

STATE OF DELAWARE



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DEPARTMENT OF TRANSPORTATION

BID PROPOSAL

for

CONTRACT T200512102.01

FEDERAL AID PROJECT NO. STP-N029(3)

CFDA NO. 20.205

Christina River Bridge Approaches

New Castle County

ADVERTISEMENT DATE: May 9, 2018

COMPLETION TIME: 516 Calendar Days

**PROSPECTIVE BIDDERS ARE ADVISED THAT THERE WILL BE PRE-BID MEETING FRIDAY
MAY 18, 2018 AT 1:00 P.M. IN THE DelDOT ADMINISTRATION BUILDING, 800 BAY ROAD,
DOVER, DELAWARE, 19903.**

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 prior to 2:00 P.M. local time **June 5, 2018**

**Contract No. T200512102.01
Federal Aid Project No. STP-N029(3)**

**Christina River Bridge Approaches
New Castle County**

GENERAL DESCRIPTION

LOCATION

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

DESCRIPTION

The improvements consist of furnishing all labor and materials for This project. The proposes of this contract is to establish an urban grid system as part of the Wilmington River Access and Street Grid Design that will connect and access the new bridge crossing over the Christina River from both the east and west banks of the River. The streets will be multi-modal to improve traffic flow, including efforts to provide signal systemization, construct HOV lanes, streamline intersections, add turning lanes, improve transportation systems management and operations that mitigate congestion and improve air quality, and implement ITS and other CMAQ-eligible projects, including efforts to improve incident and emergency response or improve mobility 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 516 Calendar Days. The Contract Time includes an allowance for 77 Weather Days.

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. Bids will be received in the Bidder's Room at the Delaware Department of Transportation's Administration Building, 800 Bay Road, Dover, Delaware prior to 2:00 P.M. local time June 5, 2018 unless changed via addendum.
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 bid opening date in order to receive a response. Please include T200512102.01 in the subject line. Responses to inquiries are posted on-line at <http://www.bids.delaware.gov>.
3. THE BID PROPOSAL incorporates a cd containing **Expedite, version 5.9a** and its installation file. Bidders are to use the cd provided to enter their bid amounts into the Expedite file. The Expedite bid file must be printed and submitted in paper form along with the cd and other required documents prior to the Bid due date and time.
4. SURETY BOND - 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. DRUG TESTING - Regulation 4104; The state Office of Management and Budget has developed regulations that require Contractors and Subcontractors to implement a program of mandatory drug testing for Employees who work on Large Public Works Contracts funded all or in part with public funds pursuant to 29 Del.C. §6908(a)(6). Refer to the full **REVISED** requirements at the following link: <http://regulations.delaware.gov/register/december2017/final/21 DE Reg 503 12-01-17.htm>

Note a few of the requirements;

- * At bid submission - Each bidder must submit with the bid a signed affidavit certifying that the bidder and its subcontractors has in place or will implement during the entire term of the contract a Mandatory Drug Testing Program that complies with the regulation, *form is attached*;
- * At least Two business days prior to contract execution - The awarded Contractor shall provide to DelDOT copies of the Employee Drug Testing Program for the Contractor, each participating DBE firm, and all other listed Subcontractors;
- * Subcontractors - Contractors that employ Subcontractors on the job site may do so only after submitting a copy of the Subcontractor's Employee Drug Testing Program along with the standard required subcontractor information. A Subcontractor shall not commence work until **DelDOT** has approved the subcontractor in writing.

6. **DBE PROGRAM REQUIREMENTS** (49CFR §26.53(b)(3)(i)(B)) require submission of DBE participation information from the apparent low bidder no later than five (5) calendar days **after bid opening**, (forms are attached)
7. No RETAINAGE will be withheld on this contract.
8. EXTERNAL COMPLAINT PROCEDURE can be viewed on DelDOT's Website at; <http://regulations.delaware.gov/AdminCode/title2/2000/2500/2501.shtml> or you may request a copy by calling (302) 760-2555.
9. SUPPLEMENTAL SPECIFICATIONS to the August 2001 Standard Specifications were issued November 24, 2014 and apply to this project. They can be [viewed here](#). The *Specifications Note* document is for the use by the bidders to reference the new numbers to the past numbers used for bidding purposes on previous Department contracts.
10. 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.
11. PROPOSED TRAINEE PLANS - The number of trainees to be trained will be **2**, as listed in the Training Special Provisions within Contract General Notices. The program(s) must be submitted online at <https://deldotojt.com> as soon as possible by the apparent low bidder. Award of the Contract will not take place until acceptable On-the-Job (OJT) program plans are received and approved by the Department's Civil Rights Section.
Failure of the apparent low bidder to submit acceptable OJT Trainee Programs within ten (10) calendar days of bid opening shall create a rebuttable presumption that the bid is not responsive.
12. Prospective bidders are advised that there will be a **Pre-Bid Meeting** Friday May 18, 2018 at 1:00 p.m. in the DelDOT Administration Building, 800 Bay Road, Dover, Delaware, 19903. It is **highly recommended** that interested bidders attend this Pre-Bid Meeting.
13. Contractor must add Glass Dr. Holdings, LLC & its assigns, Cedar Christina Crossing, LLC & its assigns, HCC Corporation, LLC & its assigns, Wilmington Riverfront Owner, LLC and Rockbridge Hospitality Fund VIL.P. as "Additional Insured" to the Certificate of Liability Insurance and submit prior to contract execution.
14. **Additional Insurance:** See Special Provision 763502 - Maintenance of Railroad Traffic (NS), paragraph XV, for additional insurance required for this project.
15. **Road User Cost Information:**

CONTRACT LIQUIDATED DAMAGES

The contract drawings and notes provide a sequence of construction for this contract.
FAILURE TO OPEN PROJECT TO UNRESTRICTED HIGHWAY TRAFFIC ON TIME

Phase 2E – Closure of Market Street and Walnut Street from approximately station 93+40 to 96+00

During Phase 2E, Market Street and Walnut Street will be closed over consecutive non-holiday weekends as shown in the plans between the hours of 7:00 pm Friday night and 6:00 am Monday morning. The Department will assess the Contractor an hourly Road User Cost for failure to have the roadway fully open to traffic by 6:00AM Monday morning according to the below chart as follows:

Time	Hourly Road User Cost	Cumulative Road User Cost
6:00 AM thru 6:59:59 AM	\$1,200	\$1,200
7:00 AM thru 7:59:59 AM	\$1,500	\$2,700
8:00 AM thru 8:59:59 AM	\$1,600	\$4,300
9:00 AM thru 9:59:59 AM	\$1,350	\$5,650
10:00 AM thru 10:59:59 AM	\$1,300	\$6,950
11:00 AM thru 11:59:59 AM	\$1,300	\$8,250
12:00 PM thru 12:59:59 PM	\$1,350	\$9,600
1:00 PM thru 1:59:59 PM	\$1,350	\$10,950
2:00 PM thru 2:59:59 PM	\$1,400	\$12,350
3:00 PM thru 3:59:59 PM	\$1,500	\$13,850
4:00 PM thru 4:59:59 PM	\$1,600	\$15,450
5:00 PM thru 5:59:59 PM	\$1,600	\$17,050
6:00 PM thru 6:59:59 PM	\$1,350	\$18,400

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.

EQUALITY OF EMPLOYMENT OPPORTUNITY ON PUBLIC WORKS:

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

- 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, gender identity or national 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, gender identity 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, sexual orientation, gender identity or national origin.
3. The contractor will ensure employees receive equal pay for equal work, without regard to sex. Employee pay differential is acceptable if pursuant to a seniority system, a merit system, a system which measures earnings by quantity or quality of production, or if the differential is based on any other factor other than sex.

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 on a project designated to include federal funds, shall obtain a Delaware business 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 or 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 forth 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

12.3% (New Castle County)
14.5% (Kent & Sussex Counties)

Goals for Female Participation In
Each Trade

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 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 New Castle 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).

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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 **2**. 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, Kiribati, 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 15 % 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 five (5) 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.

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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 five (5) 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.

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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 Finance, DelDOT, 800 Bay Road, Dover, Delaware 19901, and Email a copy to dot-ask@state.de.us. 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.

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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.

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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.

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CARGO PREFERENCE ACT

Requirements in the Federal-aid Highway Program

- (a) Agreement Clauses. "Use of United States-flag vessels:
 - (1) Pursuant to Pub. L. 664 (43 U.S.C. 1241(b)) at least 50 percent of any equipment, materials or commodities procured, contracted for or otherwise obtained with funds granted, guaranteed, loaned, or advanced by the U.S. Government under this agreement, and which may be transported by ocean vessel, shall be transported on privately owned United States-flag commercial vessels, if available.
 - (2) Within 20 days following the date of loading for shipments originating within the United States or within 30 working days following the date of loading for shipments originating outside the United States, a legible copy of a rated, 'on-board' commercial ocean bill-of-lading in English for each shipment of cargo described in paragraph (a)(1) of this section shall be furnished to both the Contracting Officer (through the prime contractor in the case of subcontractor bills-of-lading) and to the Division of National Cargo, Office of Market Development, Maritime Administration, Washington, DC 20590.
- (b) Contractor and Subcontractor Clauses. "Use of United States-flag vessels: The contractor agrees—
 - (1) To utilize privately owned United States-flag commercial vessels to ship at least 50 percent of the gross tonnage (computed separately for dry bulk carriers, dry cargo liners, and tankers) involved, whenever shipping any equipment, material, or commodities pursuant to this contract, to the extent such vessels are available at fair and reasonable rates for United States-flag commercial vessels.
 - (2) To furnish within 20 days following the date of loading for shipments originating within the United States or within 30 working days following the date of loading for shipments originating outside the United States, a legible copy of a rated, 'on-board' commercial ocean bill-of-lading in English for each shipment of cargo described in paragraph (b) (1) of this section to both the Contracting Officer (through the prime contractor in the case of subcontractor bills-of-lading) and to the Division of National Cargo, Office of Market Development, Maritime Administration, Washington, DC 20590.
 - (3) To insert the substance of the provisions of this clause in all subcontracts issued pursuant to this contract.

NOTE:

This requirement applies to material or equipment that is acquired for a specific Federal-aid highway project. It is not applicable to goods or materials that come into inventories independent of an FHWA funded-contract.

* * * * *

BUY AMERICA

Requirements in the Federal-aid Highway Program

By signing and submitting this proposal, the bidder certifies that:

In accordance with 23 U.S.C, 313 and 23 CFR 635.410, all iron and steel materials permanently incorporated into this project will be produced in the United States and that all manufacturing processes involving these materials will occur in the U.S, except that a minimal amount of foreign steel or iron materials may be used,

provided the cost of the foreign materials does not exceed 0.1 percent of the total Contract cost or \$2,500.00, whichever is greater. If such minimal amount of foreign steel is used, the Contractor shall maintain a record of the costs to ensure that the allowable limit is not exceeded. This documentation shall be presented to the Department upon request.

