index (PPI) most recently published average for month of October:		**157.0**

Adjustment formula is A = B X P X Q

Where:	A =	Steel price adjustment in lump sum dollars
	B = $ 0.28	Average weighted price of steel submitted with bid on project in $/lb = $0.28
	P = -0.0039	Adjusted percentage change in PPI average from shipping date to bid date minus 10% threshold = (173.7- 157.0)/157.0 – 0.10 = -0.0039
	Q = 450,000	Total quantity of steel shipped to fabricator in October 2009 for this project in lb = 450,000 lb
	A = $ (486.01)	0.28 x 0.0039 x 450,000
	A = $ (486.01)	Lump Sum credit from Contractor

.03 Basis of Payment: The price adjustments will be made as a lump sum payment for eligible steel products placed and accepted.

2/1/11

763687 - PUMP HOUSE

Description:

This work consists of furnishing all materials and constructing a Sanitary Sewer Pumping Station and related items as shown on contract plan sheets M-01, M-02, M-03, ST-01, and electrical detail sheets E-00 through E-07. All work shown on these plan sheets, unless otherwise noted, is to be included in the Lump Sum Bid for item 763687, Pump House. Kent County Public Works will salvage any material or equipment deemed usable and also perform demolition and final removal of the existing pump station after the new station is fully functional.

The Contractor is responsible for assuring that all precast concrete elements will fit the field conditions encountered. No additional compensation will be considered to correct openings in the precast parts that were not properly cast in the shop.

Any requirements included in the Technical Specifications that are not addressed on the plans or by these Special Provisions, shall be performed in accordance with the applicable sections of the Technical Specifications. The Contractor is advised to obtain and be fully acquainted with the applicable specifications of the Owner.

The Owner of the sewer line on this project is the Kent County, Delaware, Department of Public Works and the Technical Specifications are titled, "Department of Public Works, Kent County Delaware, Pump Station 8 Replacement and Relocation, Technical Specification, August 2012" and are included in this contract as Appendix A to the Special Provisions.

Specifications:

DelDOT Standard Specification Sections 207.05, 209.04, 602.10, 602.11, 602.17, 602.18, 602.19, 603.05, 812.02, 812.03 (Class B), and 824.02(a).

Technical Specification Sections 02530, 02532, 02821, 15830, and the entire Division 16 (Electrical)

Contract Drawings

These Special Provisions

Materials and Construction Methods:

Excavation limits shall be at least 18 inches outside the neat lines of structures. Backfilling shall be performed in accordance with Section 207.05 of the DelDOT Standard Specifications with Type C material meeting the requirements of DelDOT Standard Specification 209.04.

Cast in place concrete shall meet the requirements of DelDOT Standard Specifications of Sections 812.02 and 812.03 (Class B). Concrete placement shall be in accordance with DelDOT Standard Specifications 602.10, 602.11, 602.17, 602.18 and 602.19

Reinforcing steel shall meet the requirements of DelDOT Standard Specification 824.02(a) and shall be placed in accordance with DelDOT Standard Specification 603.05. Chain link fencing shall meet the requirements of Technical Specification 02821 and the Plan Details and notes.

Refer to the plan notes and details and Technical Specifications (Appendix A) for additional material requirements and related specifications.

When the new Pump Station is put into service, the Contractor shall coordinate with Kent County and be prepared with tanker trucks and pumps to handle any excess flow during the change over to the new station. Kent County personnel must be satisfied with the equipment and tanker trucks provided on site before diverting flow to the new pump station. Any excess flow in tankers shall be delivered to the wastewater treatment facility located south of Frederica, DE.

System Integrator:

The Contractor shall designate a person to serve as the "System Integrator" for the Pumping Station Construction shown on the plans. Duties shall include, but not be limited to, assuring the compatibility of all elements of the Pumping Station, coordination of civil, electrical, and mechanical work resulting in a fully functioning Pumping Station.

Method of Measurement:

Pump House will not be measured.

Basis of Payment:

The work covered by the Lump Sum Payment for this item includes, but is not limited to, excavation, sheeting or shoring if required to meet OSHA requirements, Type C backfill, backfilling, chain link fencing (including posts, gates and all accessory items), precast concrete wet well and all accessory items, all hatches and ladders, precast concrete valve vault and all accessory items, stone bedding, stand-by generator (including concrete pad and all accessory items), grading, blower (including all ducts and accessory items), all wiring on the customer side of the power meter, all conduits on the customer side of the power meter, the underground conduit between the transformer and service cabinet enclosure (including excavation, bedding, and backfill), all lighting (including pole, fixtures, foundations and all accessory items), service cabinet enclosure (including concrete pad and all accessory items), cast-in-place concrete and reinforcing steel (including structural top slab, slab on grade, and all incidental concrete), yard hydrant, water supply piping from pitless adapter to the yard hydrant, splice box, furnishing the system integrator, all piping and piping accessories within and between the wetwell and metering/valve vault (8" DIP terminates 1 ft. downstream of vault wall), all pumps, meters, and accessory equipment within the wetwell and metering/valve vault, all controls, control components and accessory items within the service cabinet enclosure and between the service cabinet enclosure and each controlled item, wetwell and metering /valve vault exterior coatings, wetwell and metering/valve vault interior linings, piping, coating and lining, pipe supports, thrust blocking, testing and start-up services including furnishing treated water, furnishing necessary pumps and tanker trucks when the new pump station is put into service, hauling excess flow to the treatment plant south of Frederica, DE, and all other related electrical, mechanical, and structural work detailed on the plan sheets referenced in the "Description" section of this specification resulting in a fully functioning sanitary sewer pumping station.

01/23/15

900500 - ENVIRONMENTAL PERFORMANCE INCENTIVE (DISINCENTIVE)

Description:

This work consists of maintaining the project's erosion and sediment control items and provides an incentive payment for that Work.

Materials:

There are no materials included in this specification.

Construction Methods:

Continuously maintain all erosion and sediment control items per the approved plan throughout the duration of the Project, including periods when the Project is inactive or suspended. Repair, replace and/or maintain any erosion and sediment control measures as noted on the ES2M Inspection Rating Reports, at the following link,

http://deldot.gov/information/business/drc/pd_files/plan_development/es2m_inspection_rating_form.pdf

and as directed by the Engineer. Maintain access to all sediment control devices until construction phasing and stabilization allow the removal of those controls that are no longer required.

The incentive payment is based on performance. Performance is determined by the score obtained on the ES2M Inspection Rating Reports that are completed weekly.

Compliance procedures for failure to perform will be implemented per Section 901.06.

Method of Measurement:

There is no method of measurement in this specification.

Basis of Payment:

The total incentive awarded for this Contract will not exceed ***$636,000.00.*** This amount applies to all erosion and sediment control work shown on the plans or required by the Engineer to complete the Work and any erosion and sediment control work that is required to perform work that is added to the Contract.

Divide the total incentive by the number of Calendar Days originally assigned to the Contract to obtain the daily incentive amount. At the end of each estimate period, the Engineer will multiply the number of Calendar Days consumed during the estimate period times the daily incentive amount times the incentive factor taken from the table below. This amount will be paid on the monthly estimate

Payments will be made per each Calendar Day charged until either (1) Substantial Completion or (2) the total incentive amount reaches ***$636*,000.00** whichever occurs first.

Environmental Performance Incentive Schedule	
Average ES2M Inspection Rating Report Score (Sum of the scores of the reports received during the estimate period divided by the number of reports)	Incentive Factor
100 – 90	1.00
89.9 – 80	0.75
79.9 – 70	0.50
69.9 – 0	0.00

1/29/15

908502 - WET GROUND EROSION CONTROL GRASS SEEDING - FLATS

Description:

This work consists of furnishing and placing seed and straw mulch.

Materials:

Add the following after the end of 908.02 C 3 of the Standard Specifications:

Wet Ground Erosion Control Grass Seeding – Flats:

Species Name Common / *(Latin)*	Max. % Weed Seeds	Min % Purity	Min % Germination	Seeding Rate lb/Ac
Redtop *(Agrostis alba/Agrostis gigantea)*	0.75	95	90	40
			Total Seed Quantity (lb/Ac)	**40**

All seed shall be fresh, clean, from new crop seed, and delivered to the site in original unopened tagged packages in accordance with the Delaware Code and respective State laws.

Straw for mulching shall be from oats, wheat, rye, or other approved grain crops that are free from noxious weeds, mold, or other objectionable material. Straw mulch shall be in an air-dry condition and shall be suitable for placing with an approved mechanical blower.

Construction Methods:

As per Section 908 Seeding with changes to methods as shown on the Plans.

Application of Wet Ground Erosion Control Grass Seeding - Flats shall only occur between the following dates:

March 1st to May 15 and August 15 to October 31st.

Low-pressure tires or equipment shall be used on all seeding equipment.

No Lime or Fertilizer shall be added to the mix.

All topsoil placement and grading where specified shall be completed before seeding. No other seedbed preparation is required for Wet Ground Erosion Control Grass Seeding – Flats.

Straw mulch shall be applied at the rate of 4000 lb/ac. Small grain straw shall be uniformly and evenly applied immediately after seeding has been completed. An approved mechanical blower shall be used to apply the straw. Straw mulch applied by blowers shall provide a loose depth of not less than 1/2 nor more than 2". Ninety-five percent of the blown and shredded straw mulch shall be 6" or more in length when in place.

Placed straw shall not be crimped, tracked or disked into the soil unless shown on the Plans. Acceptance of 908502 – Wetland Erosion Seeding Control – Flats shall be made at time of placement, provided the seed and straw are mixed and placed as specified herein and as directed on the Plans.

No Maintenance Bond is required for this work.

All other aspects and conditions of Section 908 – Soil Stabilization Practices shall apply.

Method of Measurement:

As per Section 908 – Soil Stabilization Practices.

Basis of Payment:

As per Section 908 – Soil Stabilization Practices.

11/12/2014

908503 - WETLAND MITIGATION SEED MIX

Description:

This work consists of furnishing and placing seed in wetland mitigation areas in accordance with this specification, notes and details on the Plans, and applicable requirements of Section 908 of the Standard Specifications.

Materials:

Wetland mitigation seed mix shall conform to the following requirements:

	Max.% Weed Seeds	Min.% Purity	Min.% Germination	Seeding Rate (lb/Ac)
Redtop (Agrostis alba)	0.75	95	90	20
Creeping Bentgrass (Agrostis palustris) Annual Barnyard Grass	0.75	98	90	12
Duck Millet (Echinocloa spp.)	1.00	90	90	20
			Total Seed Quantity (lb/Ac)	52

Construction Methods:

Construction methods shall be in accordance with notes and details on the Plans, Section 908 of the Standard Specifications.

Method of Measurement & Basis of Payment:

The method of measurement and basis of payment will be in accordance with Subsections 908.05 and 908.06, respectively of the Standard Specifications.

11/17/2014

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
800 BAY ROAD
P.O. BOX 778
DOVER, DELAWARE 19903

SHAILEN P. BHATT
SECRETARY

UTILITY STATEMENT
STATE CONTRACT NO. T200412202
SR1, LITTLE HEAVEN GRADE SEPARATED INTERSECTION
KENT COUNTY, DELAWARE
December 22, 2014

The following companies maintain facilities within the contract limits:

• Delmarva Power Electric Distribution	Electric
• Delaware Electric Cooperative, Inc.	Electric
• Verizon Delaware LLC	Telephone
• Comcast Cable Co.	Communications
• Kent County Department of Public Works	Sanitary Sewer
• Artesian Water Co.	Water
• Fibertech Networks	Communications
• State of Delaware – DelDOT	Communications Fiber

The following is a summary of the utilities and companies involved. A detailed description, in the form of various Appendixes', can be found at the end of this summary for each Utility Company where facilities are removed, relocated, and/or replaced.

Delmarva Power Electric Distribution:

Delmarva Power Electric Distribution maintains the following aerial facilities within the project limits:

Delmarva Power Electric Distribution maintains aerial facilities on Company owned poles throughout the project limits. A detailed description of these facilities can be found in Appendix A.

TEAM DelDOT
Transparent Efficient Accountable Measured

Delmarva Power Electric Distribution maintains the following underground facilities within the project limits:

Delmarva Power Electric Distribution maintains underground facilities throughout the project limits. A detailed description of these facilities can be found in Appendix A.

Delmarva Power Electrical Distribution proposed changes to the aerial facilities include but are not limited to:

Delmarva Power Electric Distribution shall be responsible for the relocation of existing poles or the installation of new poles that belong to them.

Delmarva Power Electrical Distribution proposed changes to the underground facilities include but are not limited to:

Delmarva Power Electric Distribution will relocate existing underground facilities if impacted. Facilities to be relocated are identified in Appendix A.

Delmarva Power will complete these changes with their forces. These relocations/adjustments are expected to take approximately 120 calendar days to complete after the Company has been given a minimum of 30 calendar days advance notice that work shall begin; that right-of-way and easements have been staked, proposed cuts and fills have been staked; and proposed structures, inlets, pipes, signings, and any other proposed work has been staked.

Any additional adjustments or relocations shall be performed by the utility's forces during the construction of this project and the time to complete this additional work shall depend on the nature of the adjustment or relocation.

Delaware Electric Cooperative, Inc.:

Delaware Electric Cooperative, Inc. maintains the following aerial facilities within the project limits:

Delaware Electric Cooperative, Inc. maintains aerial facilities on Company owned poles along Barratts Chapel Road. A detailed description of these facilities can be found in Appendix B.

Delaware Electric Cooperative, Inc. maintains the following underground facilities within the project limits:

Delaware Electric Cooperative, Inc. maintains underground facilities along Barratts Chapel Road. A detailed description of these facilities can be found in Appendix B.

Delaware Electric Cooperative, Inc. proposed changes to the aerial facilities include but are not limited to:

Delaware Electric Cooperative, Inc. shall be responsible for the relocation of existing poles or the installation of new poles that belong to them.

Once poles are relocated and/or installed by each Utility Company, Delaware Electric Cooperative, Inc. will relocate the existing aerial facilities to the new poles as identified in Appendix B.

Delaware Electric Cooperative, Inc. proposed changes to the underground facilities include but are not limited to:

Delaware Electric Cooperative, Inc. will relocate existing underground facilities if impacted. Facilities to be relocated are identified in Appendix B.

Delmarva Electric Cooperative, Inc. will complete these changes with their forces. These relocations/adjustments are expected to take approximately 30 calendar days to complete after the Company has been given a minimum of 30 calendar days advance notice that work shall begin; that right-of-way and easements have been staked, proposed cuts and fills have been staked; and proposed structures, inlets, pipes, signings, and any other proposed work has been staked.

Any additional adjustments or relocations shall be performed by the utility's forces during the construction of this project and the time to complete this additional work shall depend on the nature of the adjustment or relocation.

Verizon Delaware LLC:

Verizon Delaware LLC maintains the following aerial facilities within the project limits:

Verizon Delaware LLC maintains aerial facilities on Company owned poles along throughout the Project limits. A detailed description of these facilities can be found in Appendix C.

Verizon Delaware LLC maintains the following underground facilities within the project limits:

Verizon Delaware LLC maintains underground facilities throughout the project limits. A detailed description of these faculties can be found in Appendix C.

Verizon Delaware LLC proposed changes to the aerial facilities include but are not limited to:

Verizon Delaware LLC shall be responsible for the relocation of existing poles or the installation of new poles that belong to them.

Once the poles are relocated by each Utility Company, Verizon Delaware LLC will relocate the existing aerial facilities to the new poles as identified in Appendix C.

Verizon Delaware LLC proposed changes to the underground facilities include but are not limited to:

Verizon Delaware LLC will relocate existing underground facilities if impacted. Facilities to be relocated are identified in Appendix C.

Verizon of Delaware, Inc. will complete these changes with their forces. These relocations/adjustments are expected to take approximately 240 calendar days to complete after the Company has been given a minimum of 30 calendar days advance notice that work shall begin; that right-of-way and easements have been staked, proposed cuts and fills have been staked; and proposed structures, inlets, pipes, signings, and any other proposed work has been staked. These relocations/adjustments should be broken down into two phases as identified in the Final Plans. Phase I shall be work north of Bowers Beach Road to the project limits and Phase 2 shall be work south of Bowers Beach Road to the project limits.

Any additional adjustments or relocations shall be performed by the utility's forces during the construction of this project and the time to complete this additional work shall depend on the nature of the adjustment or relocation.

Comcast Cable Company:

Comcast Cable Company maintains the following aerial facilities within the project limits:

Comcast Cable Company maintains aerial facilities throughout the project limits. Facilities of Comcast Cable Company may be found attached to poles owned by other Utility Companies. A detailed description of these faculties can be found in Appendix D.

Comcast Cable Company maintains the following underground facilities within the project limits:

Comcast Cable Company maintains underground facilities throughout the project limits. A detailed description of these faculties can be found in Appendix D.

Comcast Cable Company proposed changes to the aerial facilities include but are not limited to:

Comcast Cable Company shall be responsible for the relocation of existing poles or the installation of new poles that belong to them.

Once the poles are relocated by each Utility Company, Comcast Cable Company will relocate the existing aerial facilities to the new poles as identified in Appendix D.

Comcast Cable Company proposed changes to the underground facilities include but are not limited to:

Comcast Cable Company will relocate existing underground facilities if impacted. Facilities to be relocated are identified in Appendix D.

Comcast Cable Company will complete these changes with their forces. These relocations/adjustments are expected to take approximately 90 calendar days to complete after the Company has been given a minimum of 30 calendar days advance notice that work shall begin; that right-of-way and easements have been staked, proposed cuts and fills have been staked; and proposed structures, inlets, pipes, signings, and any other proposed work has been staked.

Any additional adjustments or relocations shall be performed by the utility's forces during the construction of this project and the time to complete this additional work shall depend on the nature of the adjustment or relocation.