At the Department's request, I/we will provide manufacturer's/supplier's documentation verifying domestic origin as defined in the Specifications. All Materials accepted on the basis of such Certificate of Compliance may be sampled by the Department and tested at any time. Use of Material on the basis of Certificate of Compliance shall not relieve the Contractor of responsibility for incorporating Material in the Project conforming to the requirements of the Contract. Any Material not conforming to such requirements will be subject to rejection whether in place or not. The Department reserves the right to refuse to permit the use of Material on the basis of Certificate of Compliance.

* * * * *

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 it has 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 D), (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 1964,The AgeDiscrimination Act of 1975and Section 504 of the Rehabilitation Act of 1973,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 7618200

Mailing Address:
4425 North Market St., 3rd Fl
Wilmington, DE 19802

Located at:
4425 North Market St., 3rd Fl
Wilmington, DE 19802

PREVAILING WAGES FOR HIGHWAY CONSTRUCTION EFFECTIVE MARCH 15, 2018

CLASSIFICATION	NEW CASTLE	KENT	SUSSEX
BRICKLAYERS	53.89	53.89	53.89
CARPENTERS	54.62	54.81	43.57
CEMENT FINISHERS	34.63	34.85	27.71
ELECTRICAL LINE WORKERS	24.02	46.36	22.69
ELECTRICIANS	68.70	68.70	68.70
IRON WORKERS	63.68	25.48	27.06
LABORERS	43.30	40.70	39.95
MILLWRIGHTS	17.20	16.69	14.41
PAINTERS	68.79	68.79	68.79
PILEDRIVERS	70.92	25.36	28.77
POWER EQUIPMENT OPERATORS	45.46	42.29	38.73
SHEET METAL WORKERS	24.30	21.68	19.64
TRUCK DRIVERS	36.49	30.14	36.72

CERTIFIED: 04/06/2018

BY: [Signature]
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 302 761 8200

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

PROJECT: T200512102.01 Federal Aid Project No STP-N029 (3) Christina River Bridge Approaches , New Castle County

GENERAL DECISION: DE180020 01/05/2018 DE20

Superseded General Decision Number: DE20170020

State: DELAWARE

Construction Type: HIGHWAY

COUNTY: New Castle County in Delaware

HIGHWAY CONSTRUCTION PROJECTS

Note: Under Executive Order (EO) 13658, an hourly minimum wage of \$10.35 for calendar year 2018 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was 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 \$10.35 per hour (or the applicable wage rates listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2018. The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1 (a) (2) - (60). Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date	
0	01/05/2018	

SUDE2016-002	04/23/2015	
	Rates	Fringes
Bricklayer	50.49	
Carpenter	52.81	
Cement Mason/Concrete Finisher	31.10	
ELECTRICIAN		
Electrician	65.10	
Line Worker	23.23	
Ironworker	43.56	
Laborer	33.59	
Millwright	16.63	
Painter	63.14	
Power Equipment Operator:		
Piledriver	68.57	
Power Equipment Operator	41.90	
Sheet Metal Worker	23.49	
Truck Driver	34.02	

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

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

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

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. The *Specifications Note* document is for the use by the bidders to reference the new numbers to the past numbers used for bidding purposes on previous Department contracts.

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 [can be viewed here](#).

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

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, loading of contaminated material from stockpile.
- 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:

- Not required to, or charged for, transport of contaminated material from site.
- Not required to, or charged for, disposal of contaminated water and sediment.

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 and stockpile or direct 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 Materials and Water Management Work Plan" prepared by the Department's environmental representative. A copy of this plan is provided in the bid package at advertisement. The Contractor shall adhere to applicable Occupational Safety and Health standards, Guidelines and/or Laws. This will include compliance with 29 CFR Part 1910. The loading of stockpiled contaminated material and the off-site disposal of contaminated solids will be the responsibility of DelDOT's environmental representative.

After award of the Contract, the Contractor shall immediately be responsible for notifying the Department's HAZMAT Coordinator's office (760-2108) 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. When possible, instead of stockpiling, the Contractor will be responsible for direct loading contaminated soil onto trucks arranged by the Department's environmental representative to be 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 loading of stockpiled contaminated material; the transportation of contaminated material for disposal; and the disposal of contaminated material.

The "Contaminated Materials and Water Management 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 or direct loading into trucks arranged by the Department's environmental representative, and providing plastic and daily covering of the segregated soil staging area.

12/13/2017

202573 - TEST HOLES

Description:

This work consists of excavation of test holes to locate existing subsurface structures and utilities, prior to the start of adjacent construction activities, that may be affected by or interfere with the proposed construction at the locations shown on the plans or at locations directed by the Engineer. This work also consists of excavating test holes at proposed construction locations where excavation may impact existing facilities, known or unknown, at the construction location.

Construction Methods:

When facilities and utility lines must be discovered or exposed and identified at specified locations, the contractor shall use minimally intrusive excavation techniques, acceptable to DelDOT, that ensure the safety of the excavation, the integrity of the facility / utility line to be located, and that of other facilities which may be encountered during test hole excavation.

Excavation shall be by means of air-assisted vacuum excavation equipment manufactured specifically for the purpose.

Clear the test hole area of surface debris.

In paved areas, neatly cut and remove existing pavement, which cut shall not exceed 225 square inches (0.15 square meters) unless otherwise approved.

Excavate the test hole by the method(s) acceptable to DelDOT and noted above. The nominal diameter of the test hole shall not exceed 15 inches (375 mm) unless otherwise approved.

Where facilities are discovered or located, expose the facility / utility only to the extent required for identification and data collection purposes.

Avoid damage to lines, wrappings, coatings, cathodic protection or other protective coverings and features.

Hand-dig as needed to supplement mechanical excavation and to ensure safety.

Test hole locations may be revised, as directed or approved by the engineer, in the field as necessary to positively expose the utility or to determine the absence of facilities within the area impacted by the proposed construction.

Store excavated material for re-use or disposal, as appropriate.

Replace bedding material around exposed utility lines in accordance with owner's specifications or as otherwise directed or approved.

Backfill and compact the excavation in lifts no greater than six inches using excavated material with appropriate moisture/density control.

If test holes are excavated within paved areas that will be exposed to traffic, provide pavement restoration within the limits of the original cut using materials, compaction, and pavement thickness matching the excavated pavement material and thicknesses.

Method of Measurement:

The quantity of test holes will be measured by the number of EACH excavated.

Basis of Payment:

The quantity of test holes will be paid for at the Contract price per EACH. Price and payment will constitute full compensation for performing all the work described in these Special Provisions, as noted on the Plans, and/or as directed by the Engineer, and includes, excavation, backfill, backfilling, pavement restoration, disposal and removal, away from the site of the unsuitable materials, for all labor, tools, equipment, and incidentals necessary to complete the item.

3/26/13

202576 - DEBRIS REMOVAL

Description:

This item shall consist of loading, hauling, and disposing of unsuitable material generated by project grubbing and excavation activities, to an approved disposal site. This does not include contaminated material, defined as solids or liquids (including soil) potentially contaminated with a hazardous substance, requiring special handling and/or disposal per state or federal regulations.

Construction Methods and Responsibilities:

The Contractor shall be responsible for providing the appropriate equipment and personnel necessary to perform loading, hauling, and disposing of unsuitable material generated by project grubbing and excavation activities, to an approved disposal site as required during construction activities. The work will be performed in accordance with the procedures described in the site specific "Contaminated Materials and Water Management Work Plan" prepared by the Department's environmental representative. A copy of this plan is provided in the bid package at advertisement. The Contractor shall adhere to applicable Occupational Safety and Health standards, Guidelines and/or Laws. This will include compliance with 29 CFR Part 1910.

All non-hazardous debris materials (i.e., timbers, untreated wood, metal, large trash items, and/or concrete) encountered during excavation activities will be segregated from excavated soil. Contractor will be responsible for transportation and disposal of all non-hazardous debris materials. If debris material is determined to be hazardous, it will be managed following RCRA generator, transportation, and disposal requirements by the Department's environmental representative. All debris will be managed in accordance with the site specific "Contaminated Material and Water Management Work Plan" and disposed at a facility approved by the Department's environmental representative.

The Department's environmental representative shall be present during all phases of work associated with intrusive activities. Payment will not be made for any debris disposal without Department approved Inspector and environmental representative approval.

Department's Responsibilities:

The Department is responsible for providing and paying the environmental representative. The Department's approved Inspector and environmental representative will determine if the debris is hazardous or non-hazardous and oversee any site clearing, excavation, and removal activities of the debris. The Department's environmental representative will perform such tests as field screening for contamination utilizing vapor monitoring techniques and collect samples for laboratory analysis to meet the requirements of the treatment/disposal facility, DNREC and/or the USEPA.

Method of Measurement:

For bidding purposes, the unit price shall be fixed at \$88.00 per ton. Actual payment shall be based on the submitted disposal weight tickets and invoice from the disposal facility plus ten (10) percent. Payment shall constitute full compensation for the loading and hauling activities, vehicles and equipment, the Contractor's allowable administrative cost and any necessary incidentals.

Basis of Payment:

For bidding purposes, the unit price shall be fixed at \$88.00 per ton. The quantity of debris will be paid for at the Contract unit price per ton. Actual payment shall be based on the submitted disposal weight ticket from the disposal facility plus ten (10) percent. Payment shall constitute full compensation for the loading and hauling activities, vehicles and equipment, the Contractor's allowable administrative cost and any necessary incidentals.

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.

01/19/18

271502 - BIORETENTION FACILITIES

Description:

This work shall consist of constructing bioretention facilities, small landscaped basins that provide water quality management by filtering stormwater runoff before it is released into stormdrain systems and waterways, at locations as shown on the Plans, or as directed by the Engineer.

Materials:

Provide materials as specified below and in accordance with what is shown in the plans:

Polyvinyl Chloride (PVC) Pipe

Use schedule 40 PVC pipe meeting the requirements of ASTM D 3034, Type PSM. The acceptable standard thermoplastic pipe dimension ratios (SDR) are SDR-35 and SDR-41. The pipe and fittings shall be made of PVC plastic. The two joining systems are:

- (a) Solvent cement joints.
- (b) Elastomeric gasket joints: Assembly shall be in accordance with the pipe manufacturer's recommendations.

Perforated, Corrugated Polyethylene Pipe

Will meet the requirements of AASHTO M 294, Type C. Underdrains shall be wrapped in ¼" hardware cloth (wire mesh with minimum wire diameter of 0.025 inches).

Reinforcing Bar

Use epoxy coated, No. 4 reinforcing bar that conforms to the requirements of AASHTO M31, Grade 60 and ASTM A775.

Triple Shredded Mulch

Mulch will be hardwood and aged for a minimum of six months, and shall conform to the requirements of Section 737.09.

Construction Methods:

Before construction starts on any bioretention facility during any phase of production, the Stormwater Engineer or the delegated representative will be contacted a minimum of two working days in advance.