Kent County Department of Public Works:

Kent County Department of Public Works maintains the following underground facilities within the project limits:

Kent County Department of Public Works maintains various sized Forced Mains and Gravity Sewers within the Project Limits, both within the Right-of-Way and in private easements. Kent County Department of Public Works also operates Pumping Station No. 8 south of Mulberrie Point Road. These items are identified in Appendix E.

Kent County Department of Public Works proposed changes to the underground facilities include but are not limited to:

Kent County Department of Public Works shall relocate the existing underground facilities if impacted. The 36" Force Main is to be relocated as a separate County Project prior to the start of this contact (36" Force Main Bypass Project, Kent County Project No. 1890.45). Remaining work (Relocation of Pump Station No. 8 and associated work) shall be completed as part of the State's Contract using Standard or Special Provision Item Numbers with materials furnished and installed by the State's Contractor. These items are identified in Appendix E.

Any additional adjustments or relocations shall be performed by the Project's Contractor during the construction of this project and the time to complete this additional work shall depend on the nature of the adjustment or relocation.

Artesian Water Company:

Artesian Water Company maintains the following underground facilities within the project limits:

Artesian Water Company maintains a water transmission line along Buffalo, Clapham, and Mulberrie Point Roads as well as a water transmission line crossing of SR1 in a steel casing in the area of Mulberrie Point Road. Additional information can be found in Appendix F.

Artesian Water Company proposed changes to the underground facilities include but are not limited to:

Artesian Water Company shall relocate existing underground facilities if impacted. That work is identified in Appendix F.

Artesian Water Co. will complete these changes with their forces. These relocations/adjustments are expected to take approximately 58 calendar days to complete after the Company has been given a minimum of 60 calendar days advance notice that work shall begin; that right-of-way and easements have been staked, proposed cuts and fills have been staked; and proposed structures, inlets, pipes, signings, and any other

proposed work has been staked and after survey layout of new construction has been completed.

Any additional adjustments or relocations shall be performed by the utility's forces during the construction of this project and the time to complete this additional work shall depend on the nature of the adjustment or relocation.

Fibertech Networks:

Fibertech Networks maintains the following aerial facilities within the project limits:

Fibertech Networks maintains aerial facilities throughout the project limits. Facilities of Fibertech Networks may be found attached to poles owned by other Utility Companies. The recent installation of aerial facilities through the project limits was coordinated and slack was built into the lines for proposed relocations shown on the plans.

Fibertech Networks proposed changes to the aerial facilities include but are not limited to:

Once the poles are relocated by each Utility Company, Fibertech Networks will relocate the existing aerial facilities to the new poles. These relocations/adjustments are expected to take approximately 30 calendar days to complete after the Company has been given a minimum of 30 calendar days advance notice that work shall begin.

State of Delaware – DelDOT (Communications):

The State of Delaware, Department of Transportation (DelDOT) maintains underground communications facilities between traffic signals located within the project limits: DelDOT's proposed changes to the underground facilities include but are not limited to the installation of additional underground conduit and cable.

A summary and plan of all additional conduit runs, relocation of existing cables and new facilities can be found on the Contract Signal and/or Utility Plans. Materials and the installation of those materials shall be completed as part of the State's Contract using Standard or Special Provision Item Numbers with materials furnished and installed by the State's Contractor.

Completed as a separate contract towards the end of construction for State Contract Number T200412202, or after the completion of this Contract, DelDOT will have the Fiber Optic cable installed to complete this work.

Any additional adjustments or relocations shall be performed by the utility's forces during the construction of this project and the time to complete this additional work shall depend on the nature of the adjustment or relocation.

General Notes

1. The contractor's attention is directed to Section 105.09 Utilities, Delaware Standard Specifications, August 2001.The Contractor shall contact Miss Utility (1-800-282-8555) two working days prior to any excavation. The Contractor is responsible for the support and protection of all utilities when excavating. The Contractor is responsible for ensuring proper clearances, including safety clearances, from overhead utilities for construction equipment. The contractor is advised to check the site for access purposes for his equipment and, if necessary, make arrangements directly with utility companies for field adjustments for adequate clearances.

2. It is understood and agreed that the contractor has considered in their bid all permanent and temporary utility appurtenances in their present or relocated positions as shown on the plans or described in the utility statement and/or are readily discernible and that no additional compensation will be allowed for any delays, inconvenience, or damage sustained by him/her to any interference from the utility facilities and appurtenances or the operation of moving the, except that the contractor may be granted an equitable extension of time.

3. The Contractor shall follow all requirements of the Delaware Code, Title 26, Chapter 8. Underground Utility Damage Prevention And Safety. Chapter 8 includes, among other requirements, Section 806. Duties of Excavators which contains the requirement for the Contractor to excavate prudently and carefully and to take all reasonable steps necessary to properly protect, support and backfill underground utility lines. This protection shall include but may not be limited to hand digging, within the limits of the planned excavation or demolition, starting 2 feet of either side of the extremities of the underground utility line for other than parallel type excavations and at reasonable distances along the line of excavation for parallel type excavations.

4. The Contractor shall note that the Delaware Code, Chapter 74B, Section 7405B requires notification to and mutually agreeable measures from the public utility for any person intending to carry on any function, activity work or operation within dangerous proximity of any high voltage overhead lines.

5. As outlined in Chapter 3 of the DelDOT Utilities Manual, utilities are responsible for obtaining all required permits from municipal, State and federal government agencies and railroads. This includes but is not limited to water

quality permits/DNREC Water Quality Certification, DNREC Subaqueous Lands/Wetlands permits, DNREC Coastal Zone Consistency Certification, County Floodplain permits (New Castle County only), U.S. Coast Guard permits, US Army Corps 404 permits, sediment and erosion permits, and railroad crossing permits.

6. Utility companies are required to restore any areas disturbed in conjunction with their relocation work. If an area is disturbed by a utility company and is not properly restored, the Department may have the highway contractor perform the necessary restoration. Any additional costs incurred as a result will be forwarded to the utility company.

NOTE: Coordination and cooperation among the utilities and the State's Contractor are of prime importance, therefore, the Contractor is directed to contact the following Utility Representatives with any questions in regard to this work prior to submitting bids and work schedules. Proposed work schedules should reflect the Utility Companies' proposed relocations.

Mr. William Whitaker	Delmarva Power	(302) 934-3356
Mr. Troy Dickerson	Delaware Electric Cooperative	(302) 349-3125
Mr. George Zang	Verizon Delaware Inc.	(303) 422-1238
Mr. Jim Spencer	Comcast Cable	(302) 632-8059
Mr. Andrew Jakubowitch	Kent County Dept. of Public Works	(302) 744-2430
Mr. David Spacht	Artesian Water	(302) 453-6918
Mr. James Highsmith	Fibertech Networks	(585) 697-5145
Ms. Mel Peters	DelDOT	(302) 760-2565

PREPARED AND RECOMMENDED BY:

CENTURY ENGINEERING, INC. — DATE 12/22/14

APPROVED AS TO FORM BY:

UTILITIES SECTION, DELDOT — DATE 12/23/14

APPENDIX A
Delmarva Power Facilities

Delmarva Power Electric Distribution existing aerial facilities:

1. Delmarva Power Electric Distribution maintains a 12KV electric systems beginning on Pole No. 50909/16863 on the west side of SR1 at Sta. 499+00 and heads north to Pole No. 51003/17982 at Sta. 612+40 on the west side of SR1.
2. Line begins on Pole No. 51003/17982 at Sta. 612+40 on the west side of SR1 and continues heading north on the west side of the proposed Clapham Road to a Pole No. 50843/18233 at Sta. 642+40 where the line crosses the proposed Clapham Road to Pole No. 18253/183 and then heads north on the east side of the proposed Clapham Road to the project limits.
3. Line begins on Pole No. 50934/17014 at Sta. 514+50 crossing SR1 to Pole No. 50949/17006.
4. Line begins on Pole No. 50958/17144 at Sta. 528+45 crossing SR1 to Pole No. 50975/17144 and continues heading east to Pole No. 50981/17134 out side of the project limits.
5. Line begins on Pole No. 50985/17306 at Sta. 544+60 crossing SR1 to Pole No. 51002/17306 and continues heading east on the south side of Skeeter Neck Road out side of the project limits.
6. Line begins on Pole No. 51004/17412 at Sta. 555+00 and heads west out of the project limits.
7. Line begins on Pole No. DPL 51029/17559 at Sta. 569+55 crossing SR1 to Pole No. 51043/17551.
8. Line begins on Pole No. 51043/17551 at Sta. 569+00 where one line heads east to Pole No. 51063/17542 and continues heading east out of the project limits, one line heads north to Pole No. 51056/17634 at Sta. 577+40, one line heads east to a 1-story building, and one line heads south to Pole No. 51043.
9. Line begins on Pole No. 51047/17572 at Sta. 571+10 and heads east to the 1 story house.
10. Line begins on Pole No. 51050/17092 at Sta. 573+15 and heads east to the 1 story house.
11. Line begins on Pole No. 51044/17654 at Sta. 579+00 and heads west to the house.
12. Line begins on Pole No. 51047/17676 at Sta. 581+40 and heads west to the house.
13. Lines begin on Pole No. 51047/17690 at Sta. 582+70 and heads west on the north side of Wilkins Ave out side of the project limits.
14. Line begins on Pole No. 51046/17710 at Sta. 585+00 and heads west to the house.
15. Line begins on Pole No. 51045/17719 at Sta. 585+65 and heads west to the house.
16. Line begins on Pole No. 51044/17746 at Sta. 588+50 and heads west to Pole No. 51043/17756 where one line goes to the 3 story house and one line heads north to the liquor store. Also from Pole No. 51043/17756 the line crosses SR1 and

continues heading east on the north side of Bowers Beach Road out side of the project limits.

17. Two lines begin on Pole No. 51089/17744 at Sta. 904+00 on the north side of Bowers Beach Road one line heads north to a Pole out side of the project limits, and one line heads north to a 1-story building.
18. Two lines begin on Pole No. 51108/17744 at Sta. 905+90. Two lines head north to two 1.5 story buildings and one line crosses Bowers Beach Road to Pole No. 51106/17738.
19. Two lines begin on Pole No. 51126/17746 at Sta. 907+65. One line heads north on the east side of Poplar Street to the project limits, and one line crosses Bowers Beach Road to Pole No. 51124/17738.
20. Line begins on Pole No. 51136/17748 at Sta. 908+85 and heads north to a house.
21. Two lines begin on Pole No. 51151/17753, at Sta. 910+50, one line heads north to a house and one line crosses Bowers Beach Road to a pole outside the project limits.
22. Line begins on Pole No. 51176/17771 at Sta. 913+60 crossing Bowers Beach Road to Pole No. 51178/17762 and then to a 2-story building.
23. Two lines begin on Pole No. 51186/17782 at Sta. 915+10, one line heads south crossing Bowers Beach Road to a 2-story building, and one line heads north to a 1-story building.
24. Line begins on Pole No. 51043/17769 at Sta. 590+70 on SR1 and head west to a pole outside of the project limits.
25. Two lines begin on Pole No. 51042/17779 at Sta. 591+70, and head west to two buildings.
26. Line begins on Pole No. 51039/17800 at Sta. 593+70 and heads west outside of the project limits.
27. Two lines begin on Pole No. 51032/17863 at Sta. 600+10. One line heads west to a building, and one line heads southwest to Pole No. 51028/17856 outside of the project limits.
28. Line begins on Pole No. 51031/17885 at Sta. 602+20 and heads west to the gas Sta. outside of the project limits.
29. Line begins on Pole No. 51031/17885 at Sta. 602+20 and heads east crossing SR1to Pole No. 51042/17887 and continues heading east to the project limits. Line also heads north to Pole No. 51041/17896 at Sta. 603+30.
30. Line begins on Pole No. 51042/17887 at Sta. 602+20 and heads south to Pole No. 51057/17791 at Sta. 592+85.
31. Line begins on Pole No. 51056/17810 at Sta. 594+60 and heads east to Pole No. 51063/17811 and then continues heading east.
32. Line begins on Pole No. 51052/17829 at Sta. 596+50 and heads east to Pole No. 51062/17829 and then continues east
33. Two lines begin on Pole No. 51050/17845 at Sta. 598+00. One line goes to a 1 story building and one line heads east.
34. Line begins on Pole No. 51061/17889 at Sta. 602+20 on the south side of East Front Street before it crosses the street to a house.

35. Line begins on Pole No. 51028/17906 at Sta. 604+50 and heads west to a 1-story house.
36. Line begins on Pole No. 50997/17997 at Sta. 614+40 on the west side of the proposed Clapham Road before crossing the street and SR1 to the north side of Skeeter Neck Road to Pole No. 51036/18006 where one line goes to a house and one line continues east to the project limits.
37. Line begins on Pole No. 50983/18029 at Sta. 617+60 and heads west to the project limits.
38. Three lines begin on Pole No. 50969/18055 at Sta. 620+40. One heads south to a house, one heads north to a house, and one crosses the proposed Clapham Road to a Pole.
39. Line begins on Pole No. 50956/18078 at Sta. 623+00 on the west side of the proposed Clapham Road and heads east on the south side of Mulberrie Point Road to the project limits.
40. Line begins on Pole No. 50968/18078 at Sta. 623+00 on the south side of Mulberrie Point Road then crossing the road to a Pole No. 50967/18085 and then to a building.
41. Line begins on Pole No. 51021/18093 at Sta. 1101+35 on the south side of Mulberrie Point Road before heading east to a house.
42. Line begins on Pole No. 51040/1099 at Sta. 1103+30 and crosses Mulberrie Point Road north to Pole No. 51041/18108 before heading north to two houses.
43. Two lines begin on a NO NUMBER Pole at Sta. 626+60. One line goes west to a house, and one line heads south crossing Buffalo Road to Pole No. 50937/18095 where it heads west on the south side of Buffalo Road to the project limits.
44. Line begins on a NO NUMBER Pole at Sta. 1308+00 and heads north crossing Buffalo Road to Pole No. 50924/18095.
45. Line begins on Pole No. 50921/18090 at Sta. 1306+25 crossing Buffalo Road to Pole No. 50924/18095 and then continues west underground to a building.

Delmarva Power Electric Distribution existing underground facilities:

1. Line begins on Pole No. 50928/16979 at Sta. 510+50 and heads south 30 feet to a DelDOT traffic counter on the west side of SR1.
2. Line begins on Pole No. 50931/16998 at Sta. 512+50 and heads west to a meter pan.
3. Line begins on Pole No. 50934/17014 at Sta. 514+50 and heads west to a meter pan.
4. Line begins on Pole No. 50949/17006 at Sta. 514+00 and heads east to a meter pan.
5. Line begins on Pole No. 50999/17374 at Sta. 551+45 and heads west to a meter pan.
6. Line begins on Pole No. 51004/17412 at Sta. 555+00 and heads west to a meter pan.

7. Line begins on Pole No. 51021/17516 at Sta. 565+40 and heads west to meter pan.
8. Two Lines begin on Pole No. 51052/17610 at Sta. 575+00 and heads east to two meter pans.
9. Two Lines begin on Pole No. 51056/17634 at Sta. 577+30 and heads east to two meter pans.
10. Line begins on Pole No. 51047/17676 at Sta. 581+45 and heads west to a meter pan.
11. Line begins on Pole No. 51069/17744 at Sta. 902+00 and heads west 60 feet to a DelDOT control.
12. Line begins on Pole No. 51106/17738 at Sta. 905+65 and heads south to a meter pan.
13. Line begins on Pole No. 51124/17738 at Sta. 907+50 and heads south to a meter pan.
14. Line begins on Pole No. 51136/17748 at Sta. 908+70 and heads north to a meter pan.
15. Line begins on Pole No. 51165/17761 at Sta. 912+05 and heads south crossing Bowers Beach Road to the project limits.
16. Line begins on a pole at Sta. 916+40 and heads west 140' to a meter pan.
17. 1/0 Pri. Line begins on Pole No. 51199/17798 at Sta. 917+15 and heads south crossing Bowers Beach Road to a transformer.
18. Four lines begin in a transformer at Sta. 917+50. All four lines head south to four meter pans.
19. 1/0 Pri. Line begins in a transformer at Sta. 917+50 and heads east to a transformer at Sta. 921+50.
20. Line begins on Pole No. 51211/17814 at Sta. 919+00 and heads north to a meter pan.
21. Two Lines begins on Pole No. 51223/17829 at Sta. 921+00 and heads north to a meter pan.
22. 1/0 Pri. Line begins in a transformer at Sta. 921+50 and heads east to Skeeter Neck Rd. where the line turns heading south out side of the project limits.
23. Line begins in a transformer at Sta. 921+50 and heads southwest to a meter pan.
24. Line begins on Pole No. 51297/1843 at Sta. 923+00 and heads north to a meter pan.
25. Line begins on Pole No. 51057/17791 at Sta. 592+75 and heads east to a meter pan.
26. Line begins on Pole No. 51003/17982 at Sta. 612+40 and heads west to a meter pan.
27. Two lines begin on Pole No. 51036/18006 at Sta. 456+00 on the north side of Skeeter Neck Road. Both lines head south crossing Skeeter Neck Road one line heads west 160 ft. then turns south for 190 ft., this line splits, one line continues south to Sta. 301+00 to a meter pan and the other line heads east for 140 ft. to a transformer and then south to the cell tower. The other line heads east to the project limits.
28. Line begins on Pole No. 50997/17997 at Sta. 614+40 heading west to a meter pan.