At no time should any construction equipment traverse within one foot of the designed bottom of the bioretention facility. At no time should any stockpiling operation occur on or within ten feet of the bioretention facility. Construct the bioretention facility to the dimensions shown on the plans. Excavated materials shall be used or disposed of in conformance with Section 201.

Outlet Structure

Construct outlet structure in accordance with Section 708 and as noted on the plans.

Subgrade Establishment

Excavate to the design subgrade elevation shown in accordance with Section 202 and as noted on the plans. Scarify the bottom to a minimum depth of 6 inches. At no time shall any construction equipment traverse within one foot of the designed bottom elevation.

Observation Port and Clean Outs

Construct the observation port(vertical) and clean outs (45 degree) using SDR 35 (min.) PVC pipe. Place a screw-on or locking cap on the top and place an 18 inch length of rebar through the pipe and secure on the bottom to serve as an anchoring system. Extend the inspection port from the bottom of the facility to 1 foot above the top bioretention soil mix elevation.

Infiltration Stone

Place infiltration stone as noted on the plans in accordance with Section 910.

Underdrains

Place perforated, corrugated polyethylene pipe underdrains as noted on the plans.

Bioretention Soil Mix and Topsoil

Place bioretention soil mix in the bottom of the facility, and topsoil on the side slopes, as noted on the plans.

Planting

Plant material shall be installed immediately after bioretention soil mix placement in accordance with Section 737 and as specified in the Contract Documents.

Mulching

Bioretention facilities shall be mulched in accordance with the following, as appropriate:

Typical

Immediately following plant installation, occurring immediately after final grading, bioretention facilities shall be mulched to a uniform thickness of 4 in., and the mulch shall be raked to an even surface.

Temporary

For plant installation that will commence within 30 calendar days of final grading, bioretention facilities shall be mulched to a minimum thickness of 1 in. immediately following final grading. The mulch shall be raked to an even surface. During plant installation, care shall be taken to prevent contamination of the mulch and BSM. Immediately after plant installation, bioretention facilities shall be mulched to a total uniform thickness of 4 in. and raked to an even surface.

Extended Temporary

For plant installation that will commence beyond 30 calendar days of final grading, bioretention facilities shall be mulched to a uniform thickness of 4 in., and the mulch shall be raked to an even surface. Prior to plant installation, the extended temporary mulching layer shall be removed in its entirety from bioretention facilities and disposed of as excess or unsuitable material. Care shall be taken to prevent the removal of BSM during the mulch removal. Immediately after plant installation, bioretention facilities shall be mulched to a uniform thickness of 4 in. and raked to an even surface.

Standing Water

If standing water is encountered during excavation or construction, dewatering will be in accordance with Section 902 and Section 906.

Stabilization

Stabilization will be in accordance with Section 908 and as stated on the plans.

Bioretention Facility Maintenance

Maintenance of the bioretention facility will continue until final project acceptance. Maintenance will include annual mowing, removal of accumulated sediment, and anything else which would hinder the

bioretention facility being accepted at project completion. Disposal of sediment to be at a location approved by the Engineer. Refer to the plans on conversion of the bioretention facility from a sediment trap to a permanent facility, if needed.

Method of Measurement:

The quantity of biofiltration facilities will be measured as the actual number of cubic yards of material excavated to construct biofiltration facilities. All excavation will be measured in its original position. No measurement will be made for materials excavated beyond or below the lines and grades shown on the Plans.

Basis of Payment:

Price and payment will constitute full compensation for clearing, grubbing, and disposing of all obstructions, including all pipes within the limits of the work not covered under any other Section; for excavating and grading the bioretention facility; for removing and disposing of all unsuitable material; for salvaging and stock piling topsoil for re-use; for furnishing and installing all required materials, PVC pipe observation port and clean out with cap and anchor reinforcing bar, perforated corrugated polyethylene pipe underdrain with hardware cloth, triple shredded aged hardwood mulch, sheeting, shoring, dewatering, scarifying, and for all labor, tools, equipment, and incidentals required to complete the work.

Other bioretention facility components will be measured and paid for under the following respective pay items:

Furnishing, hauling and placing Delaware No. 8 Stone will be paid for under Item 910002.

Furnishing, hauling and placing Drainage Inlet will be paid for under Section 708.

Furnishing, hauling and placing Bioretention Soil, Mix I will be paid for under Item 910500.

Furnishing, hauling and placing Topsoil will be paid for under Section 908.

Furnishing, hauling and placing Seeding will be paid for under Section 908.

Furnishing, hauling and installing Plantings will be paid for under Item 737523.

01/15/18

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:

1. *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.

2. *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 in the 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.

3. *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

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 subplot basis. The size for each subplot shall be 100 to 500 tons and testing for the sub lots will be completed on a daily basis. For each subplot, 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 Gyrotory 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 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):

$$QU = ((JMF \text{ target}) + (\text{single test tolerance}) - (\text{mean value})) / (\text{standard deviation}).$$
3. For each parameter, calculate the Lower Quality Index (QL):

$$QL = ((\text{mean value}) - (JMF \text{ target}) + (\text{single test tolerance})) / (\text{standard deviation}).$$
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 subplot tests values, to the nearest 0.001 unit. Obtain the Theoretical maximum Specific Gravity values from the corresponding laboratory subplot 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 Other¹ 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.

Appendix 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
		<hr/>
		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
		<hr/>
		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 (construction tolerance range of 26 to 40 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.

4/5/2017

401754 – FOG SEAL

Description:

This work consists of preparing the surface, furnishing and applying an emulsified asphalt and water mixture as a surface seal.

Materials:

Materials for fog seal shall be a 1:1 mixture CSS-1h, which conforms to Section 811 of the Standard Specifications, and water, which conforms to Section 803 of the Standard Specifications. A Certificate of Analysis shall be submitted for each lot of CSS-1h for approval. The percentage of residual asphalt of the CSS-1h shall be no less than 57 percent. The emulsion should be diluted no more than 24 hours before its intended use. This is to avoid settlement of the diluted emulsion. The emulsion may be circulated using a centrifugal or other suitable pump to ensure uniformity.

Equipment:

Distributors. The distributors used shall be capable of uniformly applying the bituminous material in liquid form. Devices to control the pressure, volume, and temperature shall be provided. Each distributor shall have an approved calibration chart, be equipped with an approved sampling device, and conform to the following:

- a. *Pressure.* The pressure shall be supplied by a positive displacement pump or air compressor. The pressure shall be uniform throughout the entire width of spray. If pressure is supplied by an air compressor, automatic controls must be provided to maintain sufficient and even pressure throughout the application of an entire load.
- b. *Temperature.* The distributor shall be equipped with a heating system that applies heat uniformly across the width of the tank. Provisions shall be made for circulating or agitating the material whenever necessary while heating. The distributor shall be equipped with a thermometer marked in degrees Fahrenheit (Celsius) of sufficient range to determine the actual temperature of the material.
- c. *Tachometer.* All distributors shall be provided with an approved tachometer recording feet (meters) per minute with a tabulation of feet (meters) per load with adjustments. Each load tabulation shall start at zero. There shall also be a totaling tabulation of this instrument.
- d. *Volume.* A tachometer shall give correct readings of the speed, and the volumetric efficiency of the distributor shall ensure the correct volume at various speeds. Tests shall be required to prove the volumetric efficiency of the distributor at various speeds as directed by the Engineer.
- e. *Circulating System.* All pump distributors shall be equipped with a circulating system designed to maintain a homogenous liquid while circulating in the distributor tank. This circulating system shall also be arranged to circulate the material in the tank truck before application.

Air distributors shall be equipped with a device for agitating the bituminous material in the tank trucks when necessary.

- f. *Tests.* Necessary tests shall be made to determine the accuracy of all pressure gauges, tachometers, and pump efficiencies. The tests shall be made by the Contractor when and as required by the Engineer.
- g. *Spray Bars.* Each distributor shall be equipped with spray bars capable of applying material uniformly throughout the entire length of the spray bars when they are extended. Spray bar extensions shall be provided for applying up to a 12' (7.3 m) width in one operation. Spray bars shall be equipped with a cleaning device and a shut-off valve to prevent dribbling, dripping, or streaking.
- h. *Tank Capacity Gauge.* A float or other approved type tank capacity gauge shall be furnished to indicate the volume in the tank in not less than 25 gal (100 L) units. The gauge shall have adjustments for correction.

Tanks shall have a minimum capacity of 750 gal (2800 L).

The rate of application of the distributor shall be calibrated by an approved method determined by the Engineer.

If the Engineer deems that the equipment applying the material is inadequate or fails to comply with all regulations, the Engineer will order the equipment to be removed from the job and require that another unit be placed on the work.

Application of Fog Seal Material:

The fog seal shall be applied in one application at the rates specified using the pressure distributor for the full width of the sealing operation, unless otherwise directed. Apply at the temperature that is recommended by the manufacture.

The nozzles of the spray bar shall be kept clean at all times. If one or more nozzles becomes blocked during the application of bituminous materials, the distributor shall be stopped immediately, and the nozzles shall be cleaned. The streaked areas shall be made uniform using a hand hose or other approved methods.

If the Contractor is unable to keep the application uniform, the operation shall be discontinued until a more experienced operator or a better distributor, or both, can be provided; or, the Contractor shall take such other precautions as may be necessary to keep the application within specified limits.

When applying bituminous materials adjacent to structures or curbs, the Contractor shall furnish and use effective means of protecting the structures or curbs from discoloration.

Construction Methods:

The surface upon which the fog seal is to be placed shall be cleaned thoroughly to the satisfaction of the Engineer. The fog seal shall be applied at a rate of 0.05 to 0.17 gal/yd² at ambient temperature. The application rate appropriate for the surface being sealed shall be determined by the Engineer. This rate will be determined by test strip. Apply the fog seal when the air and surface temperature is 60°F and above. Measure the air and surface temperature in the shade away from artificial heat. The application shall not begin if rain or high winds are eminent. The Engineer will determine when weather conditions are suitable for application. The fog seal should be a thin, uniform coating sufficient to seal the underlying pavement. The fog seal shall be applied using pressurized distributing equipment with a spray bar or other approved distribution system. During the application of the fog seal, care shall be taken to prevent splattering of adjacent pavement, curb and gutter and structures. Surface preparation shall be completed by removing all vegetation prior to sweeping with a power broom followed by a final sweeping with a approved vacuum truck. The preparation shall be done just prior to the application of the fog seal and be approved by the Engineer.

Method of Measurement:

The quantity of Emulsified Asphalt fog seal will be measured as the actual number of gallons of fog seal applied. The quantity will be determined by any or all of the following methods and should be verified for accuracy by computations based on field measurements taken on and along the completed finished surfaces. Multiple layers will not be measured separately.