29. Line begins on Pole No. 50986/18018 at Sta. 616+45 then heads south to a meter pan.
30. Line begins on Pole No. 51012/18090 at Sta. 1100+25 on Mulberrie Point Road then heads south to a meter pan.
31. Line begins on Pole No. 51021/18093 at Sta. 1101+40 on Mulberrie Point Road then heads south.
32. Two Lines begin on Pole No. 51040/1099 at Sta. 1103+40 on Mulberrie Point Road One line heads south to a meter pan, and one heads east on Mulberrie Point Road for 70 feet, then turns south on the west side of Swaim Avenue to the project limits.
33. Line begins on Pole No. 50962/18067 at Sta. 621+60 on the proposed Clapham Road heading west to a meter pan.
34. Four lines begin on Pole No. 50937/18095 at Sta. 1309+50 and all four head south to four meter pans.
35. Four lines begin on a No Number Pole at Sta. 1308+00 and all four head south to four meter pans.
36. Five lines begin on Pole No. 50921/18090 at Sta. 1306+30. Four lines head south to four meter pans and one line heads west on the south side of Buffalo Road to a transformer at Sta. 1305+00.
37. Five lines begin on a No Number Pole at Sta. 1303+65. Four lines head south to four meter pans and one line heads north crossing Buffalo Road then turns heading west to the project limits.
38. Line begins on Pole No. 50924/18095 at Sta. 1306+30 on the north side of Buffalo Road and heads west to a building.
39. Two Lines begin on Pole No. 50928/18118 at Sta. 628+40 on the proposed Clapham Road. One line heads west to a meter pan and one heads north to the Verizon telephone box.
40. Three Lines begin on Pole No. 50905/18150 at Sta. 632+40 on the proposed Clapham Road. Two lines head north for 60 feet then turn west to the project limits, and one line heads north crossing the street then turns west to a transformer outside of the project limits.
41. Two Lines begin on Pole No. 50892/18167 at Sta. 634+30 on the proposed Clapham Road, one line heads west to a meter pan and one line heads south crossing the street to a sign.

Delmarva Power Electric Distribution proposed changes to the aerial facilities:

1. On the west side of SR1 beginning at Sta. 499+00 to Sta. 577+10 install new Poles, equipment and conductors as shown on the utility relocation plans from Sta. 579+00 to Sta. 612+40, maintain the existing facilities as is.
2. On the west side of Clapham Road beginning at Sta. 612+40 to Sta. 648+00. Install new Poles, equipment and conductors as shown on the utility relocation plans.

3. At Sta. 514+50 remove the existing overhead from Pole No. 50934/17014 to Pole No. 50949/17006 and install new underground cable.
4. At Sta. 528+45 remove the existing overhead from Pole No. 50958/17144 to Pole No. 50975/17144 and install new underground cable to relocated poles.
5. At Sta. 528+45, install new underground cable from relocated Pole No. 50975/17144 to proposed Variable Message Sign at Sta. 107+90.
6. At Sta. 544+60 remove the existing overhead from Pole No. 50985/17306 to Pole No. 51002/17306 and install new underground cable.
7. At Sta. 555+00 maintain the existing facilities heading west as is.
8. At Sta. 569+55 remove the existing overhead from Pole No. 51029/17559 to Pole No. 51043/17551.
9. Remove the existing overhead line from Pole No. 51043/17551 to Pole No. 51063/17542 at Sta. 569+00 and also remove the line from Pole No. 51043/17551 to Pole No. 51056/17634 at Sta. 577+40.
10. At Sta. 571+10 remove the existing overhead line from Pole No. 51047/17572 to the 1 story house.
11. At Sta. 573+15 remove the existing overhead line from Pole No. 51050/17092 to the 1 story house.
12. At Sta. 579+00 maintain the existing facilities on Pole No. 51044/17654 as is.
13. At Sta. 581+40 maintain the existing facilities on Pole No. 51047/17676 as is.
14. At Sta. 582+70 maintain the existing facilities heading west on Pole No. 51047 17690/8236 as is.
15. At Sta. 585+00 maintain the existing facilities heading west on Pole No. 51046 17710/D235 as is.
16. At Sta. 585+65 maintain the existing facilities heading west on Pole No. 51045 17719/D234 as is.
17. At Sta. 588+50 remove the existing line heading east crossing SR1 from Pole No. 51043/17756 to Pole No. 51108/17744 at Sta. 906+00 on Bowers Beach Road and install new underground cable.
18. At Sta. 904+00 remove the existing facilities from Pole No. 51089/17744.
19. At Sta. 905+90, Pole No. 51108/17744, relocate the existing line to the new Pole location.
20. At Sta. 907+65, Pole No. 51126/17746, relocate the existing line to the new Pole location.
21. At Sta. 908+85, Pole No. 51136/17748, relocate the existing line to the new Pole location.
22. At Sta. 910+50, Pole No. 51151/17753, relocate the existing line to the new Pole location.
23. At Sta. 913+60, Pole No. 51176/17771, maintain the existing facilities as is.
24. At Sta. 915+10, Pole No. 51186/17782, maintain the existing facilities as is.
25. At Sta. 590+70, Pole No. 51043/17769, maintain the existing facilities as is.
26. At Sta. 591+70, Pole No. 51042/17779, maintain the existing facilities as is.
27. At Sta. 593+70, DP&L Pole No. 51039/17800, maintain the existing facilities as is.

28. At Sta. 600+10, Pole No. 51032/17863, maintain the existing facilities as is.
29. At Sta. 602+20, DP&L Pole No. 51031/17885, maintain the existing facilities as is.
30. Remove the existing lines crossing SR1 from Pole No. 51031/17885 to Pole No. 51042/17887 at Sta. 602+20 and continues north to Pole No. 51041/17896 at Sta. 603+30.
31. Remove the existing lines starting from Pole No. 51042/17887 at Sta. 602+20, southward over the next five poles to Pole No. 51057/17791.
32. Remove the existing lines from Pole No. 51056/17810 at Sta. 594+60, heading easterly, to Pole No. 51063/17811.
33. Remove the existing lines from Pole No. 51052/17829 at Sta. 596+50 heading east to Pole No. 51062/17829.
34. Remove the existing lines from Pole No. 51050/17845 at Sta. 598+00.
35. Remove the existing lines from Pole No. 51061/17889 at Sta. 602+20.
36. At Sta. 604+50, Pole No. 51028/17906, maintain the existing facilities as is.
37. Remove the existing lines from Pole No. 50997/17997 at Sta. 614+40 heading east to Pole No. 51036/18006.
38. At Sta. 617+60, Pole No. 50983/18029, relocate the existing lines to the new Pole location.
39. At Sta. 620+40, Pole No. 50969/18055, relocate the existing lines to the new Pole location and remove the line crossing Clapham Road.
40. At Sta. 623+00 remove the existing lines from Pole No. 50956/18078 heading east to Sta. 1102+10 on Mulberrie Point Road and install new underground cable.
41. Remove the existing lines from Pole No. 50968/18078 at Sta. 623+00 heading north to Pole No. 50967/18085.
42. Remove the existing lines from Pole No.51021/18093 at Sta.1101+35 heading east.
43. On pole No. 51040/1099 at Sta. 1103+30 maintain the existing facilities as is.
44. On the pole at sta.626+60 remove the line going west to the house and relocate the line to the new pole location.
45. At Sta. 1308+00 maintain the existing facilities as is.
46. At Sta. 1306+40 maintain the existing facilities as is.

Delmarva Power Electric Distribution proposed changes to the underground facilities:

1. At Sta. 510+50, relocate the existing line to the new Pole location.
2. At Sta. 512+50, relocate the existing house service to the new Pole location.
3. At Sta. 514+50, relocate the existing house service to the new Pole location.
4. At Sta. 514+00 install new pri. cable crossing SR1 from pole 50934/17014 to a new ped at Sta.514+00.
5. Relocate the existing cable to the new ped at Sta. 514+00.
6. Install new primary cable from the new pole 50958/17144 to pole 50975/17144 at Sta.528+20.
7. Install new primary cable crossing SR1 from the new pole 50958/17144 to the new pole 50975/17144 at Sta. 528+20.

8. Install new primary cable from the new pole 50985/17306 crossing SR1 to the new ped and then continues and cross Skeeter Neck Rd. to the new pole.
9. At Sta. 551+40 maintain the existing facilities as is.
10. At Sta. 555+00 maintain the existing facilities as is.
11. At Sta. 565+40, relocate the existing house service to the new Pole location.
12. On Pole No. 51052/17610 at Sta. 575+00, remove the existing cables.
13. On Pole No. 51056/17634 at Sta. 577+30, remove the existing cables.
14. At Sta. 581+45 maintain the existing facilities as is.
15. Remove the existing pole and cable at Sta. 902+00
16. Install new primary cable from pole 51044/17746 to the new pole 51108/17744 at Sta. 588+65.
17. At Sta. 905+65 relocate the existing house to the new pole location.
18. At Sta. 907+50, relocate the existing house service at Pole No. 51124/17738 to the new Pole location.
19. At Sta. 908+70, relocate the existing house service at Pole No. 51136/17748 to the new Pole location.
20. At Sta. 912+05 maintain the existing facilities as is.
21. At Sta. 916+40 maintain the existing facilities as is.
22. At Sta. 917+15 maintain the existing facilities as is.
23. At Sta. 917+50 maintain the existing facilities as is.
24. At Sta. 917+50 maintain the existing facilities as is.
25. At Sta. 919+00 maintain the existing facilities as is.
26. At Sta. 921+00 maintain the existing facilities as is.
27. At Sta. 921+50 maintain the existing facilities as is.
28. At Sta. 921+50 maintain the existing facilities as is.
29. At Sta. 923+00 maintain the existing facilities as is.
30. At Sta. 592+75 remove the existing house service from Pole No. 51057/17791.
31. At Sta. 612+40, maintain the existing facilities as is from Pole No. 51003/17982.
32. At Sta. 456+00, from Pole No. 51036/18006, maintain the existing cable heading east as is, abandon the existing cable crossing Skeeter Neck Road heading west. Install new cable from Pole No. 51036/18006 heading south on the East Service Road to Sta. 609+60; the new line then turns west to the cell tower.
33. At Sta. 614+40 maintain the existing facilities as is from Pole No. 50997/17997.
34. At Sta. 616+45 maintain the existing facilities as is from Pole No. 50986/18018.
35. At Sta. 1100+25 relocate the existing service to a new pedestal.
36. At Sta. 1101+40 abandon the cable heading south from Pole No. 51021/18093.
37. At Sta. 1103+30 maintain the existing facilities as is from Pole No. 51040/1099.
38. At Sta. 621+60 relocate the existing service from Pole No. 50962/18067 to a new pole.
39. Maintain the existing facilities as is at Sta.1309+50.
40. Maintain the existing facilities as is at Sta.1308+00.
41. Maintain the existing facilities as is at Sta.1306+30.
42. Maintain the existing facilities as is at Sta.1303+65.

43. At Sta. 1306+30 maintain the existing house service from Pole No. 50924/18095.
44. At Sta. 628+40 relocate the existing services to the new pole location from Pole No. 50928/18118.
45. At Sta. 632+40 relocate the existing services from pole No. 50905/18150 to new pole location.
46. At Sta. 634+30 relocate the existing services from Pole No. 50892/18167 to the new pole location.

47. **At the far north end of the project, install new cable from Transformer box 50930/18694 approximately 1,600 LF south to proposed Variable Message Sign.**

48. **Delmarva Power will install new secondary services to the three (3) new emergency service gates per the signal plans.**
49. **Delmarva Power will install new secondary services for the five (5) new lighting control boxes per the Lighting Plans.**

APPENDIX B
Delaware Electric Cooperative Facilities

Delaware Electric Cooperative Distribution existing aerial facilities:

1. Delaware Electric Cooperative, Inc. maintains a 12KV 3/0 electrical system beginning on Pole No. 66447 at Sta. 805+50 on the north side of Old Barratts Chapel Road. The line then heads west to Pole No. 66446.
2. Line begins on Pole No. 66446 at Sta. 807+40 heading south crossing Old Barratts Chapel Road to Pole No. 66443.
3. Line begins on Pole No. 66443 and heads west on the south side of Old Barratts Chapel Road to the project limits.
4. At Sta. 700+40 on a No Number Pole, line crosses Barratts Chapel Road to Pole No. 66437.

Delaware Electric Cooperative Distribution existing underground facilities:

1. Line begins on Pole No. 66447 at Sta. 805+50 on the north side of Old Barratts Chapel Road and heads north to a meter pan.
2. Two lines begin on Pole No. 66446 at Sta. 807+40, Old Barratts Chapel Road, and head north to two meter pans.
3. Two lines begin on Pole No. 66439 at Sta. 703+50, Old Barratts Chapel Road, and head south to two meter pans.

Delaware Electric Cooperative Distribution proposed changes to the aerial facilities:

1. At Sta. 805+50 install a new Pole 32' Right of baseline.
2. At Sta. 807+35 install a new Pole 32' Right of baseline.
3. At Sta. 810+65 install a new Pole 55' Left of baseline.
4. At Sta. 814+00 install a new Pole 125' Left of baseline.
5. At Sta. 706+10 install a new Pole 132' Right of baseline.
6. At Sta. 703+50 install a new Pole 52' Right of baseline.
7. At Sta. 700+35 install a new Pole 35' Right of baseline.
8. At Sta. 700+20 install a new Pole 35' Left of baseline.
9. Transfer or install new equipment and conductors to maintain electric services from Sta. 805+50 to 700+00.

Delaware Electric Cooperative Distribution proposed changes to the underground facilities:

1. At Sta. 805+50 relocate the existing services to the new Pole location.
2. At Sta. 807+40 relocate the existing services to the new Pole location.
3. At Sta. 703+50 relocate the existing services to the new Pole location

APPENDIX C
Verizon Delaware LLC Facilities

Verizon Delaware LLC existing aerial facilities:

1. Line begins on Pole No. 50909/16863 on the west side of SR1 at Sta. 499+00 and heads north to Pole No. 51003/17982 at Sta. 612+40 on the west side of SR1.
2. Line begins on Pole No. 51003/17982 at Sta. 612+40 on the west side of SR1 and continues heading north on the west side of the proposed Clapham Road to Pole No. 50916/18135 at Sta. 630+40.
3. Line begins on Pole No. 51004/17412 at Sta. 555+00 and heads west to the project limits.
4. Line begins on Pole No. 51043/17551 at Sta. 569+00 and heads north to Pole No. 51056/17634 at Sta. 577+40.
5. Line begins on Pole No. 51047/17572 at Sta. 571+10 and heads east to a house.
6. Line begins on Pole No. 51050/17092 at Sta. 573+25 and heads east to a house.
7. Line begins on Pole No. 51044/17654 at Sta. 579+25 and heads west to a house.
8. Line begins on Pole No. 51047/17690 at Sta. 582+65 and heads west to the project limits.
9. Line begins on Pole No. 51045/17719 at Sta. 585+75 and heads west to a house.
10. Line begins on Pole No. 51069/17744 at Sta. 902+00 on the north side of Bowers Beach Road and continues heading east to the project limits.
11. Two lines begin on Pole No. 51089/17744 at Sta. 904+00 on the north side of Bowers Beach Road One line continues heading north to the project limits and one heads north to a house.
12. Line begins on Pole No. 51126/17746 at Sta. 907+80 heading north on the east side of Poplar Street to the project limits.
13. Line begins on Pole No. 51176/17771 at Sta. 913+60 heading south crossing Bowers Beach Road to Pole No. NB8.
14. Line begins on Pole No. 51211/17814 at Sta. 919+00 heading south crossing Bowers Beach Road to a house.
15. Two Lines begin on Pole No. 51032/17863 at Sta. 600+10 on the west side of SR1. One line heads west to a building, and one heads west to a Pole outside of the project limits.
16. Two Lines begin on Pole No. 51031/17885 at Sta. 602+30. One line heads west to a building and one line heads east crossing SR1to Pole No. 51042/17887.
17. Three Lines begin on Pole No. 51042/17887 at Sta. 602+30. One line heads north to Pole No. 51041/17896, one line heads east to the project limits, and one heads south to Pole No. 51057/17791 at Sta. 592+65.
18. Line begins on Pole No. 51057/17791 at Sta. 592+65 and heads east to a house.

19. Line begins on Pole No. 51056/17810 at Sta. 594+50 heads east to the project limits.
20. Line begins on Pole No. 51052/17829 at Sta. 596+50 and heads east to the project limits.
21. Line begins on Pole No. 51050/17845 at Sta. 598+00 and heads east to a house.
22. Line begins on Pole No. 51061/17889 at Sta. 444+00 on the South side of East Front Street and heads north to a house.
23. Two lines begin on Pole No. 51028/17906 at Sta. 604+50 and head west to two houses.
24. Line begins on Pole No. 50997/17997 at Sta. 614+45 and heads west to a house.
25. Line begins on Pole No. 50997/17997 at Sta. 614+45 and heads east crossing the proposed Clapham Road and SR1 to Pole No. 51036/18006, and then continues heading east on the north side of Skeeter Neck Road to the project limits.
26. Line begins on Pole No. 50983/18029 at Sta. 617+60 and heads west to the project limits.
27. Two lines begin on Pole No. 50969/18055 at Sta. 620+45 and heads west to two houses.
28. Line begins on Pole No. 50956/18078 at Sta. 623+00 and heads east on the south side of Mulberrie Point Road to the project limits.
29. Line begins on Pole No. 51021/18093 at Sta. 1101+40 on the south side of Mulberrie Point Road and heads east to a house.
30. Line begins on Pole No. 51040/1099 at Sta. 1103+40 and heads north to Pole No. 51041/18108.
31. Two Lines begins on Pole No. 51041/18108 at Sta. 1103+50, both head north to two houses.
32. Line begins on a NO NUMBER Pole at Sta. 626+60 and heads south to Pole No. 50937/18095.

Verizon Delaware LLC existing underground facilities:

1. One cable that begins at Sta. 500+00 and heads north in the existing southbound lane of SR1 to Sta.528+00 where the line turns heading west on the south side of Barratts Chapel Rd. to Sta. 799+20 where the line crosses Barratts Chapel Rd. heading northeast to pole No. 50962/17161 at Sta. 530+20 the line continues to head north a manhole at Sta. 581+40. From this manhole a series of conduits and 6 manholes run along the existing southbound lane of SR1 to a manhole at Sta. 623+50. From this manhole the line continues to a telephone cabinet at Sta. 628+70.
2. One cable begins at Sta. 500+00 and heads north in the existing median of SR1 to Sta. 573+40, where it turns and heads west to the west side of SR1 and then turns north to a manhole at Sta. 581+40.

3. An abandoned cable begins at Sta. 500+00 and heads north in the existing northbound lane of SR1 to an abandoned manhole Sta. 573+40.
4. Two lines begin on Pole No. 50931/16998 at Sta. 512+50. One line heads west to a house. The other line heads east crossing SR1 to Pole No. 50949/17006 at Sta. 514+00 and then continues to the project limits.
5. Line begins on Pole No. 50934/17014 at Sta. 514+50 and heads west to a house.
6. Three lines begin on Pole No. 50962/17164, at mainline Sta. 530+25. One line crosses SR1 and heads south to Pole No. 50975/17144, and two lines head west along the north side of Barratts Chapel Road.
7. Line begins on Pole No. 50985/17306 at Sta. 544+50, crosses SR1 and heads east to the project limits on the south side of Skeeter Neck Road.
8. Line begins on Pole No. 50999/17374 at Sta. 551+40 and heads west to a house.
9. Line begins on Pole No. 51001/17392 at Sta. 553+00 and heads west to a house.
10. Line begins on Pole No. 51021/17516 at Sta. 565+40 and heads west to a house.
11. Line begins on Pole No. 51029/17559 at Sta. 569+60 and heads east crossing SR1 to Pole No. 51043/17551 where it then heads east to the project limits.
12. Two lines begin on Pole No. 51052/17610 at Sta. 152+00 and both head east to houses.
13. Two lines begin on Pole No. 51056/17634 at Sta. 154+30 and both head east to houses.
14. Line begins on Pole No. 51047/17676 at Sta. 581+40 and heads west to a house.
15. Two lines begin on Pole No. 51045/17719 at Sta. 585+70 and both head west to houses.
16. Two lines begin on Pole No. 51046/17732 at Sta. 587+10 and head north to a manhole at Sta. 587+60.
17. A line begins in a manhole at Sta. 587+60 and heads north to a cabinet at Sta. 589+15.
18. A series of conduits heads east crossing SR1 along the south side of Bowers Beach Road to a manhole at Sta. 906+00 one line then continues heading east to the project limits. And a second line heads north to Pole No. 51108/17744.
19. Two Lines begin on Pole No. 51106/17738 at Sta. 905+60, Bowers Beach Road. Both head south to houses.
20. Line begins on Pole No. 51108/17744 at Sta. 905+80 and heads north to houses.
21. Line begins on Pole No. 51136/17748 at Sta. 908+90 and heads north to a house.
22. Line begins on Pole No. 51161/17753 at Sta. 910+50 and heads west to a house.
23. Line begins on Pole No. 51165/17761 at Sta. 912+10 and heads south to a house.
24. Line begins on Pole No. NB8 at Sta. 912+50 then heads south to a house.
25. Line begins on Pole No. 51186/17782 at Sta. 915+10 then heads north to a house.
26. Two Lines begin in a pedestal at Sta. 916+45 One line heads west to a house at Sta.915+00 and one line heads south to a house.
27. Begin in a pedestal at Sta. 916+45 one line heads north crossing Bowers Beach Rd. to a Pole No. 51199/17798.

28. Two lines begin on Pole No. 51211/17814 at Sta. 919+00 and heads North to a house.
29. Line begins on Pole No. 51223/17829 at Sta. 921+00 and heads north to a house.
30. Three lines begins on Pole No. 51297/1843 at Sta. 923+00 one line heads north to a house and one line heads north on the west side of Skeeter Neck Rd.to the project limits and one line heads south crossing Bowers Beach Rd.
31. Line begins in a manhole at Sta. 597+60 then heads east crossing SR1 to Pole No. 51050/17845.
32. Two Lines begin on Pole No. 51041/17896 at Sta. 603+30. One line heads east to the project limits, and one heads north to a manhole at Sta. 204+00 and then continues north crossing Skeeter Neck Road to Pole No. 51023/18004 on the north side of Skeeter Neck Road.
33. A Fiber Optic cable begins on Pole No. 51023/18004 on the north side of Skeeter Neck Road, located opposite Sta. 208+10 of the Proposed SR1 Northbound and heads south to a Fiber Optic pedestal at Sta. 203+65.
34. Line begins in a pedestal at Sta. 203+65 and heads east to the cell tower.
35. Beginning in a manhole at Sta. 204+00, two lines heads east to the cell tower.
36. Line begins on Pole No. 50956/18078 at Sta. 623+05 on the proposed Clapham Road heading east on the south side of Mulberrie Point Road; where it crosses SR1 and heads east to the project limits.
37. Line begins in a pedestal on the south side of Mulberrie Point Road at Pole No. 50987/18083 and heads north crossing Mulberrie Point Road along the west side of southbound SR1 to the project limits.
38. Two Lines begin in a pedestal at Sta. 1100+25 on the south side of Mulberrie Point Road and head south to the Kent County Department of Public Works Pumping Station No. 8.
39. Line begins on Pole No. 51040/1099 at Sta. 1103+30 and heads south to a house.
40. Line begins on Pole No. 51040/1099 at Sta. 1103+30 and heads east to Swaim Avenue then turns south to the project limits.
41. Line begins in a manhole at Sta. 623+55, heads east for 50 feet crossing Clapham Road then heads north along the east side of Clapham Road to the project limits.
42. Line begins on Pole No. 50928/18118 at Sta. 628+40 and heads west to a house.
43. Two lines begin on Pole No. 50928/18118 at Sta. 628+40 and head north to a telephone cabinet.
44. Line begins in a cabinet at Sta. 628+70 and heads north along the west side of Clapham Road to the project limits at Sta. 642+35.
45. Line begins on Pole No. 50937/18095 at Sta. 1309+50 on Buffalo Road and heads west along the south side of Buffalo Road to the project limits.
46. Two Lines begin on Pole No. 50924/18095 at Sta. 1306+40, Buffalo Road, and head north to houses.
47. Line begins on Pole No. 50921/18090 at Sta. 1306+40 on Buffalo Road and heads south into High Point.

48. Two lines begin on Pole No. 5092/17164 at Sta. 799+40, Barratts Chapel Road, and head west on the north side of Barratts Chapel Road, one line goes to Pole No. DEC 66447, Sta. 805+50, Barratts Chapel Road, and then heads north to a house, the other line heads west to the project limits along the north side of Barratts Chapel Road.
49. Line begins in a pedestal at Sta. 705+00 and crosses Barratts Chapel Road then heads west to Pole No. DEC 66439 at Sta. 703+50.
50. Two lines begin at Pole No. DEC 66439 at Sta. 703+50 and head south to houses.

Verizon Delaware LLC proposed changes to the aerial facilities:

1. Transfer existing and install new equipment and cables from Sta. 496+50 to Sta. 612+40.
2. Transfer existing or install new equipment and cables from Sta. 612+40 to Sta. 642+35, Chapham Road.
3. At Sta. 555+00 maintain the existing facilities as is.
4. Remove the existing lines from Pole No. 51043/17551 at Sta. 569+00 to Pole No. 51056/17634 at Sta. 577+40.
5. At Sta. 571+10 remove the existing overhead line from Pole No. 51047/17572 to the house.
6. At Sta. 573+25 remove the existing overhead line from Pole No. 51050/17092 to the house.
7. At Sta. 579+25 maintain the existing facilities from Pole 51044/17654 to a house as is.
8. At Sta. 582+65 maintain the existing facilities from Pole No. 51047/17690 as is.
9. At Sta. 585+75 maintain the existing facilities on Pole No. 51045/17719 as is.
10. Remove the existing lines from Pole No. 51069/17744 at Sta. 902+00 to Pole No. 51108/17744 at Sta. 906+00. At Sta. 906+00 transfer the existing lines to the new Pole location.
11. Remove the existing lines from Pole No. 51089/17744 at Sta. 904+00.
12. Transfer the existing lines on Pole No. 51126/17746 to the new Pole location at Sta. 907+80.
13. At Sta. 913+60, Pole No. 51176/17771, maintain the existing facilities as is.
14. At Sta. 919+00, Pole No. 51211/17814, maintain the existing facilities as is.
15. At Sta. 600+10, Pole No. 51032/17863, maintain the existing facilities as is.
16. Remove the line heading east to Pole No. 51042/17887 at Sta. 602+30.
17. At Sta.602+30 remove the line heading east to Pole No. 51061/17889 and remove the lines heading north and south.
18. At Sta. 592+65, Pole No. 51057/17791, remove the existing overhead line.
19. At Sta. 594+50, Pole No. 51056/17810, remove the existing overhead line.
20. At Sta. 596+50, Pole No. 51052/17829, remove the existing overhead line.
21. At Sta. 598+00, Pole No. 51050/17845, remove the existing overhead line.

22. At Sta. 444+00, Pole No. 51061/17889 remove the existing overhead line.
23. At Sta. 604+50, Pole No. 51028/17906, maintain the existing facilities as is.
24. At Sta. 614+45, Pole No. 50997/17997 relocate to the new pole.
25. At Sta. 614+45 Pole No. 50997/17997 remove the line heading east.
26. At Sta. 617+60, Pole No. 50983/18029, relocate the existing lines to the new Pole location.
27. At Sta. 620+45, Pole No. 50969/18055, relocate the existing lines to the new Pole location.
28. Remove the line from pole # 50956/18078 At Sta. 623+00 to the project limits.
29. At Sta. 1101+40 on Mulberrie Point Road, Pole No. 51021/18093, relocate the existing lines to the new Pole location at Sta. 1102+10.
30. At Sta. 1103+40 on Mulberrie Point Road, Pole No. 51040/1099, maintain the existing facilities as is.
31. At Sta. 1103+50 on Mulberrie Point Road, Pole No. 51041/18108, maintain the existing facilities as is.
32. At Sta. 626+60 relocate the existing lines to the new Pole location at Sta. 627+00.

Verizon Delaware LLC proposed changes to the underground facilities:

1. Verizon will install new cable from out side of the project limits to pole 50907/16889 at Sta.496+50.
2. Abandon the existing facilities from the project limits to Sta. 581+40.
3. Abandon the existing facilities from the project limits to Sta. 581+40.
4. Maintain the existing abandon facilities from the project limits to Sta. 573+40.
5. Transfer the existing house service to the new pole and abandon the existing cable form Pole No. 50931/16998 at Sta. 512+50 to Pole No. 50949/17006 .
6. At Sta. 514+50 Pole No. 50934/17014 relocate the existing house service to the new pole location. And install a new cable form Pole No. 50934/17014 to Pole No. 50949/17006.
7. Install new cable from Pole No. 50958/17144 to Pole No. 50975/17144 at Sta.528+00.
8. At Sta. 530+25 Pole No. 50962/17164 relocate the existing lines to the new pole location. And abandon the existing cable crossing SR 1 and heading south to Pole No. 50975/17144.
9. Install new underground from the west side to the east side of SR1 at Sta. 545+12 and cross Skeeter Neck Rd. to the new ped at Sta.1501+52. And abandon the existing line crossing SR 1.
10. At Sta. 551+40 Pole No. 50999/17374 maintain the existing house service as is.
11. At Sta. 553+00 Pole No. 51001/17392 maintain the existing house services as is.
12. At Sta. 565+40 Pole No. 51021/17516 relocate the existing house service to the new pole location.
13. At Sta. 569+60 abandon the existing cable and install new cable form Pole No. 51029/17559 to Pole No. 51063/17542.

14. Abandon the existing facilities at Sta. 152+00, Pole No. 51052/17610.
15. Abandon the existing facilities at Sta. 154+30, Pole No. 51056/17634.
16. At Sta. 581+40 on Pole No. 51047/17676 maintain the existing house service and install new cable to the existing manhole.
17. At Sta. 585+70 Pole No. 51045/17719 maintain the existing house service as is.
18. At Sta. 586+91 lower conduits under proposed drainage pipe (Elev.20.51).
19. At Sta. 587+10 Pole No. 51046/17732 maintain the existing facilities as is.
20. Maintain the existing facilities from the existing manhole at Sta. 587+60 to the Cabinet at Sta. 589+15.
21. Abandon the existing cable and install new cable from the existing manhole at Sta. 587+60 heading east crossing SR1 to a new manhole located on the south side of Bowers Beach Road at Sta. 905+40 install new cable from the new manhole to the new pole at Sta. 905+80 remove the existing abandoned cable from the existing manhole heading east and abandon existing manhole in place.
22. At Sta. 587+65 lower conduits under proposed drainage pipe (Elev. 20.28)
23. At Sta. 905+60 on Pole No. 51106/17738 relocate the existing lines to the new pole location.
24. At Sta. 907+70 form Pole No. 51126/17746 install new cable heading north on the east side of E. Poplar Rd. out side of the project limits.
25. At Sta. 908+90 Bowers Beach Road Pole No. 51136/17748 relocate the existing line to the new pole location.
26. At Sta. 910+50 Bowers Beach Road Pole No. 51161/17753 relocate the existing line to the new pole location.
27. Maintain the existing facilities as is at Sta.912+10.
28. Maintain the existing facilities as is at Sta.912+50.
29. Maintain the existing facilities as is at Sta.915+10.
30. Maintain the existing facilities as is at Sta.916+45.
31. Maintain the existing facilities as is at Sta.916+45.
32. Maintain the existing facilities as is at Sta.919+00.
33. Maintain the existing facilities as is at Sta.921+00.
34. At Sta. 923+00 lower the line under proposed drainage pipe (Elev.15.29).
35. At Sta. 591+00 lower conduits under proposed drainage inlet (Elev.20.10).
36. Abandon the line on pole 51052/17829 at Sta.596+50.
37. Abandon the existing line from the existing manhole to Pole No. 51050/17845 at Sta.598+00.
38. At Sta. 598+12 lower conduits under proposed drainage pipe (Elev.19.28).
39. At Sta. 602+83 lower conduits under proposed drainage pipe (19.04).
40. Abandoned the existing cables on Pole 51041/17896 at Sta. 603+30 heading east and north.
41. Abandoned the existing Fiber Optic cable and remove the existing pedestal at Sta.203+60.
42. Install new F/O cable from Pole 51011/17961 crossing SR1 at Sta. 609+20 to the cell tower as shown on the plans.

43. Remove the existing cable and pedestal at Sta. 203+65 and install new cable from the existing manhole at Sta. 609+20 crossing SR1 to the cell tower as shown.
44. Install new cable from the new pedestal at Sta. 203+50 to Pole No. #51036/18006 and continue install new cable to the new pole at Sta. 1102+00 on Mulberrie Point Rd. as shown on the plans.
45. Abandon the existing cables and remove the existing handhold at Sta.204+00.
46. Install new cable from the existing manhole at Sta. 609+20 to Pole No. 51018/17945 at Sta.608+20.
47. Abandon the existing cable and ped on Mulberrie Point Rd. at Sta. 1210+50 heading east to a ped at Sta. 1100+40. Also abandon the existing cable heading north on the west side of SR1 to a ped at Sta. 337+10.
48. Install new cable on the west side of SR 1 from Sta. 337+10 heading south to Sta. 325+50 then turn heading west on the north side of Ramp B crossing Clapham Rd. at Sta. 627+00 then turn north to Sta. 628+70.
49. Abandon the existing pedestal and cable from Sta. 623+00 heading east to the pedestal on Mulberrie Point Rd.
50. Abandon the existing cable from the manhole at Sta. 623+50 heading north on Clapham Rd. to the project limits.
51. On the west side of Clapham Rd. install new cable from Sta. 628+70 to Sta. 1308+10 on the north side of Buffalo Rd. then cross Buffalo Rd. to the existing pedestal.
52. Install new cable on the west side of Clapham Rd. from Sta. 628+70 heading north to a new pedestal at Sta. 632+20 then continue north to a pedestal at Sta. 642+20.
53. Install new cable on the west side of Clapham Rd. from the pedestal at Sta. 642+20 heading east crossing Clapham Rd. then head north to Sta. 646+50 and then cross Clapham Rd. and install a new pedestal.
54. Abandon the existing cable from Sta. 628+40 to Sta. 646+50.
55. Install new cable from Sta. 632+20 west to Barkers Landing.
56. At Sta. 1308+00 lower line under proposed drainage inlet and pipes (Elev.14.40).
57. At Sta. 805+45 relocate the existing cable to the new pole.
58. At Sta. 1602+30 lower the line under proposed drainage pipes (Elev.18.49).
59. At Sta. 703+50 relocate the existing cable to the new pole.