1. **Truck Measurement:** If bituminous materials are delivered to the Project in tank trucks, distributor tanks, or drums, the Contractor shall not remove any bituminous material from the transporting vehicle or container until necessary measurements have been made, nor shall the transporting vehicle or container be released until final outage has been measured. If weighing is not convenient, the Contractor shall furnish the Engineer with a certified chart showing the dimensions and volume of each container together with a gauge or calibrated measuring rod which will permit the volume of the material to be determined by vertical measurement.
2. **Metering:** The volume may be determined by metering, in which case the metering device used and the method of using it shall be subject to the approval of the Engineer.

3. **Time of Deliveries:** The arrival and departure of vehicles delivering bituminous materials to the Project site shall be so scheduled that the Engineer is afforded proper time for the measurements of delivered volume and final outage. The Engineer will make the necessary measurements only during the Contractor's normal daily working hours.

Basis of Payment:

The quantity of the fog seal will be paid for at the Contract unit price per gallon of diluted CSS-1h. Price and payment will constitute full compensation for preparing the surface, mobilizing and furnishing all equipment, materials, and labor; placing the material; and for all labor, equipment, tools and incidentals necessary to complete the work.

2/1/11

- 401800 - BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 115 GYRATIONS, PG 64-22
(CARBONATE STONE)
- 401801 - BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 160 GYRATIONS, PG 64-22
(CARBONATE STONE)
- 401804 - BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 160 GYRATIONS, PG 70-22
(CARBONATE STONE)
- 401807 - BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 160 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
- 401813 - BITUMINOUS CONCRETE, SUPERPAVE, TYPE B, 160 GYRATIONS, PG 70-22
- 401816 - BITUMINOUS CONCRETE, SUPERPAVE, TYPE B, 160 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
- 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

- 401827 -BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 160 GYRATIONS, PG 64-22,
(NON-CARBONATE STONE)
- 401830 - BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 160 GYRATIONS, PG 70-22,
(NON-CARBONATE STONE)
- 401833 -BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 160 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
- 401838 - THIN BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 160 GYRATIONS, PG 70-22
- 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
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 gyrations 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

¹Coarse Aggregate Angularity is tested according to ASTM D5821.

²Fine Aggregate Angularity is tested according to AASHTO TP-33.

³Clay Content is tested according to AASHTO T176.

⁴Flat and Elongated is tested according to ASTM 4791 with a 5:1 aspect ratio.

⁵85/80 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 subplot 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 G_{sb} , apparent specific gravity G_{sa} , 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 Gyrotory Compactive (SGC) Effort:

The Superpave Gyrotory 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 Gyrotory 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										
SIEVE SIZE	25.0 MM		19.0 MM		12.5 MM		9.5 MM		4.75 MM	
	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:

Volumetric 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 gyrations, 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/m^2) 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: G_{mm} : +/- 0.030 and G_{mb} : +/- 0.040

a) **Design Evaluation:**

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.

12/7/2015

601520 - TEMPORARY TIMBER MAT

Description:

The item shall consist of furnishing all materials and constructing a temporary timber mat for access across the wetland area as shown on the Plans and as directed by the Engineer. All equipment shall utilize this temporary timber mat when trying to access the stockpile/staging area and the underside of the bridge.

Materials:

In accordance with Section 601 of the Standard Specifications and the following:

Timber shall have a strength and grade adequate to support the Contractor's anticipated vehicular or equipment loads. Any preservative treatment applied to the matting shall be environmentally safe for wet conditions and be preapproved by the Department.

Hardware shall be in accordance with Section 601.07 of the Standard Specifications.

Construction Methods:

The Contractor shall submit to the Department for approval shop drawings and design calculations indicating the layout, size of members, arrangement of members and the construction methods at least two weeks prior to initiating construction. This information shall be signed and sealed by a Professional Engineer registered in the State of Delaware. A timber mat system is shown on the plans and shall be used for conceptual purposes only. The actual timber mat system utilized for the construction shall be designed for the anticipated construction loads and shall be compatible with the environment. Placement of stone within the wetland area is not permitted.

The temporary timber matting should be periodically inspected by the Contractor and any damaged or deteriorated components should be replaced. The Contractor assumes full responsibility for the load carrying capability of the system and for its anchorage, as required, to resist high water flows. No additional compensation will be granted for repairing any portion of the system damaged during naturally occurring weather events or contractor usage. The Contractor is responsible for retrieving lost mats and repairing any damage caused by naturally occurring weather events.

Basis of Payment:

The payment for the item shall be made for at the contract unit price bid per Lump Sum for "601520 - Temporary Timber Mat", which price and payment shall constitute full compensation for furnishing and placing all materials, for design, submission of signed and sealed drawings and computations, installation and removal of timber mat materials, and for all labor, equipment, tools and incidentals required to complete the work.

7/16/08

602512 - REINFORCED CONCRETE WALL

Description:

This item shall consist of constructing reinforced concrete walls conforming to the configurations, sizes and dimensions as shown on the plans and these specifications. Reinforced concrete wall shall be constructed at the locations, lines and grades as indicated on the plans.

Materials:

The reinforced concrete wall shall conform to the applicable requirements of the following sections of the Standard Specifications:

207 Excavation and Backfill for Structures
210 Furnishing Borrow Type "C" for Pipe, Utility, Trench, and Structure Backfill
302 Graded Aggregate Base Course
602 Concrete Structures
603 Bar Reinforcement

Portland Cement Concrete shall be 4500 psi minimum and shall conform to the material requirements of Class A, section 812, Portland Cement Concrete of the Standard Specifications.

Construction Methods:

Construction methods shall conform with the applicable subsections of Sections 602 and 603 of the Standard Specifications, and details shown on the plans.

Method of Measurement:

The quantity of reinforced concrete wall will be measured as the number of linear feet of reinforced concrete wall constructed in place, completed and accepted, measured horizontally from end to end of top wall.

Basis of Payment:

The quantity of reinforced concrete wall will be paid for at the Contract unit price per linear foot. Price and payment shall constitute full compensation for furnishing and installing all cribbing, shoring, sheeting, excavation, backfill, compaction, formwork, concrete reinforcement, concrete, concrete surface finishing, graded aggregate base course, and the materials, labor, equipment, tools and all other incidentals required to complete the work.

1/22/2018

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. "Pisa2" Retaining Wall System as manufactured by Unilock (<https://unilock.com>)
2. "AB Classic" from the AB Collection, as manufactured by Allan Block Corporation (www.allanblock.com).
3. Or approved equal as approved by the Engineer.

Working Drawings:

General. Submit an acceptable preliminary conceptual design within 14 total calendar days from award date to the Department. 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 elevation(s), proposed bottom of footing or leveling pad elevations(s), modular blocks, existing utility locations and utility test hole documentation for test holes completed by the Contractor, and cross sections including backfill material type and limits, and quantities. Also show, as required, any details for parapets, coping, barriers, conduit, other attachments to the wall, and/or adjacent barriers or fences. 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 is conceptual. The proprietary wall vendor takes full responsibility for the engineering theory and calculations, including internal and global stability, 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 approved 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 2017 AASHTO LRFD Bridge Design Specifications 8th Edition with current interims, and the DelDOT Bridge Design Manual with current interims, 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.

Materials and Construction Method:

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 of vertical wall surface above the footing or foundation material along the front face of the wall.

Basis of Payment:

The quantity of modular block retaining wall will be paid for at the Contract unit price per square foot. Price and payment will constitute full compensation for furnishing all materials, excavation, footing, if required, backfill, drainage pipe, filter fabric, hauling, fabrication and erection, for all labor, tools, equipment and incidentals necessary to complete the work. Utility test holes necessary to complete the shop drawings will be paid for separately.

1/22/2018

602774 - PCC MASONRY FOR LIGHT POLE FOUNDATION (CY)

Description:

This work shall consist of all labor, materials, equipment, and services necessary to perform all operations to complete the installation of drilled shafts for light poles. The work shall be completed in accordance with the plans, Delaware Department of Transportation's Specifications for Road and Bridge Construction dated August 2001 (Standard Specifications), and this Special Provision. The work involves installing constant-diameter drilled shafts through Coastal Plain sediments and Piedmont Residuum. High water tables may be present.

Materials:

Materials shall meet the following requirements:

a. Portland Cement Concrete

Portland cement concrete shall be 4500-psi minimum (Class A) and shall meet the requirements specified in Section 602 and 812, in the Delaware Department of Transportation's Specifications for Road and Bridge Construction (August 2001). Where not otherwise specified, ACI 336.1-94 shall be followed. Water used in mixing concrete shall conform to Section 803 of the Standard Specifications.

Concrete shall remain workable and maintain a 4-inch slump for up to four hours after placing. If free fall methods are utilized for placement, the maximum coarse aggregate size shall be reduced to 3/8-inch. A slump value range of 5+/- 1-inch shall be provided for all uncased holes and a slump range of 6+/- 1.5-inch shall be provided for cased holes. A minimum slump of 6-inch with the addition of a retarder is required when a casing is being withdrawn. An acceptable water reducing and retarding admixture shall be added to the concrete to produce the specified slump. Under no circumstances shall the admixture cause segregation of the concrete. If any admixtures are added to the concrete at the site, the admixture must be added to the concrete by a qualified Contractor-furnished technician. Immediately after the addition of the admixture, the drum shall be turned a minimum of thirty revolutions, at mixing speed, until the concrete is thoroughly mixed. The technician shall then test the slump and consistency of the concrete mixture. Under no circumstances shall the Contractor add additional water to the concrete mixture to reach the desired slump.

b. Reinforcing Steel

Deformed reinforcing bars shall be in accordance with the sizes, spacing, dimensions, and details shown on the plans and shall conform to AASHTO M31, Grade 60, and the requirements of Section 603 and 604 of the Specifications.

c. Casing

Casing shall be metal, smooth, clean, watertight, and of ample strength to withstand both handling and driving stresses and the pressure of both concrete and the surrounding earth materials. Thickness of the casings shall not be less than 0.25-inch. The inside diameter of casing shall not be less than the specified size of the shaft. No extra compensation will be allowed for concrete required to fill an oversized casing or oversized excavation. All casings shall be removed from shaft excavations. Permanent steel casings shall not be used.

d. Slurry

Use of slurry shall not be permitted.

e. Ground Rod and Clamp

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. Ground rods shall be ¾ inch diameter by 10 foot, sectional, unless otherwise specified on the Plans.

f. Conduit sweeps

Conduit sweeps shall meet the requirements for galvanized steel rigid conduit in Section 745 of the Delaware Department of Transportation's Specifications for Road and Bridge Construction (August 2001).

g. Anchor Bolts

Anchor bolts will be supplied by the same entity that supplies the poles. Anchor bolts shall have a minimum yield strength of 55,000 psi.