APPENDIX D
Comcast Cable Company Facilities

Comcast Cable Company maintains the following aerial facilities:

1. Line begins on Pole No. 50909/16863 on the west side of SR1 at Sta. 499+00 and heads north to Pole No. 51003/17982 at Sta. 612+40 on the west side of SR1.
2. Line begins on Pole No. 51003/17982 at Sta. 612+40 on the west side of SR1 and heads north on the west side of proposed Clapham Road to the project limits.
3. Line begins on Pole No. 50958/17144 at Sta. 528+40 and heads east crossing SR1 to Pole No. 50975/17144 and continues east to the project limits.
4. Line begins on Pole No. 51004/17412 at Sta. 555+00 and heads west to the project limits.
5. Line begins on Pole No. 51029/17559 at Sta. 569+60 and heads east crossing SR1 to the project limits.
6. Line begins on Pole No. 51043/17551 at Sta. 146+00 and heads north to Pole No. 51056/17634 at Sta. 154+30.
7. Line begins on Pole No. 51047/17572 at Sta. 148+10 and heads east to a house.
8. Line begins on Pole No. 51050/17092 at Sta. 150+20 and heads east to a house.
9. Line begins on Pole No. 51047/17690 at Sta. 582+65 and heads west to the project limits.
10. Two lines begin on Pole No. 51045/17719 at Sta. 585+80 and head west to houses.
11. Line begins on Pole No. 51044/17746 at Sta. 588+50 and heads east crossing SR1 along the north side of Bowers Beach Road to the project limits.
12. Line begins on Pole No. 51108/17744 at Sta. 905+90 and heads south crossing Bowers Beach Road to Pole No. 51106/17738.
13. Line begins on Pole No. 51126/17746 at Sta. 907+80 and heads north on the east side of Poplar Street to the project limits.
14. Line begins on Pole No. 51151/17753 at Sta. 910+50 and heads south to the project limits.
15. Line begins on Pole No. 51176/17771 at Sta. 913+60 and heads south crossing Bowers Beach Road to Pole No. 51178/17762 and continues south to a house.
16. Line begins on Pole No. 51186/17782 at Sta. 915+15 and heads south crossing Bowers Beach Road to a house.
17. Two lines begin on Pole No. 51199/17798 at Sta. 917+10, one heads south crossing Bowers Beach Road to a pole and 2 lines head south to houses. The other line heads south crossing Bowers Beach Road to a house.
18. Line begins on Pole No. 51031/17885 at Sta. 602+40 and heads east crossing SR1 to the project limits.
19. Line begins on Pole No. 51042/17887 at Sta. 602+40 and heads south to Pole No. 51057/17791 at Sta. 592+80 and then heads to a house.
20. Two lines begin on Pole No. 51028/17906 at Sta. 604+50 and head west to houses.

21. Line begins on Pole No. 50997/17997 at Sta. 614+40 and heads east, crossing SR1 along the north side of Skeeter Neck Road to the project limits.
22. Line begins on Pole No. 50997/17997 at Sta. 614+40 and heads west to a house.
23. Two lines begin on Pole No. 50969/18055 at Sta. 620+45 and head west to houses.
24. Line begins on Pole No. 50956/18078 at Sta. 623+00 and heads east crossing the proposed Clapham Road and SR1 on the south side of Mulberrie Point Road to the project limits.
25. Line begins on Pole No. 51021/18093 at Sta. 1101+40 on the south side of Mulberrie Point Road then heads south to a house.
26. Line begins on Pole No. 51040/1099 at Sta. 1103+35 on the south side of Mulberrie Point Road then heads north to Pole No. 51041/18108 and then to two houses.
27. Two lines begin on a NO NUMBER Pole at Sta. 626+60, one heads south crossing Buffalo Road to Pole No. 50937/18095 and then heads west to the project limits along Buffalo Road, and the other heads west to a house.
28. Line begins on Pole No. 50921/18090 at Sta. 1306+30 and heads north crossing Buffalo Road to Pole No. 50924/18095 and then to two houses.
29. Line begins on Pole No. DEC 66446 at Sta. 807+40 on the north side of Barratts Chapel Road, and then crosses Barratts Chapel Road to Pole No. DEC 66443/W4-5-93 turns west and runs on the south side of Barratts Chapel Road to the project limits.

Comcast Cable Company maintains the following underground facilities:

1. Line begins on Pole No. 50931/16998 at Sta. 512+50 and heads west to a house.
2. Line begins on Pole No. 50934/17014 at Sta. 514+50 and heads west to a house.
3. One Fiber Optic line and one coaxial line begins on Pole No. 50962/17164 at Sta. 530+20 and heads west to Pole No. 66447 at Sta. 805+40 on the north side of Barratts Chapel Road.
4. Line begins on Pole No. 66446 at Sta. 807+40 on the north side of Barratts Chapel Road and heads north to a house.
5. Line begins on Pole No. 50999/17374 at Sta. 551+45 and heads west to a house.
6. Line begins on Pole No. 51021/17516 at Sta. 565+45 and heads west to a house.
7. Line begins on Pole No. 51052/17610 at Sta. 575+30 and heads east to a house.
8. Two lines begin on Pole No. 51056/17634 at Sta. 577+40 and head east to two houses.
9. Line begins on Pole No. 51047/17676 at Sta. 581+45 and heads west to a house.
10. Line begins on Pole No. 51045/17719 at Sta. 585+70 and heads west to a house.
11. Line begins on Pole No. 51069/17744 at Sta. 902+00 and heads west to a DelDOT control cabinet.
12. Two Lines begins on Pole No. 51106/17738 at Sta. 905+70 on the south side of Bower Beach Road and head south to two houses.

13. Line begin on Pole No. 51165/17761 at Sta. 912+10 on the north side of Bowers Beach Road then crossing Bower Beach Road and continues south to the project limits.
14. Line begin on Pole No. 51186/17782 at Sta. 915+10 and heads north to a house.
15. Two lines begin on Pole No. 51186/17782 at Sta. 919+00 and heads north to a house.
16. Two lines begin on Pole No. 51297/1843 at Sta. 923+00 one line heads north to a house and one line heads south crossing Bowers Beach Rd. to the project limits.
    Two lines begin on Pole No. 50962/18067 at Sta. 621+60 on the west side of the proposed Clapham Road and heads west to two houses.
17. Beginning on Pole No. 50905/18150 at Sta. 632+25, the line heads west to the project limits.
18. Two lines begin on a NO NUMBER Pole at Sta. 1309+50 and head south to two houses.
19. Two lines begin on a NO NUMBER Pole at Sta. 1307+95 and head south to two houses.
20. Two lines begin on Pole No. 50921/18090 at Sta. 1306+40 and head south to two houses.
21. Line begins on Pole No. 50924/18095 at Sta. 1306+40 and heads north to a house.
22. Four lines begin on a NO NUMBER Pole at Sta. 1303+65 and head south to four houses.
23. A F/O cable begins on pole 50962/17164 at Sta. 798+60 and heads west on the north side of Barratts Chapel Rd. to Sta. 806+00.
24. Line begins on pole DEC 66446 and heads north to a house.
25. Two lines begin on Pole No. DEC 66439 at Sta. 703+50 and head south to two houses.

Comcast Cable Company proposed changes to the aerial facilities:

1. Transfer or install new equipment and conductors to maintain services from Pole No. 50909/16863 at Sta. 499+00 to Pole No. 51003/17982 at Sta. 612+40 on the west side of SR1.
2. Transfer or install new equipment and conductors to maintain services from Pole No. 51003/17982 at Sta. 612+40 to Pole No. 50817/18284 out side of the project limits on the east side of the proposed Clapham Road
3. Remove the existing line from Pole No. 50958/17144 at Sta. 528+40 to Pole No. 50975/17144 and install new underground.
4. Maintain the existing line beginning on Pole No. 51004/17412 at Sta. 555+00 and heads west to the project limits.
5. Remove the existing line from Pole No. 51029/17559 at Sta. 569+60 to Pole No. 51063/17542.

6. Remove the existing line from Pole No. 51043/17551 at Sta. 569+00 to Pole No. 51056/17634 at Sta. 577+40.
7. Remove the existing line from pole #51043/17551 to the house.
8. Remove the existing line from pole #51050/17092 to the house.
9. Maintain the existing line that begins on Pole No. 51047/17690 at Sta. 582+65 and heads west to the project limits.
10. Maintain the Two lines that begin on Pole No. 51045/17719 at Sta. 585+80 and head west to two houses.
11. Remove the existing line from Pole No. 51044/17746 at Sta. 588+50 heading east to Pole No. 51108/17744 and install new underground.
12. At Sta. 905+90, relocate existing lines at Pole No. 51108/1774 and Pole No. 51106/17738 to new Pole locations.
13. At Sta. 907+80, Pole No. 51126/17746, relocate the existing line to the new Pole location.
14. At Sta. 910+50, Pole No. 51151/17753, relocate the existing line to the new Pole location.
15. At Sta. 913+60, Pole No. 51176/17771, maintain the existing facilities.
16. At Sta. 915+15, Pole No. 51186/17782, maintain the existing facilities.
17. At Sta. 917+10, Pole No. 51199/17798, maintain the existing facilities.
18. Remove the existing line from Pole No. 51031/17885 at Sta. 602+40 heading east crossing SR1 to the project limits and install a new underground line.
19. Remove the existing lines along six Poles starting from Pole No. 51042/17887 at Sta. 602+40 and ending at Pole No. 51057/17791 located at Sta. 592+80.
20. At Sta. 604+50, Pole No. 51028/17906, maintain the existing facilities.
21. Remove the existing line from Pole No. 50997/17997 to Pole No. 51036/18006 at Sta. 614+40.
22. At Sta. 614+40, Pole No. 50997/17997, maintain the existing facilities.
23. At Sta. 620+45, Pole No. 50969/18055, relocate the existing line to the new Pole location.
24. Remove the existing line and install new underground from Pole No. 50956/18078 at Sta. 623+00 to Pole No. 51021/18093 at Sta. 1102+00 on Mulberrie Point Road.
25. At Sta. 1101+40, Pole No. 51021/18093, relocate the existing line to the new Pole location.
26. At Sta. 1103+35, Pole No. 51040/1099 to Pole No. 51041/18108, maintain the existing facilities.
27. At Sta. 626+97, Pole No. 50937/18095, relocate the existing line to the new Pole location.
28. At Sta. 1306+30, Pole No. 50921/18090 to Pole No. 50924/18095, maintain the existing facilities.
29. Relocate the existing line to the new pole locations beginning on Pole No. DEC 66446 at Sta. 807+40 on the north side of Barratts Chapel Road, and then crosses Barratts Chapel Road to Pole No. DEC 66443/W4-5-93 turns west and runs on the south side of Barratts Chapel Road to the project limits.

Comcast Cable Company proposed changes to the underground facilities:

1. At. Sta. 512+50, Pole No. 50931/16998, relocate the existing cable to the new Pole location.
2. At Sta. 514+50, Pole No. 50934/17014, relocate the existing cable to the new Pole location.
3. At Sta.528+00 install new underground from pole 50958/17144 to pole 50975/17144.
4. Relocate the existing cables to avoid the new ditch line on Barratts Chapel Rd.
5. At Sta. 807+40, Pole No. 66446, relocate the existing cable to the new Pole location.
6. At Sta. 551+45, Pole No. 50999/17374, maintain the existing facilities.
7. At Sta. 553+00, Pole No. 51001/17392, maintain the existing facilities.
8. At Sta. 565+45, Pole No. 51021/17516, relocate the existing cable to the new Pole location.
9. At Sta. 575+30, Pole No. 51052/17610, remove the existing cable.
10. At Sta. 577+40, Pole No. 51056/17634, remove the existing cables.
11. At Sta. 581+45, Pole No. 51047/17676, maintain the existing facilities.
12. At Sta. 585+70, Pole No. 51045/17719, maintain the existing facilities.
13. At Sta. 588+70 install new cable from pole 51044/17746 to pole 51108/17744.
14. At. Sta. 902+00, Pole No. 51069/17744, remove the existing cable.
15. At Sta. 905+70, Pole No. 51106/17738, relocate the existing cable to the new Pole location.
16. At Sta. 912+10, lower the existing cable to avoid the new road box.
17. Maintain the existing facilities as is.
18. Maintain the existing facilities as is.
19. At Sta. 621+60, Pole No. 50962/18067, relocate the existing cables to the new Pole location.
20. Install new underground cable at Sta. 623+00 from pole 50956/18078 to pole 51021/18093.
21. At Sta. 628+20 on pole 50928/18118 relocate the existing cable to the new pole location.
22. At Sta. 632+25, Pole No. 50905/18150, relocate the existing cable to the new pole location.
23. At Sta. 1309+50, No Pole Number, maintain the existing facilities.
24. At Sta. 1307+95, No Pole Number, maintain the existing facilities.
25. At Sta. 1306+40, Pole No. 50921/18090, maintain the existing facilities.
26. At Sta. 1306+40, Pole No. 50924/18095, maintain the existing facilities.
27. At Sta. 1303+65, No Pole Number, maintain the existing facilities.
28. At Sta. 807+20 relocate the existing cable to the new pole location.

29. At Sta. 703+50, Pole No. 66439, relocate the existing cables to the new Pole location.

APPENDIX E
Kent County Department of Public Works Facilities

Kent County Department of Public Works existing underground facilities:

1. Kent County Department of Public Works maintains a 36" Force Main beginning at Sta. 500+00 on the east side of SR1 heading north to Sta. 502+00.
2. At Sta. 502+00 the 36" Force Main heads west crossing SR1 to the west side of SR1 where it turns, heading north to Sta. 512+00.
3. At Sta. 512+00 the 36" Force Main turns northeast, crossing Southbound SR1 and heads to the median.
4. At Sta. 519+00 the 36" Force Main continues heading north in the median to Sta. 587+50.
5. At Sta. 587+50 the 36" Force Main continues northwest crossing Southbound SR1 to Sta. 598+00, where the 36" Force Main continues heading north on the west side of SR1 to Sta. 612+00.
6. At Sta. 612+00 the 36" Force Main continues north on the west side of the proposed Clapham Road to the project limits.
7. Beginning at the Kent County Department of Public Works Pumping Station No. 8 on the southeast corner of the intersection of SR1 and Mulberrie Point Road, a 10" Force Main heads north crossing SR1 along the south side of Mulberrie Point Road, then crosses Clapham Road and connects to the 36" Force Main running along the north side of Clapham Road at Sta. 622+40.
8. Beginning at the Kent County Department of Public Works Pumping Station No. 8 a 6"Force Main heads north to Mulberrie Point Road then heads east to the project limits.
9. Beginning on the west side of the Kent County Department of Public Works Pumping Station No. 8 a 4" Force Main heads north to Mulberrie Point Road then heads east to the project limits.
10. Beginning at Sta. 622+40 a 12" Gravity Sewer Line heads east crossing Clapham Road to Mulberrie Point Road then continues east crossing SR1 to the Kent County Department of Public Works Pumping Station No. 8.
11. Beginning on the east side of Proposed Mulberrie Point Connector Road at Sta. 1001+50, an 8" Gravity Sewer Line heads west to a manhole at Sta. 462+50. From the manhole, the line increases to a 10" Line and heads north to the Kent County Department of Public Works Pumping Station No. 8.
12. At Sta. 629+30 a 10" Gravity Sewer Line heads east, crosses proposed Clapham Road to a manhole then turns south along the east side of Clapham Road to Mulberrie Point Road to a manhole at Sta. 623+50.
13. A 10" Gravity Sewer Line begins in a manhole at Sta. 623+50 and then heads east crossing Mulberrie Point Road to a manhole at Sta. 318+00.

14. Kent County Department of Public Works also maintains an 8" Sewer Line that begins at Sta. 913+75 on the south side Bowers Beach Road and heads east to Sta. 918+65.
15. At Sta. 915+00 the 8" Gravity Sewer Line crosses Bowers Beach Road and heads north to the project limits.
16. At Sta. 911+00, a 1.5" Force Main runs along the north side of Bowers Beach Road heading to Sta. 912+80, then turns and continues north to the project limits.

Kent County Department of Public Works proposed underground facilities:

1. The 36" Force Main will be relocated from Sta. 505+30 on SR1 to Sta. 643+10 on Clapham Road as a separate county project (36" Force Main Bypass Project, Kent County Project No. 1890.45) prior to DelDOT contract T200412202. The proposed relocation will head west at Sta. 505+30 between two homes and then turn north. At the intersection of Barratts Chapel Road and SR1, the force main will head west along the south side of Barratts Chapel Road. At Sta. 811+75, the force main heads north crossing Barratts Chapel road and continuing north to cross Proposed Barratts Chapel Road at Sta. 709+45, turning west along the north side of Proposed Barratts Chapel Road. At Sta. 700+60, the force main heads north thru farm fields, crossing Buffalo Road outside the project limits connects back to the existing 36" force main on the west side of Clapham Road at Sta. 643+10.
2. Kent County Department of Public Works Pumping Station No. 8 will be relocated to the west of SR1 at Sta. 319+00. All work associated with this relocation is shown on the Relocation of Existing Sanitary Sewer section of the plans.

APPENDIX F
Artesian Water Company, Inc. Facilities

Artesian Water Company existing underground facilities:

1. 12" line begins on the west side of Clapham Road at Sta. 633+75 and heads south to Sta. 629+40 where it turns east and crosses Clapham Road. At this point the 12" line heads north, for a short distance, where it feeds a series of four water valves.
2. 12" line begins on the west side of Clapham Road at Sta. 633+75 and heads south to Sta. 629+40 where it turns east and crosses Clapham Road. At this point the 12" line heads north, for a short distance, where it feeds a series of four water valves.
3. At Sta. 629+40 a 12" line heads south on the east side of Clapham Road to Sta. 623+50 where the line turns and heads east on the north side of Mulberrie Point Road crossing SR1 in a 20" steel casing. The line continues to head east on the north side of Mulberrie Point Road to the project limits.
4. The line reduces down from a 12" to a 8" line at Sta. 1104+10 where the line turns and crosses Mulberrie Point Road in a 16" steel casing and the 12" line continues heading east to the project limits.
5. At Sta. 625+90 a 12" line tee's off the existing 12" line and cross Clapham Road in a 20" steel casing the line then continues to head west on the south side of Buffalo Road to the project limits.

Artesian Water Company proposed changes to the underground facilities:

1. Connect a proposed 12" DIP Water Main to an existing 12" DIP Water Main on Jury Drive crossing Clapham Road in a 20" steel casing at Sta. 634+05.
2. At Sta. 634+05, a new 12" Water Main will continued to be installed on the east side of Clapham Road heading south and crossing the new SR1 Ramp in a 20" steel casing and continuing to Sta. 623+50 where the new Water Main shall be connected to an existing 12" Water Main.
3. On Mulberrie Point Road at Sta. 1100+45, the existing 12" Water Main shall be adjusted in order to eliminate the conflict with two proposed drainage pipes.
4. On the east side of Clapham Road at Sta. 627+40, install a new 12" Water Main in a 20" steel casing crossing Clapham Road where it will then continue on in the north side of Buffalo Road to Sta. 1306+60. The Main will then cross Buffalo Road and connect to an existing line.

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
PO BOX 778
DOVER, DELAWARE 19903

CERTIFICATE OF RIGHT-OF-WAY STATUS

STATE PROJECT NO. T200412202

F.A.P. NO. N/A for R/W

SR 1 LITTLE HEAVEN GRADE SEPARATED INTERSECTION

KENT COUNTY

Certificate of Right-of-Way Status – 100%

Status - LEVEL 1

As required by 23 CFR, Part 635, and other pertinent Federal and State regulations or laws, the following certifications are hereby made in reference to this highway project:

All necessary real property interests have been acquired in accordance with current FHWA/State directives covering the acquisition of real property; and,

All necessary rights-of-way, including control of access rights when pertinent, have been acquired including legal and physical possession; and,

All project rights of way are currently available in accordance with the project right-of-way plans; and,

Any residential displaced individuals or families have been relocated to decent, safe and sanitary housing, or adequate replacement housing has been made available in accordance with the provisions of the current Federal Highway Administration (FHWA) directive(s) covering the administration of the Highway Relocation Assistance Program; and,

All occupants have vacated the lands and improvements; and,

The State has physical possession and the right to remove, salvage, or demolish any improvements acquired as part of this project, and enter on all land.

REAL ESTATE SECTION

Phyllis L Trala

Phyllis Trala
Acting, Chief Right-of-Way

May 19, 2015

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
800 BAY ROAD
P.O. BOX 778
DOVER, DELAWARE 19903

JENNIFER COHAN
SECRETARY

February 6, 2015

ENVIRONMENTAL REQUIREMENTS

FOR
State Contract No. T200412202
Federal Aid No.: NH-K008(6)

Contract Title: SR 1, Little Heaven Grade Separated Intersection

In accordance with the procedural provisions for implementing the National Environmental Policy Act of 1969, as amended, the referenced project has been processed through the Department's Environmental Review Procedures and has been classified as a Class III Action. As such, an Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) have been prepared to evaluate potential adverse impacts to result from construction of the proposed action (per 23 CFR 771.119) and Section 4(f) Evaluation and *de minimis* determinations per 23 CFR Part 774 and the following special provisions have been developed to mitigate and/or minimize these impacts.

PERMIT REQUIREMENTS:

The construction that involves a vehicular grade separated interchange in Kent County, Delaware requires permit approval from those agencies listed below. Delaware requires permit approval from those agencies listed below. It is the responsibility of the contracting agency, the Delaware Department of Transportation, Division of Transportation Solutions to obtain the necessary permits to ensure that the contractor complies with the requirements and conditions established by the regulatory agencies. The permit coordination for this project is complete, however written authorization from the permitting agencies is not required and paperwork for on-site posting should not be anticipated. As such, the construction work that will occur to construct the SR 1, Little Heaven Grade Separated Intersection in Kent County, Delaware is authorized under the permits/exemptions listed below:

REQUIRED PERMITS AND APPROVAL STATUS:

- U.S. Army Corps of Engineers (COE) – Individual Section 404 Permit – CENAP-OP-R-2014-247-23– issued 1/28/15, **expires 12/31/18**

- Delaware Department of Natural Resources and Environmental Control (DNREC) – Delaware Code Chapter 72, Section 7217, Special Exemption (a)

- DNREC – 401 Water Quality Certification – WQ-317/14 issued on 12/17/14, addendum issued on 1/21/15, **expires 12/17/19**

- DNREC - Coastal Zone Consistency – FC#2014.0166 issued on 12/18/14

SPECIFIC REQUIREMENTS:

Compliance with all requirements of the permits is the responsibility of the contractor will follow all special conditions or requirements as stated within those permits. The contractor will be subject to penalties, fines, and the risk of shut down as mandated by laws governing permitting agencies if such are violated or ignored. Therefore, all special conditions, general requirements, and/or other required provisions specified within the permits must be followed. Those obligations are indicated or listed within the permit package, which can be obtained from the DelDOT Contract Administration Office.

Additional requirements by DelDOT not specified within the permits, but listed below, is also the responsibility of the contractor and is subject to risk of shut down at the contractor's expense.

1. The contractor shall employ measures during construction to prevent spills of fuels, or lubricants, if a spill should occur, efforts shall be undertaken to prevent its entry into wetlands, aquatic, or drainage areas. Any spills entering wetlands, aquatic, or drainage areas shall be removed immediately. The Division of Water Resources (DNREC), Wetlands & Aquatic Protection Branch, 302-739-4691, shall be notified of any spill(s) within six (6) hours of their occurrence. That office will determine the effectiveness of spill and contamination removal and specify remediation efforts as necessary.

2. All construction debris, excavated material, brush, rocks, and refuse incidental to such work shall be placed either on shore above the influence of flood waters or on some suitable disposal site approved by the department.

3. The disposal of trees, brush, and other debris in any stream corridor, wetland surface water or any drainage ditch is prohibited.

4. There shall be no stockpiling of construction materials or temporary fills in wetlands or subaqueous lands unless otherwise specified on project plans and approved by permitting agencies that govern them. It is the contractor's responsibility to coordinate and secure those additional permits/amendments in deviating from the plan.

5. The effort shall be made to keep construction debris from entering adjacent waterways, wetlands, ground cover, or drainage areas. Any debris that enters these areas shall be removed immediately. Netting, mats, or establishing confined work areas in stages may be necessary to address these issues.

6. If routine maintenance of worker equipment and heavy machinery is necessary during the construction period, refuse material is prohibited from being disposed or deposited onto or into the ground. All used oils and filters must be recycled or disposed of properly.

7. Harmful chemical wash water applied to clean equipment or machinery shall be discouraged. If undertaken, the residue water and/or material must be collected or contained such that it will be disposed of properly. By no means, shall it be deposited or disposed of in waterways, streams, wetlands, or drainage areas.

8. The contractor shall follow all requirements as indicated in the Environmental Compliance Sheet. It will be the contractor's responsibility, expense, & effort to ensure that workers also follow this requirement. As part of the restrictions, please note the timetables reflected in the contract for the in-stream/water work for endangered species protection.

9. That the fill material shall be free of oil and grease, debris, wood, general refuse, plaster and other pollutants, and shall contain no broken asphalt.

ENVIRONMENTAL COMPLIANCE SHEET:

The contractor shall pay special attention to specific construction requirements as indicated in the Environmental Compliance Sheets (Sheets 432-448).

1. Specifically, please note the environmental requirements as indicated on sheet 432 in:

   - Note 2C Protection of Resources (Wetlands/Waters/Natural Area) –
   - Note 2D Stream Restoration and Riprap Treatments
   - Note 3 for Cultural Resource Issues
   - Note 4 for Wetland Creation (Barratts Chapel Wetland Mitigation Site)

2. DelDOT Environmental Studies Section (302) 760-2264 must be notified if there are any changes to the project methods, footprint, materials, or designs, to allow the Department to coordinate with the appropriate resource agencies (COE, DNREC, and SHPO), for approval.

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
800 BAY ROAD
P.O. BOX 778
DOVER, DELAWARE 19903

SHAILEN P. BHATT
SECRETARY

RAILROAD STATEMENT
For

State Contract No.: T200412202

Federal Aid No.: NH-K008(6)

Project Title: SR1, Little Heaven Grade Separated Intersection

The following railroad companies maintain facilities within the contract limits:

- ☐ Amtrak
- ☐ CSX
- ☐ Delaware Coast Line
- ☐ East Penn
- ☐ Maryland & Delaware
- ☐ Norfolk Southern
- ☐ Wilmington & Western
- ☑ None

In accordance with 23 CFR 635, herein is the railroad statement of coordination (check one):

☑ No Railroad involvement.

☐ Railroad Agreement unnecessary but railroad flagging required. The contractor shall follow requirements stated in the DelDOT Maintenance of Railroad Traffic Item in the Special Provisions. Contractor shall coordinate railroad flagging with DelDOT's Railroad Program Manager at (302) 760-2183.

☐ Railroad Agreement required. The necessary railroad agreement, attached, is complete and fully executed. Railroad related work to be undertaken and completed as required for proper coordination with physical construction schedules. The Contractor shall follow requirements stated in the DelDOT Maintenance of Railroad Traffic Item in the Special Provisions. Contractor shall coordinate railroad flagging with DelDOT's Railroad Program Manager at (302) 760-2183.

Approved As To Form:

Robert A. Perrine
DelDOT Railroad Program Manager

12/19/2014
DATE

BID PROPOSAL FORMS

CONTRACT T200412202.01

FEDERAL AID PROJECT NH-K008(6)

CONTRACT ID: T200412202.01 PROJECT(S): NH-K008(6)

All figures must be typewritten.

CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
	SECTION 0001 ROAD					
0010	201000 CLEARING AND GRUBBING	LUMP	LUMP			
0020	202000 EXCAVATION AND EMBANKMENT	288638.000 CY				
0030	202514 PIEZOMETER	4.000 EACH				
0040	204000 MUCK EXCAVATION	5264.000 CY				
0050	207000 EXCAVATION AND BACKFILL FOR STRUCTURES	2052.000 CY				
0060	208000 EXCAVATION AND BACKFILLING FOR PIPE TRENCHES	19086.000 CY				
0070	208001 FLOWABLE FILL	202.000 CY				
0080	209001 BORROW, TYPE A	61655.000 CY				
0090	209002 BORROW, TYPE B	5872.000 CY				
0100	209003 BORROW, TYPE C	50.000 CY				

CANNOT BE USED FOR BIDDING

CONTRACT ID: T200412202.01 PROJECT(S): NH-K008(6)

All figures must be typewritten.

CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
0110	209006 BORROW, TYPE F	1000.000 CY				
0120	210000 FURNISHING BORROW TYPE "C" FOR PIPE, UTILITY TRENCH, AND STRUCTURE BACKFILL	23984.000 CY				
0130	211000 REMOVAL OF STRUCTURES AND OBSTRUCTIONS	LUMP	LUMP			
0140	212000 UNDERCUT EXCAVATION	1000.000 CY				
0150	302007 GRADED AGGREGATE BASE COURSE, TYPE B	55499.000 CY				
0160	302008 GRADED AGGREGATE BASE COURSE, TYPE B, PATCHING	329.000 CY				
0170	302011 DELAWARE NO. 3 STONE	1046.000 TON				
0180	302012 DELAWARE NO. 57 STONE	1000.000 TON				
0190	401810 BITUMINOUS CONCRETE, SUPERPAVE, TYPE B, 160 GYRATIONS, PG 64-22	4533.000 TON				
0200	401813 BITUMINOUS CONCRETE, SUPERPAVE, TYPE B, 160 GYRATIONS, PG 70-22	58005.000 TON				

CANNOT BE USED FOR BIDDING

CONTRACT ID: T200412202.01 PROJECT(S): NH-K008(6)

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CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
0210	401819 BITUMINOUS CONCRETE, SUPERPAVE, BITUMINOUS CONCRETE BASE COURSE, 160 GYRATIONS, PG 64-22	76371.000 TON				
0220	401821 BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 160 GYRATIONS, PG 64-22, PATCHING	168.000 TON				
0230	401823 BITUMINOUS CONCRETE, SUPERPAVE, BITUMINOUS CONCRETE BASE COURSE, 160 GYRATIONS, PG 64-22, PATCHING	252.000 TON				
0240	401824 BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 160 GYRATIONS, PG 64-22, WEDGE	3385.000 TON				
0250	401825 BITUMINOUS CONCRETE, SUPERPAVE, TYPE B, 160 GYRATIONS, PG 64-22, WEDGE	24223.000 TON				
0260	401827 BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 160 GYRATIONS, PG 64-22 (NON-CARBONATE STONE)	5833.000 TON				
0270	401830 BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 160 GYRATIONS, PG 70-22 (NON-CARBONATE STONE)	30145.000 TON				

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CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
0280	402000 BITUMINOUS CONCRETE AND/OR COLD-LAID BITUMINOUS CONCRETE (TRM)	100.000 TON				
0290	503001 PATCHING P.C.C. PAVEMENT, 6' TO 15', TYPE A	316.000 SY				
0300	503006 DOWEL BARS	616.000 EACH				
0310	602002 PORTLAND CEMENT CONCRETE MASONRY, CLASS B	800.000 CY				
0320	602004 PORTLAND CEMENT CONCRETE MASONRY, ABUTMENT FOOTING, CLASS B	189.000 CY				
0330	602009 PORTLAND CEMENT CONCRETE MASONRY, APPROACH SLAB, CLASS A	182.000 CY				
0340	602013 PORTLAND CEMENT CONCRETE MASONRY, SUPERSTRUCTURE, CLASS D	410.000 CY				
0350	602015 PORTLAND CEMENT CONCRETE MASONRY, ABUTMENT ABOVE FOOTING, CLASS A	135.000 CY				
0360	602017 PORTLAND CEMENT CONCRETE MASONRY, PARAPET, CLASS A	170.000 CY				

CANNOT BE USED FOR BIDDING

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CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
0370	602506 PRECAST CONCRETE CULVERT	LUMP	LUMP			
0380	602553 MECHANICALLY STABILIZED EARTH WALLS, WALL 1	17446.000 SF				
0390	602615 MODULAR BLOCK RETAINING WALL	2225.000 SF				
0400	602646 SILICONE ACRYLIC CONCRETE SEALER	3890.000 SF				
0410	604000 BAR REINFORCEMENT, EPOXY COATED	220488.000 LB				
0420	605002 STEEL STRUCTURES	LUMP	LUMP			
0430	605501 GROUND MOUNT BREAKAWAY TYPE SIGN SUPPORTS AND FOUNDATION	LUMP	LUMP			
0440	605511 PREFABRICATED EXPANSION JOINT SYSTEM, 3"	180.000 LF				
0450	605600 BRIDGE MOUNTED SIGN SUPPORT	LUMP	LUMP			
0460	605664 STEEL SIGN STRUCTURE	LUMP	LUMP			

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CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
0470	606503 STEEL HAND RAILING	238.000 LF				
0480	608000 COARSE AGGREGATE FOR FOUNDATION STABILIZATION AND SUBFOUNDATION BACKFILL	431.000 TON				
0490	612020 REINFORCED CONCRETE PIPE, 12", CLASS IV	32.000 LF				
0500	612021 REINFORCED CONCRETE PIPE, 15", CLASS IV	12868.000 LF				
0510	612022 REINFORCED CONCRETE PIPE, 18", CLASS IV	4900.000 LF				
0520	612023 REINFORCED CONCRETE PIPE, 24", CLASS IV	1672.000 LF				
0530	612024 REINFORCED CONCRETE PIPE, 27", CLASS IV	1594.000 LF				
0540	612025 REINFORCED CONCRETE PIPE, 30", CLASS IV	1269.000 LF				
0550	612027 REINFORCED CONCRETE PIPE, 42", CLASS IV	937.000 LF				
0560	612028 REINFORCED CONCRETE PIPE, 48", CLASS IV	742.000 LF				

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
0570	612029 REINFORCED CONCRETE PIPE, 54", CLASS IV	112.000 LF				
0580	612030 REINFORCED CONCRETE PIPE, 18", CLASS V	82.000 LF				
0590	612031 REINFORCED CONCRETE PIPE, 24", CLASS V	84.000 LF				
0600	612033 REINFORCED CONCRETE PIPE, 21", CLASS IV	2269.000 LF				
0610	612034 REINFORCED CONCRETE PIPE, 36", CLASS IV	430.000 LF				
0620	612039 REINFORCED CONCRETE PIPE, 36" CLASS V	32.000 LF				
0630	612041 REINFORCED CONCRETE PIPE, 54", CLASS V	382.000 LF				
0640	612048 REINFORCED CONCRETE PIPE, 33", CLASS IV	1199.000 LF				
0650	612052 REINFORCED CONCRETE PIPE, 72", CLASS V	167.000 LF				
0660	612205 REINFORCED CONCRETE ELLIPTICAL PIPE, 19"X30", CLASS IV	772.000 LF				

CANNOT BE USED FOR BIDDING

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CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
0670	612210 REINFORCED CONCRETE ELLIPTICAL PIPE, 22"X34", CLASS IV	911.000 LF				
0680	612215 REINFORCED CONCRETE ELLIPTICAL PIPE, 38"X60", CLASS IV	72.000 LF				
0690	612216 REINFORCED CONCRETE ELLIPTICAL PIPE, 14"X23", CLASS IV	673.000 LF				
0700	612219 REINFORCED CONCRETE ELLIPTICAL PIPE, 24"X38", CLASS IV	194.000 LF				
0710	612220 REINFORCED CONCRETE ELLIPTICAL PIPE, 29"X45", CLASS IV	80.000 LF				
0720	612225 REINFORCED CONCRETE ELLIPTICAL PIPE, 14"X23", CLASS V	228.000 LF				
0730	612226 REINFORCED CONCRETE ELLIPTICAL PIPE, 24"X38", CLASS V	238.000 LF				
0740	612227 REINFORCED CONCRETE ELLIPTICAL PIPE, 38"X60", CLASS V	104.000 LF				
0750	612228 REINFORCED CONCRETE ELLIPTICAL PIPE, 34"X53", CLASS V	72.000 LF				
0760	612520 CORRUGATED POLYETHYLENE PIPE, TYPE S, 15"	738.000 LF				