Contractor Qualification:

This work shall be performed under the supervision of the Contractor's superintendent, who will be fully knowledgeable and experienced, as defined herein, in the construction of drilled shaft foundations of similar sized shafts and geotechnical conditions using both cased and slurry methods. Further, the Contractor and the Contractor's superintendent performing the work shall document at least five years previous experience within the last eight years constructing drilled shafts, with at least two years at the current firm. The Contractor's equipment shall have the capacity to undertake the work and shall be sufficient to complete the work within the specified contract time.

The Contractor shall provide documentation of his qualifications, experience record, prior project references, and the availability of the equipment needed to perform the required work. All prior project references shall be currently available personnel who can verify the quality of the contractor's previous work and shall include current name, address, and telephone number. This documentation shall reference the experience of the drilled shaft Contractor and the drilled shaft Contractor's superintendent in responsible charge of the drilled shaft operations. This documentation shall reference successful construction of similar sized shafts in the following conditions:

- a. Experience in successfully installing drilled shafts of the size shown in the plans. The minimum experience shall consist of ten similar-sized projects in the past five years. Descriptions of projects must include a point of contact with the owner that is familiar with the project.
- b. Experience in cleaning shaft bottoms when working under wet conditions.

Equipment:

The Contractor shall furnish all equipment and instrumentation necessary for installation of the shafts.

The excavation and drilling equipment shall have adequate capacity including power, torque, and down thrust to excavate a hole of the maximum diameter shown on the plans and to a depth of 15-feet or 20 percent beyond the depths shown in the contract documents, whichever is greater.

The excavation and tools shall be of adequate design, size, and strength to perform the work shown in the contract documents or described herein. When the material encountered cannot be drilled using conventional earth augers with soil or rock teeth, drilling buckets, and/or over-reaming tools, the Contractor shall provide special drilling equipment including but not limited to: rock core barrels, rock tools, air tools, blasting materials, and other equipment as necessary to construct the shaft excavation to the size and depth required.

Provide a descriptive listing of available equipment that is fully capable of cleaning shaft bottoms when shafts are excavated under wet conditions.

Submittals:

The Contractor shall submit to the Engineer for review and approval, an installation plan for the construction of drilled shafts not less than thirty days before the start of work as detailed in this Special Provision. The submittal shall include at least the following:

- a. List of proposed equipment to be used including cranes, drills, augers, bailing buckets, final cleaning equipment, tremie or concrete pumps, casing, and other appurtenances.
- b. Details of overall construction operation sequence and the sequence of shaft construction in bents or groups, including scaled plan and profile showing the location, size and movements of equipment setup and operations. The completion of any required integrity and loading tests shall be noted in this construction operation sequence.
- c. Submit project experience and resumes in accordance with Contractor Qualification.
- d. Details of shaft excavation and stabilization methods.
- e. Method of monitoring verticality of the shaft excavation during excavation and details of proposed corrective measures to be implemented as necessary.
- f. Very specific details of methods to clean the shaft excavation. Details shall include at least three alternative bottom cleaning methods with descriptions of equipment to be used when installing drilled shafts with wet methods. Include details of method for identifying type of bearing material for consistency with design assumptions prior to placement of concrete.
- g. Details of reinforcement placement including support and centralization methods.
- h. The concrete mix design, including admixtures to be used. Details of concrete placement, curing, and protection.
- i. A copy of the proposed report format for planned shaft inspections. Record information for each shaft and details of any required load or integrity tests.
- j. Other information shown on the plans or requested by the Engineer.

The Contractor will not be permitted to start construction of any drilled shaft, until the complete installation plan submittal as described above has been received, reviewed and written approval to begin construction has been issued by the Engineer.

The Contractor will not be permitted to start the construction of drilled shafts for which working drawings are required until the Engineer has approved such drawings. Such approval will not relieve the Contractor of responsibility for results obtained by the use of these drawings or any of his other responsibilities under the contract.

Submittals during construction shall include record information for each shaft and details of any required loading or integrity tests as required.

Construction Methods:

- a. Protection of Existing Structures

All reasonable precautions shall be taken to prevent damage to all existing structures, utilities, and the public. These measures shall include but are not limited to, selecting construction methods and procedures that will prevent excessive caving of the shaft excavation, monitoring, and controlling the vibrations from the driving of casing or sheeting, drilling of the shaft, or from blasting, if permitted. The Contractor shall verify that there are no subsurface utilities in close proximity of each shaft before beginning excavation activities.

b. Construction Sequence

Where drilled shafts are to be installed in conjunction with embankment placement, they shall be constructed after the placement of the fill.

Excavation of adjacent drilled shafts or other structures or utilities within a radius of three shaft diameters will not be permitted until concrete has been in place for at least 48 hours.

c. Methods of Construction

Excavations required for shafts shall be performed through whatever materials are encountered, to the dimensions and elevations shown on the plans or otherwise required by the Standard Specifications and Special Provisions. The method used shall be suitable for the intended purpose and materials encountered. The dry method or temporary casing method will be used as necessary to produce sound, durable concrete foundation shafts that are free of any defects. Wet method may only be used after the Engineers approval. When a particular method of construction is required in the contract documents, that method shall be used. If no particular method is specified for use, the Contractor shall select and use the method, as determined by site conditions, subject to approval of the Engineer, which is needed to properly accomplish the work.

The estimated lengths shown on the plans and in the geotechnical reports should be considered approximate. Additional shaft lengths might be required depending on actual subsurface conditions. Shorter shaft lengths than indicated on the plans may only be constructed with the written approval of the Engineer.

1. Dry Construction Method

The dry construction method shall be used only at sites where the ground-water table and site conditions are suitable to permit construction of the shaft in a relatively dry excavation (i.e., less than 3-inch of water accumulates above the final base elevation over a one-hour period when no pumping is permitted), and where the sides and bottom of the shaft are stable and may be visually inspected prior to placing the concrete.

The dry method consists of drilling the shaft excavation, removing accumulated water and loose material from the excavation, placing temporary casing, inspecting the bearing stratum, removing temporary casing, placing the reinforcing steel if required, and placing the shaft concrete in a relatively dry excavation. If caving occurs or if there is excess seepage into the drilled shaft, the drilling should be continued using a casing to maintain the integrity of the hole. Concrete shall be placed in accordance with Construction Methods, sub-section I, of this Special Provision.

2. Wet Construction Method

The wet construction method shall not be used.

3. Temporary Casing Construction Method

The temporary casing construction method shall be used at all sites where excessive caving or seepage could occur. When a nearly impervious formation is reached, a temporary casing shall be placed in the hole and sealed in the nearly impervious formation. As an alternative to use of the wet excavation method, temporary casing may be installed by drilling, driving, or vibratory procedures in advance of excavation to the lower limits of the caving material. Slurry may not be used. Significant caving shall be considered to be more than 50% increased volume over theoretical shaft volume, for a section exceeding 10-feet of shaft. Casing shall be installed to the final base elevation to allow inspection of the bearing stratum.

After the reinforcing steel cage has been placed, fill the excavation with concrete. Before the casing is withdrawn and while the casing is being withdrawn, the level of fresh concrete in the casing shall be at such a level that all the fluid trapped behind the casing is displaced

upward without contaminating the shaft concrete. Placement of the concrete and pulling of the temporary casing shall be conducted in accordance with Construction Methods, sub-sections I and J, of this Special Provision.

4. Alternative Construction Methods

The Contractor may propose alternative methods to prevent caving and control ground water. Such proposals, accompanied by supporting technical data, shall be submitted in accordance with the Submittals section of this Special Provision. Written approval from the Engineer is required before the use of alternative construction methods.

d. Excavations

The bottom elevation of drilled shafts shown on the plans may be adjusted during construction if the Engineer determines that the foundation material encountered during excavation is unsuitable or differs from that anticipated in the design of the drilled shaft. The Contractor shall take soil samples when shown on the plans or as directed by the Engineer to determine the character of the material directly below the shaft excavation. The Engineer will inspect the samples or cores and determine the final depth of required shaft excavation.

The Contractor shall maintain a construction method log during shaft excavation. The log shall contain information such as the description and approximate top and bottom elevation of each soil or rock material, seepage or groundwater, and remarks.

Excavated materials, which are removed from the shaft excavation and any drilling fluids used, shall be disposed of off site in accordance with local environmental regulations and the contract documents or as directed by the Engineer.

1. Unclassified Excavation

Drilled shaft excavation is designated as unclassified; the Contractor shall provide the necessary equipment to remove and dispose of any materials encountered in forming the drilled shaft excavation to the dimensions shown on the plans or as directed by the Engineer. No separate payment will be made for excavation of materials of different densities and character.

The Contractor shall provide tools such as augers fitted with either soil or rock teeth, and drilling buckets attached to drilling equipment of the size, power, torque, and down thrust approved for use by the Engineer. Material normally classified as decomposed rock, weathered, rock, disintegrated rock, or rock shall be considered as unclassified excavation. The Contractor shall provide appropriate tools such as, but not limited to, equipment listed in the Equipment section of this Special Provision in order to install the drilled shafts to their design depths.

e. Obstructions

The Contractor shall remove surface and subsurface obstructions at drilled shaft locations. Such obstructions may include man-made materials, such as old concrete foundations, and natural materials, such as boulders. Boulders are defined as stones with a least dimension greater than 1-foot. Special tools and/or procedures shall be employed by the Contractor after the hole cannot be advanced more than 1-foot in thirty minutes using approved equipment operating at maximum power, torque, and down thrust, using conventional augers fitted with soil or rock teeth, drilling buckets, and/or under-reaming tools. Such special procedures/tools may include but are not limited to: chisels, boulder breakers, core barrels, air tools, hand excavation, temporary casing, and increasing hole diameter. Blasting shall not be permitted unless specifically approved in writing by the Engineer.

f. Lost Tools

Drilling tools that are lost in the excavation shall not be considered obstructions and shall be promptly removed by the Contractor without compensation. All costs due to lost tool removal

shall be borne by the Contractor including but not limited to costs associated with hole degradation due to removal operations or the time the hole remains open.

g. Excavation Inspection

The Contractor shall provide details of shaft construction to the Engineer for review. The Contractor shall provide equipment for checking the dimensions and alignment of each shaft excavation. The Contractor shall determine the shaft dimensions and alignment under the observation and/or direction of the Engineer. Final shaft depth shall be measured after final cleaning.

Shaft cleanliness and the bearing surface condition will be evaluated and approved by the Engineer. The Contractor shall provide safe access and egress to the Engineer for inspection of the bottom of the excavation prior to placement of reinforcing steel and concrete. After the Contractor has prepared the bottom of the shaft excavation, the Contractor shall notify the Engineer. The Contractor shall coordinate schedules for excavation inspection by the Engineer.

The Contractor shall not permit any worker to enter the shaft excavation for any reason unless: both a suitable casing has been installed and the water level has been lowered and stabilized below the level to be occupied, and adequate safety equipment and procedures have been provided to workers entering the excavation. The Contractor shall follow OSHA guidelines for confined space entry.

Prior to placement of reinforcing steel and concrete, the Contractor shall ensure that loose material from the bottom and sides of excavation have been removed and that shaft is within the specified tolerances. Specified tolerances are listed in Construction Methods, sub-section K, of this Special Provision. The shaft excavation shall be cleaned to remove all accumulated sediment and water.

The Contractor shall be responsible for correcting drilled shafts that are not constructed within the specified tolerances. Remedial measures, including engineering analysis and redesign, to correct for out-of-tolerance drilled shaft foundations, shall be performed at no additional cost to the Department.

h. Reinforcing Steel Cage Construction and Placement

The reinforcing steel cage consisting of the steel shown on the plans plus cage stiffener bars, spacers, centralizers, and other necessary appurtenances shall be completely assembled and placed as a unit immediately after the shaft excavation is inspected and accepted and prior to shaft concrete placement. Prior to installation of the steel cage in the shaft excavation, inspect and clean the reinforcing steel of materials that prevent effective bonding. Clear spacing between bars of the rebar cage shall be at least five times the size of the maximum coarse aggregate. Hooks at the top of the rebar cage shall not be bent outward if temporary casing will be used. Similarly, interior hooks must be designed to permit adequate clearance for a concrete tremie pipe (i.e., 12-inch minimum), if concrete is to be tremied into place. Where clearance is a problem, hooks may be placed on dowels that may be rotated after concrete placement or casing removal and repositioned after the tremie is removed. The concrete must remain fluid during dowel repositioning. Shafts that require a large amount of reinforcing steel shall use bundled longitudinal bars to maintain the minimum clear spacing requirement. The assembled rebar cage outside diameter shall be at least 6-inches smaller than the drilled hole diameter, which corresponds to at least 3-inches of concrete cover over the rebar on all sides.

The reinforcing steel in the shaft shall be tied and supported so that the reinforcing steel will remain within allowable tolerances until the concrete will support the reinforcing steel. When concrete is placed by tremie methods, temporary hold-down devices shall be used to prevent uplifting of the steel cage during concrete placement. Concrete spacers or other approved noncorrosive spacing devices shall be used at sufficient intervals not exceeding 5-feet along the shaft excavation. At least three spacers shall be evenly distributed around the circumference of the reinforcing steel at each elevation where used.

i. Concrete Placement, Curing, and Protection

All concrete placement, consolidation and curing activities shall conform to the recommendations of Section 602 and 812 of the Standard Specifications, except as otherwise specified herein.

Concrete shall be placed as soon as possible after reinforcing steel cage placement. Concrete placement shall be continuous in the shaft to the top elevation of the shaft. Placement shall continue after the shaft is full until good quality concrete is evident at the top of the shaft.

Concrete to be placed in dry shafts less than 50-feet in length may be placed by allowing the concrete to free fall into the excavation, provided that the concrete does not hit the reinforcing steel or the sides of the excavation. This is subject to performance satisfactory to the Engineer during construction. Limit the segregation of the concrete by placing the concrete through the use of a centering tube, sectionalized pipe or other means to direct the free fall of the concrete so that it does not strike the sides or reinforcement of the shaft. If water has infiltrated the base of the excavation, it shall be removed prior to placement of the concrete. No more than 1-inch of standing water shall be allowed in the base of an excavation at the time of concrete placement to prevent segregation of the concrete. The Engineer shall have the final decision as to the allowable amount of water in the base of the excavation. The Engineer may require the Contractor to have a small sump pit in the base of the excavation to allow removal of any accumulated water.

Concrete to be placed in water shall be placed through a tremie or concrete pump. The tremie shall be supported so as to permit free movement or permit rapid lowering when necessary to retard or stop the flow of concrete. The discharge end shall be sealed closed at the start of work so as to prevent water or slurry from entering the tube before the tube is filled with concrete. After placement has started the tremie tube shall be kept full of concrete to the bottom of the hopper. If water enters the tube after placement is started, the tremie shall be withdrawn, the discharge end resealed, and the placement restarted. The flow of concrete shall be continuous until the work is completed. The discharge end of the tremie shall always be located a minimum of 5-feet below the level of the already placed concrete.

Tremie pipes shall be a minimum of 10-inch diameter. Tremie pipes shall not have aluminum parts that will react with concrete. Pump hoses shall be a minimum of 4-inch diameter. All tremie pipe or pump hoses and connections shall be watertight.

The concrete placing rate shall be not less than 30 cubic yards of concrete per each one-hour period. The concrete mix shall be of such design that the concrete remains in workable plastic state throughout the placement of the concrete for the entire drilled shaft.

All concrete, except for that placed under water, shall be vibrated to a depth of 5-feet below the ground surface except where soft uncased soil remaining in the excavation will possibly mix with the concrete. After placement, any exposed surfaces of the shaft concrete shall be protected to allow proper curing.

For at least 48-hours after shaft concrete has been placed, no construction operations that will cause soil movement adjacent to the shaft, other than mild vibration, shall be conducted.

j. Casings and Forms

When the shaft extends above ground or through a body of water, the portion of the shaft exposed above ground or through a body of water may be formed with removable concrete forms except when a permanent form is specified. Removable forms shall be stripped from the shaft in a manner that will not damage the concrete. Forms can be removed when the concrete has attained sufficient strength provided: curing of the concrete is continued for the full 72-hour period in accordance with the specifications and the concrete has reached 75-percent of its design compressive strength as determined from concrete cylinder breaks.

Temporary casings shall be removed while the concrete remains workable. The removal of temporary casing shall not be allowed until the level of the concrete placed in the shaft is great

enough to withstand the pressure exerted by the surrounding soil, water or drilling fluid. After concreting begins, removal of the casing should begin within 1-hour, before the concrete begins to set. Telescoping casing may be used, but the bottom end of the temporary casing shall be located a minimum of 5-ft below the level of already placed concrete. If the concrete begins to set prior to removal of the casing, the removal of the casing should cease, and the casing should be cut off at its current elevation and remain in the ground permanently. No payment shall be given for any casing not retrieved.

Movement of the casing by rotating, exerting downward pressure and tapping to facilitate extraction or extraction with a vibratory hammer will not be permitted. Casing extraction shall be at a slow, uniform rate with the pull in line with the shaft axis. Do not damage or displace reinforcing cage when withdrawing casing.

k. Construction Tolerances

The following construction tolerances shall be maintained in constructing drilled shafts.

1. The center of the drilled shaft shall be within 3-inches of the plan position in the horizontal plane at the plan elevation for the top of the shaft.
2. The vertical alignment of the shaft excavation shall not vary from the plan alignment by more than 0.25-inch per foot.
3. After all the shaft concrete is placed; the top of the reinforcing steel cage shall be no more than 6-inches above and no more than 3-inches below plan position.
4. When casing is used, the outside diameter of the casing shall not be less than the shaft diameter shown on the plans. When casing is not used, the minimum diameter of the drilled shaft shall not be more than 1-inch less than the diameter shown on the plans.
5. The top elevation of the shaft shall be within 1-inch of the plan top of shaft elevation.
6. The bottom of the shaft excavation shall be normal to the axis of the shaft within 1-inch per foot of shaft diameter.
7. The reinforcing steel shall be placed so that the outer edges of the reinforcing cage are located uniformly a minimum of 3-inches inside the perimeter of the design shaft size.

Drilled shaft excavations constructed in such a manner that the concrete shaft cannot be completed within the required tolerances are unacceptable. Correction methods shall be submitted by the Contractor for the Engineer's approval. Approval will be obtained before continuing with the drilled shaft construction. Materials, engineering and work necessary to effect correction for out-of-tolerance drilled shaft excavations shall be furnished at no cost to the Department.

l. Conduit Sweeps

The end of the conduit sweeps in the ground shall be extended outside the concrete and any forms or sheeting by 12 inches and capped or connected to the existing or proposed conduit. If the conduit is to be capped underground for future use, it shall 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 of the outer edge.

m. Record Information

The Contractor shall provide the following minimum record information. For each drilled shaft foundation installed, record on drilled shaft installation logs the location, alignment, dimensions, elevation of the top and bottom, depth of the bearing stratum penetration, description of the materials encountered at all elevations, elevation of the water table during excavation, condition of the bottom of the excavation, concrete data, verticality and deviation of shaft or reinforcing

steel from the plan location, and other data called for on the report form or pertinent to the drilled shaft. Record the theoretical volume of excavation, volume of concrete placed versus depth, and total volume of concrete placed. Report observed irregularities to the Engineer within eight hours of discovery. Record the time drilling started and stopped and any significant stoppages or delays. Record the time concreting started and stopped.

Minimum Record Information shall be in accordance with FHWA Publication No. NHI-10-016 "Drilled Shafts" or Association of Drilled Shaft Contractors' "Drilled Shaft Inspector's Manual" (1989). A copy of the inspection report planned for use shall be submitted to the Engineer for approval. Submit draft record information for each completed shaft to the Engineer within twenty-four hours of completion. Submit final record drawings of each drilled shaft installed no more than three weeks after completion of the work. Submit records on a weekly basis, or more frequently if variation occurs.

n. Site Operations

The Contractor shall conduct his operations in a neat and orderly manner. Equipment and materials shall not be placed or stored beyond limits approved by the Engineer and shall promptly be removed when no longer needed. All materials, water, slurry, and auger cuttings shall be confined to the specified work area so as not to migrate from the specified work area.

o. Construction Adjacent to Freshly Drilled Shafts

No construction activity, including drilling, within a radius of three shaft diameters of a freshly drilled shaft shall take place until the concrete shaft has cured for at least 48- hours and the Engineer has provided written approval.

Method of Measurement:

The quantity of "PCC Masonry for Light Pole Foundation" will be measured per cubic yard installed and accepted.

Basis of Payment:

The payment for the item "PCC Masonry for Light Pole Foundation" as called for by the contract shall be made at the contract unit price(s) per cubic yard complete in place and accepted, which price and payment will constitute full compensation for furnishing and fabricating and placing all materials, clearing and grubbing the areas, normal excavation in accordance with Section 207, concrete and reinforcing bars, construction of foundations, backfilling and compaction, grading, sodding if required to restore the site to its original condition or as required by the Plan, and for all labor, equipment, tools and incidentals necessary to complete the work.

12/13/2017

602803 - PRECAST WALL CAP

Description:

The item shall consist of furnishing and installing Precast Wall Caps on the concrete-masonry-unit (CMU) piers in accordance with the details and notes shown on the Plans, and as directed by the Engineer. Building units are intended to simulate natural cut stone.

Shop Drawings:

Shop drawings shall be prepared, submitted, and approved before fabrication may begin. Drawings must illustrate all unit edges and dimensions.

Submittal:

Provide three (3) approximate brick size samples of precast cap. Submittals to show color, edge condition, drip stop, and texture or any other unique fabrication issue. Samples to be sent to engineer for approval.

Materials:

Precast Cap:

Cast stone cap material to be manufactured in accordance with Cast Stone Institute (CSI) specification #04435-90 and shall contain silica sand in quantity required to form 'non-grainy' edges. Cap color to be buff.