CANNOT BE USED FOR BIDDING

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CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
0770	612523 CORRUGATED POLYETHYLENE PIPE, TYPE S, 18"	1241.000 LF				
0780	612524 CORRUGATED POLYETHYLENE PIPE, TYPE S, 24"	2119.000 LF				
0790	612525 CORRUGATED POLYETHYLENE PIPE, TYPE S, 30"	861.000 LF				
0800	612526 CORRUGATED POLYETHYLENE PIPE, TYPE S, 36"	2174.000 LF				
0810	612530 CORRUGATED POLYETHYLENE PIPE, TYPE S OR D, 42"	932.000 LF				
0820	614747 BORE 16", STEEL PIPE CASING	78.000 LF				
0830	614818 BORE 24" STEEL CASING PIPE	248.000 LF				
0840	614906 PLACE 16" STEEL PIPE CASING	233.000 LF				
0850	614907 PLACE 24" STEEL PIPE CASING	44.000 LF				
0860	617002 REINFORCED CONCRETE FLARED END SECTION, 15"	27.000 EACH				

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CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
0870	617003 REINFORCED CONCRETE FLARED END SECTION, 18"	24.000 EACH				
0880	617004 REINFORCED CONCRETE FLARED END SECTION, 21"	8.000 EACH				
0890	617005 REINFORCED CONCRETE FLARED END SECTION, 24"	6.000 EACH				
0900	617006 REINFORCED CONCRETE FLARED END SECTION, 27"	2.000 EACH				
0910	617007 REINFORCED CONCRETE FLARED END SECTION, 30"	3.000 EACH				
0920	617008 REINFORCED CONCRETE FLARED END SECTION, 33"	4.000 EACH				
0930	617009 REINFORCED CONCRETE FLARED END SECTION, 36"	3.000 EACH				
0940	617010 REINFORCED CONCRETE FLARED END SECTION, 42"	2.000 EACH				
0950	617011 REINFORCED CONCRETE FLARED END SECTION, 48"	4.000 EACH				
0960	617012 REINFORCED CONCRETE FLARED END SECTION, 54"	3.000 EACH				

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CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
0970	617015 REINFORCED CONCRETE FLARED END SECTION, 72"	1.000 EACH				
0980	617164 REINFORCED CONCRETE FLARED END SECTION, 19" X 30"	9.000 EACH				
0990	617165 REINFORCED CONCRETE FLARED END SECTION, 14" X 23"	26.000 EACH				
1000	617167 REINFORCED CONCRETE FLARED END SECTION, 34" X 53"	2.000 EACH				
1010	617169 REINFORCED CONCRETE FLARED END SECTION, 38" X 60"	4.000 EACH				
1020	617174 REINFORCED CONCRETE FLARED END SECTION, 24" X 38"	1.000 EACH				
1030	617176 REINFORCED CONCRETE FLARED END SECTION, 22" X 34"	14.000 EACH				
1040	617511 CORRUGATED POLYETHYLENE FLARED END SECTION, 18"	1.000 EACH				
1050	617512 CORRUGATED POLYETHYLENE FLARED END SECTION, 24"	1.000 EACH				
1060	618042 FURNISH CAST-IN-PLACE CONCRETE PILES, 16"	3945.000 LF				

CANNOT BE USED FOR BIDDING

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
1070	618047 FURNISH CAST-IN-PLACE CONCRETE TEST PILES, 16"	275.000 LF				
1080	619022 INSTALL CAST-IN-PLACE CONCRETE PILES, 16"	3945.000 LF				
1090	619026 INSTALL CAST-IN-PLACE CONCRETE TEST PILES, 16"	275.000 LF				
1100	619519 DYNAMIC PILE TESTING BY CONTRACTOR	4.000 EACH				
1110	622002 STEEL SHEET PILES, PZ 27 (UNPROTECTED)	33336.000 SF				
1120	622500 TEMPORARY STEEL SHEET PILES (UNPROTECTED)	23289.000 SF				
1130	701011 PORTLAND CEMENT CONCRETE CURB, TYPE 2	2604.000 LF				
1140	701012 PORTLAND CEMENT CONCRETE CURB, TYPE 1-4	2719.000 LF				
1150	701022 INTEGRAL PORTLAND CEMENT CONCRETE CURB & GUTTER, TYPE 3-8	13014.000 LF				
1160	705001 P.C.C. SIDEWALK, 4"	23490.000 SF				

CANNOT BE USED FOR BIDDING

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CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
1170	705002 P.C.C. SIDEWALK, 6"	2459.000 SF				
1180	705007 SIDEWALK SURFACE DETECTABLE WARNING SYSTEM	256.000 SF				
1190	707005 UNDERDRAIN OUTLET	156.000 EACH				
1200	708050 DRAINAGE INLET, 34" X 18"	5.000 EACH				
1210	708051 DRAINAGE INLET, 34" X 24"	90.000 EACH				
1220	708052 DRAINAGE INLET, 48" X 30"	49.000 EACH				
1230	708053 DRAINAGE INLET, 48" X 48"	62.000 EACH				
1240	708055 DRAINAGE INLET, 66" X 48"	2.000 EACH				
1250	708056 DRAINAGE INLET, 66" X 66"	12.000 EACH				
1260	708057 DRAINAGE INLET, 72" X 24"	1.000 EACH				

CANNOT BE USED FOR BIDDING

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
1270	708058 DRAINAGE INLET, 72" X 48"	1.000 EACH				
1280	708059 DRAINAGE INLET, 72" X 72"	3.000 EACH				
1290	708060 REPLACE DRAINAGE INLET GRATE(S)	4.000 EACH				
1300	708061 REPLACE DRAINAGE INLET FRAME(S)	4.000 EACH				
1310	708062 FURNISH DRAINAGE INLET FRAME(S)	4.000 EACH				
1320	708111 MANHOLE, 48" X 30"	1.000 EACH				
1330	708112 MANHOLE, 48" X 48"	2.000 EACH				
1340	708113 MANHOLE, 66" X 30"	1.000 EACH				
1350	708115 MANHOLE, 66" X 66"	1.000 EACH				
1360	708512 DRAINAGE INLET, SPECIAL I	4.000 EACH				

CANNOT BE USED FOR BIDDING

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CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
1370	708513 DRAINAGE INLET, SPECIAL II	4.000 EACH				
1380	708514 DRAINAGE INLET, SPECIAL III	3.000 EACH				
1390	708515 DRAINAGE INLET, SPECIAL IV	1.000 EACH				
1400	708516 DRAINAGE INLET, SPECIAL V	1.000 EACH				
1410	708517 DRAINAGE INLET, SPECIAL VI	2.000 EACH				
1420	708518 DRAINAGE INLET, SPECIAL VII	11.000 EACH				
1430	708563 PERSONNEL GRATE FOR PIPE INLET	LUMP	LUMP			
1440	708577 SANITARY MANHOLE, SPECIAL I	8.000 EACH				
1450	708578 SANITARY MANHOLE, SPECIAL II	1.000 EACH				
1460	708582 MANHOLE,SPECIAL I	1.000 EACH				

CANNOT BE USED FOR BIDDING

CONTRACT ID: T200412202.01 PROJECT(S): NH-K008(6)

All figures must be typewritten.

CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
1470	708585 JUNCTION BOX, 48" X 30"	1.000 EACH				
1480	708586 JUNCTION BOX, 48" X 48"	3.000 EACH				
1490	708587 JUNCTION BOX, 66" X 30"	1.000 EACH				
1500	708601 SANITARY MANHOLE, SPECIAL III	1.000 EACH				
1510	708602 SANITARY MANHOLE, SPECIAL IV	1.000 EACH				
1520	710001 ADJUSTING AND REPAIRING EXISTING DRAINAGE INLET	4.000 EACH				
1530	710506 ADJUST AND REPAIR EXISTING SANITARY MANHOLE	3.000 EACH				
1540	710507 ADJUST AND REPAIR EXISTING SANITARY CLEANOUTS	4.000 EACH				
1550	710509 INSTALLING MANHOLE OVER EXISTING SANITARY SEWER	2.000 EACH				
1560	712005 RIPRAP, R-4	1835.000 SY				
1570	712006 RIPRAP, R-5	147.000 SY				

CANNOT BE USED FOR BIDDING

CONTRACT ID: T200412202.01 PROJECT(S): NH-K008(6)

All figures must be typewritten.

CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
1580	712020 RIPRAP, R-4	241.000 TON				
1590	712021 RIPRAP, R-5	9.000 TON				
1600	712022 RIPRAP, R-6	201.000 TON				
1610	712531 CHANNEL BED FILL	136.000 CY				
1620	713001 GEOTEXTILES, STABILIZATION	2150.000 SY				
1630	713002 GEOTEXTILES, SEPARATION	8654.000 SY				
1640	713003 GEOTEXTILES, RIPRAP	2374.000 SY				
1650	715001 PERFORATED PIPE UNDERDRAINS, 6"	65340.000 LF				
1660	715500 UNDERDRAIN OUTLET PIPE, 6"	4305.000 LF				
1670	720050 GALVANIZED STEEL BEAM GUARDRAIL, TYPE 1-31	9950.000 LF				

CANNOT BE USED FOR BIDDING

CONTRACT ID: T200412202.01 PROJECT(S): NH-K008(6)

All figures must be typewritten.

CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
1680	720053 GUARDRAIL OVER CULVERTS, TYPE 1-31	38.000 EACH				
1690	720054 GUARDRAIL OVER CULVERTS, TYPE 2-31	38.000 EACH				
1700	720544 REFLECTORS, WHITE, CONCRETE	53.000 EACH				
1710	720545 REFLECTORS, YELLOW, CONCRETE	6.000 EACH				
1720	720559 POST MOUNTED DELINEATORS	224.000 EACH				
1730	720586 GUARDRAIL END TREATMENT ATTENUATOR, TYPE 2-31	18.000 EACH				
1740	720587 P.C.C. SAFETY BARRIER PERMANENT, DOUBLE FACE, MODIFIED	1847.000 LF				
1750	725001 GUARDRAIL TO BARRIER CONNECTION (EXIT TYPE 31)	3.000 EACH				
1760	725002 GUARDRAIL TO BARRIER CONNECTION, APPROACH TYPE 1-31	9.000 EACH				
1770	726001 END ANCHORAGE 31	10.000 EACH				

CANNOT BE USED FOR BIDDING

CONTRACT ID: T200412202.01 PROJECT(S): NH-K008(6)

All figures must be typewritten.

CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
1780	727000 RIGHT-OF-WAY FENCE	1728.000 LF				
1790	727004 CHAIN-LINK FENCE, 6' HIGH	800.000 LF				
1800	727006 TERMINAL POSTS FOR 6' CHAIN-LINK FENCE	10.000 EACH				
1810	727014 CONSTRUCTION SAFETY FENCE	4150.000 LF				
1820	727015 MONUMENTS	190.000 EACH				
1830	727523 CANTILEVER SLIDE GATE, 26'	3.000 EACH				
1840	727527 CHAIN FENCE	1136.000 LF				
1850	727528 VINYL RAIL FENCE	150.000 LF				
1860	735501 HERBICIDE APPLICATION, NOXIOUS WEEDS	40.000 ACRE				
1870	736502 MOWING	482.000 ACRE				

CANNOT BE USED FOR BIDDING

CONTRACT ID: T200412202.01 PROJECT(S): NH-K008(6)

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CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
1880	743000 MAINTENANCE OF TRAFFIC	LUMP	LUMP			
1890	743003 ARROWPANELS, TYPE C	479.000 EADY				
1900	743004 FURNISH AND MAINTAIN PORTABLE CHANGEABLE MESSAGE SIGN	329.000 EADY				
1910	743005 FURNISH AND MAINTAIN PORTABLE LIGHT ASSEMBLY	1334.000 EADY				
1920	743006 PLASTIC DRUMS	175937.000 EADY				
1930	743007 TRAFFIC OFFICERS	2114.000 HOUR	75.00000		158550.00	
1940	743008 REFLECTOR PANELS	1117.000 EACH				
1950	743010 FURNISH AND MAINTAIN TRUCK MOUNTED ATTENUATOR, TYPE II	1112.000 EADY				
1960	743015 FURNISH AND MAINTAIN PORTABLE PCC SAFETY BARRIER	25361.000 LF				
1970	743016 RELOCATION PORATBLE SAFETY BARRIER	82172.000 LF				

CANNOT BE USED FOR BIDDING

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
1980	743023 TEMPORARY BARRICADES, TYPE III	262500.000 LFDY				
1990	743024 TEMPORARY WARNING SIGNS AND PLAQUES	51342.000 EADY				
2000	743025 INSTALL TEMPORARY IMPACT ATTENUATOR	47.000 EACH				
2010	743029 FURNISH TEMPORARY IMPACT ATTENUATOR - NON-GATING, REDIRECTIVE, TEST LEVEL 3	17.000 EACH				
2020	743030 RELOCATE TEMPORARY IMPACT ATTENUATOR	63.000 EACH				
2030	743031 ATSSA CERTIFIED TRAFFIC CONTROL SUPERVISOR	1200.000 HOUR				
2040	743051 FLAGGER, KENT COUNTY, STATE	10000.000 HOUR				
2050	743063 FLAGGER, KENT COUNTY, STATE, OVERTIME	1000.000 HOUR				
2060	743551 FURNISH AND MAINTAIN REMOTE COMMUNICATION PORTABLE CHANGEABLE MESSAGE SIGN	5036.000 EADY				

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
2070	744506 CONDUIT JUNCTION WELL, TYPE 7, PRECAST POLYMER CONCRETE	22.000 EACH				
2080	744530 CONCUIT JUNCTION WELL, TYPE 11, PRECAST CONCRETE/ POLYMER LID-FRAME	81.000 EACH				
2090	744531 CONDUIT JUNCTION WELL, TYPE 14, PRECAST CONCRETE/ POLYMER LID-FRAME	54.000 EACH				
2100	744544 ADJUST OR REPAIR EXISTING CONDUIT JUNCTION WELL	1.000 EACH				
2110	745602 FURNISH & INSTALL UP TO 4" SCHEDULE 80 HDPE CONDUIT (BORE)	3920.000 LF				
2120	745604 FURNISH & INSTALL UP TO 4" SCHEDULE 80 PVC CONDUIT (TRENCH)	32415.000 LF				
2130	745605 FURNISH & INSTALL UP TO 4" SCHEDULE 80 PVC CONDUIT (ON STRUCTURE)	1360.000 LF				
2140	745606 FURNISH & INSTALL UP TO 4" GALVANIZED STEEL CONDUIT (TRENCH)	3553.000 LF				
2150	745607 FURNISH & INSTALL UP TO 4" GALVANIZED STEEL CONDUIT (BORE)	465.000 LF				

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
2160	745609 FURNISH & INSTALL UP TO 4" GALVANIZED STEEL CONDUIT (ON STRUCTURE)	150.000 LF				
2170	746517 ALUMINUM LIGHTING STANDARD WITH SINGLE DAVIT ARM, 30' POLE	30.000 EACH				
2180	746519 ALUMINUM LIGHTING STANDARD WITH SINGLE DAVIT ARM, 40' POLE	62.000 EACH				
2190	746528 INSTALLATION OF STEEL POLE (EQUAL TO OR GREATER THAN 40')	1.000 EACH				
2200	746538 BRIDGE ELECTRICAL SYSTEM	LUMP	LUMP			
2210	746653 ELECTRICAL TESTING	LUMP	LUMP			
2220	746847 POLE BASE, TYPE 3	15.000 EACH				
2230	746850 POLE BASE, TYPE 4	20.000 EACH				
2240	746852 POLE BASE, TYPE 6	94.000 EACH				
2250	746908 FURNISH & INSTALL 1-CONDUCTOR #4 AWG STRANDED COPPER	1550.000 LF				

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
2260	746909 FURNISH & INSTALL 1-CONDUCTOR #6 AWG STRANDED COPPER	44048.000 LF				
2270	746918 FURNISH & INSTALL #2/0 AWG STRANDED COPPER	319.000 LF				
2280	746924 FURNISH & INSTALL LOOP WIRE 1-CONDUCTOR #14 AWG ENCASED IN 1/4" FLEXIBLE TUBING IN A LOOP SAWCUT	5710.000 LF				
2290	746925 FURNISH & INSTALL EMBEDDED METERED SERVICE PEDESTAL (100 AMP)	11.000 EACH				
2300	746926 FURNISH & INSTALL ELECTRICAL UTILITY SERVICE EQUIPMENT 120/240	6.000 EACH				
2310	747508 LIGHTING CONTROL CENTER - 100 A	4.000 EACH				
2320	747509 LIGHTING CONTROL CENTER - 200A, 277/480V	4.000 EACH				
2330	747516 CABINET BASE, TYPE P	10.000 EACH				
2340	747517 CABINET BASE, TYPE R	8.000 EACH				

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CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
2350	748015 PERMANENT PAVEMENT STRIPING, SYMBOL/LEGEND ALKYD-THERMOPLAST IC	19511.000 SF				
2360	748019 TEMPORARY MARKINGS, PAINT, 4"	10800.000 LF				
2370	748026 TEMPORARY MARKINGS, PAINT SYMBOL/LEGEND	1060.000 SF				
2380	748027 PERMANENT PAVEMENT STRIPING, ALKYD-THERMOPLASTIC, 12"	2626.000 LF				
2390	748032 TEMPORARY MARKINGS, PAINT, 5"	40000.000 LF				
2400	748502 RAISED/RECESSED PAVEMENT MARKER	1897.000 EACH				
2410	748530 REMOVAL OF PAVEMENT STRIPING	125000.000 SF				
2420	748538 PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, BLACK, 10"	756.000 LF				
2430	748548 PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, WHITE/YELLOW, 5"	110321.000 LF				

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
2440	748549 PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, WHITE/YELLOW, 10"	6456.000 LF				
2450	748553 PREFORMED RETROREFLECTIVE THERMOPLASTIC PAVEMENT MARKINGS, BIKE SYMBOL	41.000 EACH				
2460	749500 SIGN PANEL	2432.000 SF				
2470	749503 VARIABLE MESSAGE SIGN (VMS) SUPPORT STRUCTURES	2.000 EACH				
2480	749687 INSTALLATION OR REMOVAL OF TRAFFIC SIGN(S) ON SINGLE SIGN POST	838.000 EACH				
2490	749688 INSTALLATION OF 4" DIAMETER HOLE, LESS THAN OR EQUAL TO 6" DEPTH	25.000 EACH				
2500	749690 INSTALLATION OR REMOVAL OF TRAFFIC SIGNS ON MULTIPLE SIGN POSTS	1376.000 SF				
2510	750000 ADJUST WATER VALVE BOXES	2.000 EACH				
2520	753501 INSTALLING SANITARY SEWER, PVC, 8"	1028.000 LF				

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
2530	753503 INSTALLING SANITARY SEWER, PVC, 12"	822.000 LF				
2540	753505 INSTALLING SANITARY SEWER, PVC, 18"	30.000 LF				
2550	753510 INSTALLING SANITARY SEWER (FORCE MAIN), PVC, 8"	2146.000 LF				
2560	753516 SANITARY SEWER SYSTEM	LUMP	LUMP			
2570	758000 REMOVAL OF EXISTING PORTLAND CEMENTCONCRETE PAVEMENT, CURB, SIDEWALK, ETC.	29574.000 SY				
2580	759511 FIELD OFFICE SPECIAL II	38.000 EAMO				
2590	760012 RUMBLE STRIPS, BIKE-FRIENDLY, HOT-MIX	32000.000 LF				
2600	760016 RUMBLE STRIPS, HOT-MIX	56132.000 LF				
2610	760507 PROFILE MILLING, BITUMINOUS CONCRETE	223534.000 SYIN				
2620	762001 SAW CUTTING, BITUMINOUS CONCRETE	81724.000 LF				

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
2630	762002 SAW CUTTING, CONCRETE, FULL DEPTH	2105.000 LF				
2640	763000 INITIAL EXPENSE	LUMP	LUMP			
2650	763501 CONSTRUCTION ENGINEERING	LUMP	LUMP			
2660	763503 TRAINEE	2000.000 HOUR	0.80000		1600.00	
2670	763508 PROJECT CONTROL SYSTEM DEVELOPMENT PLAN	LUMP	LUMP			
2680	763509 CPM SCHEDULE UPDATES AND/OR REVISED UPDATES	38.000 EAMO				
2690	763597 UTILITY CONSTRUCTION ENGINEERING	160.000 HOUR				
2700	763687 PUMP HOUSE	LUMP	LUMP			
2710	900500 ENVIRONMENTAL PERFORMANCE INCENTIVE (DISINCENTIVE)	LUMP	LUMP		636000.00	
2720	905001 SILT FENCE	67325.000 LF				

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
2730	905002 REINFORCED SILT FENCE	5000.000 LF				
2740	905003 SEDIMENT TRAP	1168.000 CY				
2750	905004 INLET SEDIMENT CONTROL, DRAINAGE INLET	224.000 EACH				
2760	905005 INLET SEDIMENT CONTROL, CURB INLET	110.000 EACH				
2770	906001 PORTABLE SEDIMENT TANK	1.000 EACH				
2780	906002 DEWATERING BAG	1.000 EACH				
2790	906003 SUMP PIT	7.000 EACH				
2800	906004 SKIMMER DEWATERING DEVICE	5.000 EACH				
2810	907011 STONE CHECK DAM	771.000 TON				
2820	907012 TEMPORARY SLOPE DRAIN, 12"	400.000 LF				
2830	908007 TOPSOILING	15439.000 SY				

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CONTRACT ID: T200412202.01 PROJECT(S): NH-K008(6)

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CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS		UNIT PRICE DOLLARS	CTS	BID AMOUNT DOLLARS	CTS
2840	908010 TOPSOILING, 6" DEPTH	349324.000	SY				
2850	908014 PERMANENT GRASS SEEDING, DRY GROUND	349324.000	SY				
2860	908015 PERMANENT GRASS SEEDING, WET GROUND	10958.000	SY				
2870	908017 TEMPORARY GRASS SEEDING	45029.000	SY				
2880	908019 STREAMBANK SEED MIX, SEEDING	2641.000	SY				
2890	908020 EROSION CONTROL BLANKET MULCH	4800.000	SY				
2900	908021 TURF REINFORCEMENT MATTING, TYPE 1	716.000	SY				
2910	908023 STABILIZED CONSTRUCTION ENTRANCE	450.000	TON				
2920	908502 WET GROUND EROSION CONTROL GRASS SEEDING, FLATS	2065.000	SY				
2930	908503 WETLAND MITIGATION GRASS SEEDING	15554.000	SY				
2940	909001 SANDBAG DIKE	4.000	CF				

CANNOT BE USED FOR BIDDING

CONTRACT ID: T200412202.01 PROJECT(S): NH-K008(6)

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CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
2950	909005 STREAM DIVERSION	LUMP	LUMP			
2960	910005 CLAY BORROW, POND LINER	9562.000 CY				
2970	910007 OUTLET STRUCTURE	LUMP	LUMP			
2980	910008 STORMWATER MANAGEMENT POND	134248.000 CY				
	SECTION 0001 TOTAL					
	TOTAL BID					

CANNOT BE USED FOR BIDDING

Contract No. T200412202.01

Diesel Fuel Cost Price Adjustment Option

The Bidder is required to submit this form with his/her Bid Proposal at the time of bid opening. When this form is not provided by the Bidder at the time of Bid, the Option-OUT will be automatically selected and no further option is available to the Contractor and no Diesel Fuel Cost Adjustments will be made.

OPTION-IN

☐ Checking here selects the option to participate in the 763626 - Diesel Fuel Cost Price Adjustment.

OPTION-OUT

☐ Checking here declines the option to participate in the 763626 - Diesel Fuel Cost Price Adjustment.

The undersigned hereby certifies that he/she is authorized to make this Option on behalf of the bidder in compliance with the special provision 763626 - Diesel Fuel Cost Price Adjustment.

Sealed and dated this _____ day of _____ in the year of our Lord two thousand and _____ _____ (20__).

_____
Name of Bidder (Organization)

Corporate Seal

By: _____
Authorized Signature

Attest _____ _____
Title

SWORN TO AND SUBSCRIBED BEFORE ME this ____ day of _____, 20___.

Notary Seal

_____
Notary

CANNOT BE USED FOR BIDDING

BREAKOUT SHEET INSTRUCTIONS

BREAKOUT SHEET(S) MUST BE SUBMITTED EITHER WITH YOUR BID DOCUMENTS; OR WITHIN SEVEN (7) CALENDAR DAYS FOLLOWING THE BID DUE DATE BY THE LOWEST APPARENT BIDDER.

BREAKOUT SHEETS ARE TO BE SUBMITTED TO DELDOT'S CONTRACT ADMINISTRATION AS SHOWN BELOW. BREAKOUT SHEETS CANNOT BE CHANGED AFTER AWARD. THE DEPARTMENT WILL REVIEW THE FIGURES SUBMITTED ON THE BREAKOUT SHEET(S) TO ENSURE THEY MATCH THE RESPECTIVE LUMP SUM BID AMOUNT(S). MATHEMATICALLY INCORRECT BREAKOUT SHEETS WILL BE RETURNED FOR IMMEDIATE CORRECTION.

BREAKOUT SHEETS MAY BE SUBMITTED;

VIA E-MAIL TO: DOT-ASK@STATE.DE.US
SUBJECT: **T200412202.01** Breakout Sheet

OR MAILED TO: DELDOT
CONTRACT ADMINISTRATION
PO BOX 778, DOVER, DE 19903

'BREAKOUT SHEET' AND THE PROJECT NUMBER
MUST APPEAR ON THE ENVELOPE.

BREAKOUT SHEET - 1 **CONTRACT NO. T200412202.01**

ITEM 605501 - GROUND MOUNT BREAKAWAY TYPE SIGN SUPPORTS AND FOUNDATIONS

ITEM NO.	APPROX. QTY.	UOM	DESCRIPTION	UNIT PRICE	AMOUNT
1	1	LS	GM-1	$	$
2	1	LS	GM-2	$	$
3	1	LS	GM-3	$	$
4	1	LS	GM-4	$	$
5	1	LS	GM-5	$	$
6	1	LS	GM-6	$	$
7	1	LS	GM-7	$	$
8	1	LS	GM-8	$	$
9	1	LS	GM-9	$	$
10	1	LS	GM-10	$	$
11	1	LS	GM-11	$	$
12	1	LS	GM-12	$	$
13	1	LS	GM-13	$	$
14	1	LS	GM-14	$	$

TOTAL ITEM 605501- GROUND MOUNT BREAKAWAY TYPE SIGN SUPPORTS AND FOUNDATIONS

$_____

(LUMP SUM BID PRICE FOR ITEM 605501)

CANNOT BE USED FOR BIDDING

BREAKOUT SHEET - 2
ITEM 605564 - STEEL SIGN STRUCTURES

CONTRACT NO. T200412202.01

ITEM NO.	APPROX. QTY.	UOM	DESCRIPTION	UNIT PRICE	AMOUNT
1	1	LS	SC 2004	$	$
2	1	LS	SC 2005	$	$
3	1	LS	SC 2013	$	$
				$_____ (LUMP SUM BID PRICE FOR ITEM 605564)	

CANNOT BE USED FOR BIDDING

BREAKOUT SHEET - 3 **CONTRACT NO. T200412202.01**

708563 – PERSONAL GRATE FOR PIPE INLET

ITEM NO.	APPROX. QTY.	UOM	DESCRIPTION	UNIT PRICE	AMOUNT
1	1	EACH	PSG for 15” RCP FES (FES 134)	$	$
2	1	EACH	PSG for 18” RCP FES (FES 61, 83)	$	$
3	1	EACH	PSG for 21” RCP FES (FES 60)	$	$
4	1	EACH	PSG for 27” RCP FES (FES 18)	$	$
5	1	EACH	PSG for 30” RCP FES (FES 26)	$	$
6	1	EACH	PSG for 42” RCP’s at Headwall (Pipes 256 & 258)	$	$
TOTAL ITEM 708563 – PERSONAL GRATE $_____ (LUMP SUM BID PRICE FOR ITEM 708563)					

CANNOT BE USED FOR BIDDING

BREAKOUT SHEET - 4
910007 – OUTLET STRUCTURE

CONTRACT NO. T200412202.01

ITEM NO.	APPROX. QTY.	UOM	DESCRIPTION	UNIT PRICE	AMOUNT
1	1	LS	Pond Outlet Structure, Concrete #1 (Facility #455)	$	$
2	1	LS	Pond Outlet Structure, Concrete #1 (Facility #456)	$	$
3	1	LS	Pond Outlet Structure, Concrete #1 (Facility #458)	$	$
4	1	LS	Pond Outlet Structure, Concrete #1 (Facility #459)	$	$
5	1	LS	Pond Outlet Structure, Concrete #1 (Facility #457)	$	$

TOTAL ITEM 910007 – OUTLET STRUCTURE $_____
(LUMP SUM BID PRICE FOR ITEM 910007)

CANNOT BE USED FOR BIDDING

"ATTENTION"

TO BIDDERS

BREAKOUT SHEET(S) MUST BE SUBMITTED EITHER WITH YOUR BID DOCUMENTS; OR WITHIN SEVEN (7) CALENDAR DAYS FOLLOWING THE BID DUE DATE BY THE LOWEST APPARENT BIDDER.

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VIA E-MAIL TO: DOT-ASK@STATE.DE.US
SUBJECT: **T200412202.01** Breakout Sheet

OR MAILED TO: DELDOT
CONTRACT ADMINISTRATION
PO BOX 778, DOVER, DE 19903

'BREAKOUT SHEET' AND THE PROJECT NUMBER
MUST APPEAR ON THE ENVELOPE.

CERTIFICATION

Contract No. T200412202.01
Federal Aid Project No. NH-K008(6)

The undersigned bidder, _____

whose address is _____

and telephone number is _____hereby certifies the following:

I/We have carefully examined the location of the proposed work, the proposed plans and specifications, and will be bound, upon award of this contract by the Department of Transportation, to execute in accordance with such award, a contract with necessary surety bond, of which contract this proposal and said plans and specifications shall be a part, to provide all necessary machinery, tools, labor and other means of construction, and to do all the work and to furnish all the materials necessary to perform and complete the said contract within the time and as required in accordance with the requirements of the Department of Transportation, and at the unit prices for the various items as listed on the preceding pages.

Bidder's Certification Statement [US DOT Suspension and Debarment Regulation (49 CFR 29)]:

NOTICE: All contractors who hold prime contracts (Federal Aid) with DelDOT are advised that the prime contractor and subcontractors are required to submit to DelDOT a signed and notary attested copy of the Bidder Certification Statement for each and every subcontract that will be utilized by the prime contractor. This Certification **must** be filed with DelDOT prior to written approval being granted for each and every subcontractor. Copies of the Certification Form are available from the appropriate District Construction Office.

Under penalty of perjury under the laws of the United States, that I/We, or any person associated therewith in the capacity of (owner, partner, director, officer, principal, investigator, project director, manager, auditor, or any position involving the administration federal funds):

a. am/are not currently under suspension, debarment, voluntary exclusion, or determination of ineligibility by any federal agency;
b. have not been suspended, debarred, voluntarily excluded or determined ineligible by any federal agency within the past 3 years;
c. do not have a proposed debarment pending; and,
d. have not been indicted, convicted, or had a civil judgement rendered against (it) by a court of competent jurisdiction in any matter involving fraud or official misconduct within the past 3 years.

Exceptions will not necessarily result in denial of award, but will be considered in determining bidder responsibility. For any exception noted, indicate below to whom it applies, initiating agency, and dates of action. Providing false information may result in criminal prosection or administrative sanctions.

_____

_____

_____

(Insert Exceptions)

DBE Program Assurance:

NOTICE: In accordance with 49 CFR Part 26 the undersigned, a legally authorized representative of the bidder listed below, must complete this assurance.

By its signature affixed hereto, assures the Department that it will attain DBE participation as indicated:

Disadvantaged Business Enterprise _____ percent (blank to be filled in by bidder)

CANNOT BE USED FOR BIDDING

The foregoing quantities are considered to be approximate only and are given as the basis for comparison of bids. The Department of Transportation may increase or decrease the amount of any item or portion of the work as may be deemed necessary or expedient. Any such increase or decrease in the quantity for any item will not be regarded as a sufficient ground for an increase or decrease in the unit prices, nor in the time allowed for the completion of the work, except as provided in the contract.

Accompanying this proposal is a surety bond or a security of the bidder assigned to the Department of Transportation, for at least ten (10) percentum of total amount of the proposal, which deposit is to be forfeited as liquidated damages in case this proposal is accepted, and the undersigned shall fail to execute a contract with necessary bond, when required, for the performance of said contract with the Department of Transportation, under the conditions of this proposal, within twenty (20) days after date of official notice of the award of the contract as provided in the requirement and specifications hereto attached; otherwise said deposit is to be returned to the undersigned.

I/We are licensed, or have initiated the license application as required by Section 2502, Chapter 25, Title 30, of the Delaware Code.

By submission of this proposal, each person signing on behalf of the bidder, certifies as to its own organization, under penalty of perjury, that to the best of each signer's knowledge and belief:

1. The prices in this proposal have been arrived at independently without collusion, consultation, communication, or Agreement with any other bidder or with any competitor for the purpose of restricting competition.
2. Unless required by law, the prices which have been quoted in this proposal have not been knowingly disclosed and will not knowingly be disclosed by the bidder, directly or indirectly, to any other bidder or competitor prior to the opening of proposals.
3. No attempt has been made or will be made by the bidder to induce any other person, partnership, or corporation to submit or not to submit a proposal for the purpose of restricting competition.

CANNOT BE USED FOR BIDDING

I/We acknowledge receipt and incorporation of addenda to this proposal as follows:

No.	Date	No.	Date	No.	Date	No.	Date	No.	Date

BIDDERS MUST ACKNOWLEDGE RECEIPT OF <u>ALL</u> ADDENDA

MUST INSERT DATE OF FINAL QUESTIONS AND ANSWERS ON WEBSITE: _____

Sealed and dated this _____ day of _____ in the year of our Lord two thousand _____ (20___).

_____
Name of Bidder (Organization)

Corporate Seal

By: _____
Authorized Signature

Attest _____

_____
Title

SWORN TO AND SUBSCRIBED BEFORE ME this ____ day of _____, 20____.

Notary Seal

_____
Notary

BID BOND

TO ACCOMPANY PROPOSAL
(Not necessary if security is used)

KNOW ALL MEN BY THESE PRESENTS That:_____ of_____ in the County of _____and State of _____ as **Principal**, and _____ of _____ in the County of _____ and State of _____ as **Surety**, legally authorized to do business in the State of Delaware ("**State**"), are held and firmly unto the **State** in the sum of _____ _____Dollars ($_____), or _____ percent not to exceed _____

_____Dollars ($_____) of amount of bid on Contract No. T200412202.01 , to be paid to the **State** for the use and benefit of its Department of Transportation ("**DelDOT**") for which payment well and truly to be made, we do bind ourselves, our and each of our heirs, executors, administrators, and successors, jointly and severally for and in the whole firmly by these presents.

NOW THE CONDITION OF THIS OBLIGATION IS SUCH That if the above bounden **Principal** who has submitted to the **DelDOT** a certain proposal to enter into this contract for the furnishing of certain materiel and/or services within the **State**, shall be awarded this Contract, and if said **Principal** shall well and truly enter into and execute this Contract as may be required by the terms of this Contract and approved by the **DelDOT**, this Contract to be entered into within twenty days after the date of official notice of the award thereof in accordance with the terms of said proposal, then this obligation shall be void or else to be and remain in full force and virtue.

Sealed with _____ seal and dated this _____ day of _____ in the year of our Lord two thousand and _____ (20___).

SEALED, AND DELIVERED IN THE presence of

_____
Name of Bidder (Organization)

Corporate Seal

By: _____
Authorized Signature

Attest _____

_____
Title

_____
Name of **Surety**

Witness:_____

By: _____

_____
Title

CANNOT BE USED FOR BIDDING