- (1) Portland Cement: Use High Early Strength Type I cement conforming to the "Standard Specification for Portland Cement", ASTM designation C-150. Cement shall not contain more than 0.60 percent total alkali when tested according to ASTM C 114.
- (2) Water: Water used in mixing concrete shall be clean and free from deleterious amounts of acids, alkalines or organic materials.
- (3) Concrete mixture shall be proportioned and designed to develop minimum compression strength of 5000 p.s.i. and a maximum absorption of 5% at 28 days.
- (4) Fine aggregates to be natural sand or crushed stone complying with ASTM C 33, gradation as needed to produce required textures and colors. Materials shall be non-fading, non-staining material.

Stainless Steel Pin:

3/8" dia. 4" long. Minimum two per cap segment. Epoxy dowels to wall and cap.

Mortar:

Mortar shall conform to the requirements of Section 610. Color to match precast cap.

Construction Methods:

Provide all material, labor, equipment and appliances necessary to fabricate, deliver and erect all precast caps.

Stainless steel pins shall be made secure in the CMU wall. Pins shall be firmly placed and all anchor holes and dowel holes shall be completely filled with epoxy.

When setting with mortar, all stones shall be thoroughly wet with clean water just prior to setting.

All joints shall be flush with precast cap.

The precast caps shall be set in accordance with the approved shop drawings and as directed by the Engineer. After setting the precast cap, it shall be thoroughly cleaned of all spots, concrete, mortar, etc. to present a clean surface.

Methods of Measurement:

The quantity of precast wall caps will be measured as the number of units (Each) installed and accepted.

Basis of Payment:

The quantity of precast wall caps will be paid for at the contract unit price per Each. Price and payment shall constitute full compensation for furnishing and installing all materials, equipment, labor, mortar, epoxy, grout, stainless steel pins and incidentals necessary to complete the work.

1/22/2018

605576 - BICYCLE RACK

Description:

The item shall consist of furnishing and installing a bicycle rack in accordance with the Construction Plan Details, in accordance with the manufacturer's recommendations and as directed by the Engineer. Each bicycle rack shall be considered one unit for payment.

Materials and Construction Methods:

The bicycle rack shall be made of stainless steel pipe, 1-1/2" diameter. The above grade height is 27". Circle diameter is 25"

Concrete shall be Class B conforming to the requirements of Section 812 of the Standard Specifications.

Install in accordance with Construction Plan Details and Manufacturer's recommendations.

Basis of Payment:

The payment for the item shall be made for at the contract unit price Per Each bid for "Bicycle Rack," which price and payment shall constitute full compensation for furnishing and placing all materials, excavation, forming for concrete footing, concrete, core drilling, epoxy grout, expansion joints, backfilling, disposing of the surplus material, for all labor, tools, equipment, and necessary incidentals to complete the work.

1/22/2018

611505 - CONCRETE UNIT MASONRY

Description:

This work consists of furnishing all materials and labor necessary for the placing of concrete masonry units with all required accessories including concrete masonry units, mortar, grout, masonry ties and anchors, wall reinforcing, weep holes, wall drainage systems and cleaning for the purpose of constructing the concrete unit masonry structures shown on the Plans.

Materials:

(a) Concrete Masonry Units.

Concrete masonry units for use in load bearing walls shall conform to the requirements of the applicable Codes and ASTM Specifications as follows, except that the requirements for maximum moisture content, percentage of total absorption, at time of laying shall be 30 percent.

Concrete Masonry Units - ASTM Specification C90, Grade H-1.

Hollow Load Bearing Concrete Masonry Units - ASTM Specification C90, Grade H-1.

Concrete masonry units shall be cured either in high temperature steam kilns or high pressure steam autoclaves (125 psi).

High temperature steam cured block shall be air dried 28-days before delivery to the job site.

(b) Mortar for Unit Masonry

Cementitious Materials

Cementitious materials shall be new, clean, loose, and dry. Do not change source of brands during the progress of the work. Materials include, but are not limited to the following:

Portland Cement shall be in accordance with Section 801(a) and ASTM Specification C150 (AASHTO M85), Type I, II, or III.

Hydrated Lime: ASTM Specification C207, Type S.

Masonry Cement: ASTM Specification C91.

1. Water

Water used for mixing mortar shall be clean and potable and in accordance with Section 803.

2. Aggregate

Mortar aggregate shall be clean, natural colored sand conforming to ASTM Specification C144 (AASHTO M45), except that for joints less than 1/4" (6 mm) an aggregate graded with 100% passing the No. 16 (1.18 mm) sieve shall be used.

3. Mortar

Mortar shall conform to ASTM Specification C170.

4. Proportioning

Proportioning for mortar shall be within the limits given for each type specified. Proportions by volume are as follows:

- a. Mortar - Type S - 1-part Portland Cement, 1/4 to 1/2 parts Hydrated Lime and 2-3/4 to 4-1/2 parts clean sand.

(c) Masonry Ties

Dovetail type for use with slots - No. 12 gauge (2.7 mm), galvanized steel corrugated strips 1" (25 mm) wide by length required to engage slot and protrude into masonry 2 1/2" (63 mm) minimum.

(d) Continuous Masonry Wall Reinforcing

Continuous masonry wall reinforcing shall be truss, parallel rod type or ladder type fabricated from 3/16" (4.75 mm) diameter deformed side rods and No. 9 gauge, (3.74 mm) plain trussing rod, electrically welded. Truss rod type shall be continuous for each length. Cross rods for ladder type shall be spaced not over 16" (405 mm) on center, reinforcing shall be similar to Dur-O-Wall or Wal Mesh, standard weight. Continuous masonry wall reinforcing shall be placed in every third block course.

(e) Mortar Cleaning Materials

Mortar Cleaning Materials employed to remove excess mortar, mortar stains and other objectionable marks splattered on walls during construction operations shall be of the inorganic acid form such as Sure-Klean 101 and 600 by the Process Solvent Company, Quick Masonry Cleanser Number 22 by Delta Plastics Company, Deox by National Chemsearch Corporation or approved equal.

Should the Contractor desire to use acid for the cleansing of masonry work, he shall first obtain the written permission of the Engineer. If permission to use acid is given, no more than five (5) percent of any cleansing solution may be of muriatic acid and the Contractor shall so certify before any cleansing operations commence.

(f) Storage of Materials

All masonry and related materials shall be stored under tarpaulins or other strong, waterproof membrane in an approved manner that will protect them from contact with soil and exposure to both the elements and the hazards of construction operations.

Construction Method:

- (a) The concrete footings shall be cured in accordance of Sections 602.18 and 602.19 prior to the placement of any concrete masonry units.
- (b) All masonry shall be laid plumb, true to line, with level courses accurately spaced, and unless otherwise shown or noted, with each course breaking joints with the course next below. Units shall be laid in full mortar bed with shoved joints unless otherwise noted.
- (c) Where several deliveries and/or pallets of interior and exterior face materials are to be supplied, the Contractor shall intermix portions of each delivery and/or pallet in order that a more uniform range of color will appear in the walls. There shall be no definite line of demarcation as a result of laying face materials of subsequent deliveries of masonry units.
- (d) Walls
 1. Masonry Unit Walls

Masonry shall be thoroughly bonded and anchored to the concrete footings.

Masonry shall be:

Laid in full beds of mortar and spread with trowel so that pressing and shoving blocks will obviate dashing or slushing joints after blocks are laid. Mortar shall not be "Furrowed".

Laid between two others by throwing mortar on each block in place, then rocking the closure into position.

Left with no joint voids whatever.

Buttering or tipping the corners of units, then filling end and side joints by dashing or slushing will not be permitted.

2. Joints

Horizontal and vertical joints shall be of uniform width. Vertical joints shall be maintained in reasonably true vertical alignment and clipped as required for such alignment.

3. Placing Metal Ties and Anchors

Those portions of all metal ties and anchors, shall be covered by mortar before laying the next masonry course.

4. Horizontal and Vertical Face Joints

All joints in masonry units shall be set plumb, true to line, with level and accurately spaced courses and of a uniform thickness of 3/8" (9 mm), unless otherwise shown. Vertical joints shall be all the same width except for inconspicuous variations required to maintain the bond.

Common bond concrete masonry units shall be "running" type without headers laid out and adjusted so that no course shall finish at an external corner, or expansion or construction joint with a unit masonry less than 4" (100 mm) long.

5. Laying Conditions

Freezing Weather: No masonry shall be laid when the ambient temperature of the surrounding air is below 40° F (4° C) except by written permission of the Engineer approving means of providing heat to maintain the temperature of masonry materials and protect the completed work from freezing. Protection shall consist of heating and maintaining the temperature of the masonry materials to at least 40° F (4° C), but not more than 160° F (71° C) and maintaining an air temperature above 40° F (4° C) on both sides of the completed masonry for a period of at least 48 hours where type M or S mortar is used and 72 hours if type N or O mortar is used. These periods may be reduced, by written permission of the Engineer, to 24 hours and 48 hours, respectively, where high early strength cement is specified.

No frozen work shall be built upon and no masonry units having a film of water or frost on its surface shall be laid in the walls.

The use of chemicals or salts in the mix to lower the freezing point or the use of admixtures intended to accelerate hardening or to produce higher than normal strengths at early periods will not be permitted.

Arid weather: Masonry erected during arid weather when the ambient temperature is more than 95° F (35° C) in the shade shall be protected from direct exposure to wind and sun for 48 hours after

installation. In addition, all finished work laid during the period from April to November, inclusive, shall be wetted well before being protected from direct exposure as mentioned above and shall be kept moist for a period of up to seven (7) days, if directed by the Engineer, to prevent cracking of the mortar or other injurious effects resulting from too rapid drying.

6. Joining of Work

Where fresh masonry joins masonry that is partially set or totally set, the exposed surface of the set masonry shall be cleaned and lightly wetted so as to obtain the best possible bond with the new work. All loose block and mortar shall be removed.

If it becomes necessary for construction purposes to "stop off" a horizontal run of masonry, this shall be done only by racking back 2-unit length in each course and, if grout is used, stopping the grout 4" (100 mm) back of the rack. Tothing will not be permitted, except with written approval of the Engineer.

In grouted construction when grouting is stopped for one (1) hour or longer, the grout pour shall be stopped 1 ½" (37 mm) below the top of the last course grouted, except at the finishing course.

7. Protection of Work

During erection, all walls shall be kept dry by covering with a strong, waterproof membrane at the end of each day or shutdown period. Partially completed walls not being worked on shall be similarly protected at all times. All covering shall overlap old work on each side of the wall and shall be securely anchored.

8. Mixing Mortar and Grout

All cementitious materials and aggregate shall be mixed for a minimum of five (5) minutes in a mechanical batch mixer, with all materials thoroughly "dry" mixed before any water is added. The consistency of mortar shall be adjusted to the satisfaction of the mason, but only sufficient water to produce a mortar of as stiff a consistency as possible while retaining good working characteristics shall be added. If the mortar begins to stiffen from evaporation or absorption of a part of the mixing water, the mortar may be retempered by adding water and remixed. All mortar shall be used within 2-1/2 hours of initial mixing and no mortar nor grout shall be used after it has begun to set. Remove dust, dirt, mortar dropping, loose masonry and other foreign materials from grout spaces.

Method of Measurement:

The quantity of concrete masonry units placed and accepted will be measured by the square foot. The CMU thickness of the wall shall be as detailed on the contract drawings.

Basis of Payment:

The quantity of concrete unit masonry will be paid for at the Contract unit price per square foot. Price and payment will constitute full compensation for furnishing and placing all materials including concrete masonry units, all joint material, metal ties and reinforcing; drainage systems; cleaning; for the disposal of surplus materials; and for all labor, equipment, tools and incidentals required to complete the work.

Payment for excavation and backfill will be provided for under Section 207.

Payment for Concrete and bar reinforcement will be provided for under Section 602, and 603, respectively. Brick masonry for the wall veneers and precast caps will be paid for separately under the pertinent Brick Masonry Veneer and Precast Wall Caps items.

1/22/2018

611506 – BRICK MASONRY VENEER

Description:

The item shall consist of furnishing all materials and constructing Brick Masonry Veneer, composed of approved clay brick masonry veneer laid in mortar bed in accordance with these specifications and in reasonably close conformity with the form, dimensions, and details shown on the Plans and/or as directed by the Engineer. Additionally flat cut steel pinned-off letters shall be inclusive to this pay item.

Materials:

Brick Masonry Veneer:

Brick masonry veneer shall be new, of best quality, of uniform and dense structure, free from lumps of lime, laminations, cracks, checks, soluble salt, or other defects that in any way impair their strength, durability, appearance, or usefulness for the purpose intended. All brick masonry veneer shall conform to requirements of ASTM Designation: C 216, Type FBS or FBX, Grade SW, including passing the freeze-thaw 50-cycle test. Veneer units shall be brown brick with a uniform color to match existing Riverfront Wilmington wall located on Maryland Avenue/MLK Boulevard. The color shall be selected by the Engineer. The Contractor must submit samples from proposed supplier for approval by Engineer before starting work. The nominal size of brick masonry veneer shall be $\frac{3}{4}$ " x $2\frac{1}{4}$ " x $7\frac{5}{8}$ ". Head and bed mortar joints shall be $\frac{3}{8}$ " thick.

Mortar:

Mortar for brick masonry veneer shall be a proprietary, premixed packaged blend of Type S Portland cement mix, lime and sand, without color, that requires only water to prepare for use as brick mortar or grout. Packages of premix shall bear the manufacturer's name, brand, weight, and color identification. The manufacturer's recommended mixing proportions and procedures shall be furnished to the Engineer.

Masonry Ties:

Dovetail type for use with slots - No. 12 gauge (2.7 mm), galvanized steel corrugated strips 1" (25 mm) wide by length required to engage slot and protrude into masonry $2\frac{1}{2}$ " (63 mm) minimum.

Continuous Wall Reinforcing:

Continuous masonry wall reinforcing shall be truss, parallel rod type or ladder type fabricated from $\frac{3}{16}$ " (4.75 mm) diameter deformed side rods and No. 9 gauge, (3.74 mm) plain trussing rod, electrically welded. Truss rod type shall be continuous for each length. Cross rods for ladder type shall be spaced not over 16" (405 mm) on center; Reinforcing shall be similar to Dur-O-Wall or Wal Mesh, standard weight. Continuous masonry wall reinforcing shall be placed every third block course.

Painted Flat Cut Steel Pinned-off Letters:

Furnish flat cut aluminum letters, associated riverfront wave graphic and mounting hardware necessary to install cut metal letters shown on drawings and herein specified.

Material: Aluminum 5052 alloy.

Finish: 5 mil painted baked enamel finish (including spacers). Matte finish.

Thickness: $\frac{1}{4}$ "

Heights:	Match existing letters on identification wall at Martin Luther King, Jr. Boulevard and South Madison Street intersection.
Font Style:	Match existing letters on identification wall at Martin Luther King, Jr. Boulevard and South Madison Street intersection.
Mounting:	Blind mount with projected spacer to "float" letters from wall. Match existing letters on identification wall at Martin Luther King, Jr. Boulevard and South Madison Street intersection.
Color:	Tiger Drylac Powder Coatings or approved equal. Wave - Blue RAL 6034 49/55020 Letters - White RAL 9003 49/11400

Construction Methods:

Surfaces of concrete against which thin brick is to be placed shall be abrasive blasted to remove foreign substances, such as paint, tar, oil and curing compounds and to partially expose air bubbles and provide a roughened sandy texture.

The bond coat shall be a latex-portland cement mortar. Organic adhesive shall not be used for bond coat. The consistency of the mixture shall be such that ridges formed with the recommended notched trowel shall not flow or slump. Reworking will be allowed provided no water or materials are added. The cured setting bed shall be dampened before placing the bond coat but the setting bed shall not be soaked. The bond coat shall be floated onto the cured setting bed surface with sufficient pressure to cover the surface evenly with no bare spots. The surface area to be covered with bond coat shall be no greater than the area that can be covered with brick masonry veneer while the bond coat is still plastic. Bond coat shall be combed with a notched trowel within 10 minutes before installing the brick veneer. Brick veneer shall not be installed on a skinned over mortar bond coat.

Water shall be mixed with the premixed cement mortar until the mortar attains such consistency as can be easily handled and spread with a trowel. The mortar shall be so placed to form a firm bond. Mortar that is not used within 30 minutes after water has been added shall be wasted. Re-tempering of mortar will not be permitted.

Do not begin placement of the brick veneer on masonry concrete elements until the following cure times from removal of the forms have been achieved:

- 1) Curved Concrete Members and Walls - 60 days
- 2) Straight Concrete Members and Walls - 30 days

In addition, do not begin placement of brick veneer until the average daily temperature is greater than 40 degrees Fahrenheit.

Brick veneer shall be thoroughly wetted before laying. Wetted thin brick veneer shall be drained adequately to prevent floating of the brick veneer on the mortar bed. Sprinkling water onto brick veneer is not an acceptable method for wetting.

The brick veneer units shall be back buttered immediately before installing the units and shall be firmly pressed into the freshly notched bond coat. Brick veneer units shall be tapped to a true surface and to obtain 100 percent coverage by mortar on the back of each unit. Joints shall be straight and of uniform and equal width. Bond coat mortar that exudes into the grout spaces between and around brick veneer units shall be removed to the bottom of the unit.

Spacers, strings, ropes, pegs, glue, paper and face mounting material shall be removed before grouting the veneer. Grouting shall not begin until at least 48 hours after installing veneer. A maximum amount of grout shall be forced into the joints between and surrounding veneer units. The grout shall be tooled to a slightly concave cross section to a depth not more than 1/8" below the finished surface.

The finished surface shall not vary more than 1/8" in 8 feet from the finished surface shown on the plans. There shall be no offset in adjoining units. The brick veneer shall be cured by keeping the veneer continuously damp for at least 72 hours after laying. Curing materials shall not stain the veneer, mortared joints, or surrounding concrete surfaces.

Brick masonry veneer which is to be exposed after completion of the structure, shall be thoroughly cleaned of all mortar, scars, or spots, and shall present a surface showing the natural color of the bricks. Efflorescence may be partly removed by water. Cleaning agents shall conform to the brick veneer manufacturer's recommendations. Abrasive blast cleaning methods will not be permitted on surfaces of veneer.

Mounting studs for metal letters shall be set in adhesive cement on predrilled holes. Precut spacers shall be inserted between the letter and the mounting surface. Install signs level, plumb, and at the height indicated with sign surfaces free from distortion or other defects in appearance.

Method of Measurement:

The quantity of Brick Masonry Veneer placed and accepted will be measured by the square foot inclusive of pinned off letters and graphics.

Basis of Payment:

The payment for the item shall be made at the contract Square Foot price bid for Brick Masonry Veneer, which price and payment shall constitute full compensation for furnishing and placing all materials, inclusive of pinned off letters and graphics, disposal of sample materials, and for all labor, equipment, tools, and incidentals required to complete the work, including cleaning.

1/22/2018

612501 - PVC PIPE, 4"
612502 - PVC PIPE, 6"
612503 - PVC PIPE, 8"
612504 - PVC PIPE, 10"
612505 - PVC PIPE, 12"
612506 - PVC PIPE, 15"
612507 - PVC PIPE, 18"
612518 - PVC PIPE, 21"

Description:

This work consists of furnishing and installing PVC pipe, including all fittings, in accordance with the locations, details, notes on the Plans and as directed by the Engineer. The PVC pipe shall be used for subsurface drainage or for serving as conduit as specified on the Contract Plans.

Materials and Construction Methods:

The PVC pipe and fittings shall be free from defects and shall conform to the applicable requirements of ASTM D3034 Type PSM, and pipe shall be of SDR-35 or SDR-41 or SDR-42 for subsurface drainage pipe of the nominal size required by the Plans.

The PVC pipe and fittings shall be free from defects and shall conform to the applicable requirements of ASTM D2466 PVC Pipe Fitting, Schedule 40 for conduit of the size required by the Plans.

The excavation and backfill for the pipe shall be performed in accordance with the applicable requirements of Section 612 of the Standard Specifications, unless otherwise modified on the Plans. 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.

Method of Measurement:

The quantity of PVC pipe will be measured as the actual number of linear feet (linear meters) of each size 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 PVC pipe will be paid for at the Contract unit price per linear foot (linear meter) for each size of pipe. Price and payment will constitute full compensation for furnishing, hauling, and installing pipe, for all cribbing or foundation treatment 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, and for all material, labor, equipment, tools, and incidentals required to complete the work.

For pipe under 24" (600 mm) nominal inside diameter, the excavation, bedding, backfill and backfilling will be included in the price for this work. For pipe of nominal inside diameter 24" (600 mm) and over, payment for excavation, bedding, backfill and backfilling will be in accordance with Section 208.

10/31/01

612535 - CLEANING DRAINAGE PIPE, 15" - 24" DIA.
612536 - CLEANING DRAINAGE PIPE, GREATER THAN 24" DIA.

Description:

This work consists of cleaning existing drainage pipe. It is the intent that equipment and cleaning methods used to perform this work conform to Specification Guidelines prepared by the National Association of Sewer Service Companies (NASSCO) hereinafter referred to as the NASSCO Specifications.

Materials and Construction Methods:

Water used for cleaning shall be safe for all downstream environments. The source for the cleaning water shall be approved by the Engineer.

Equipment and construction methods shall be in accordance with the requirements under Sewer Line Cleaning, High-Velocity Jet (Hydrocleaning) found in the NASSCO Specifications. Equipment shall be operated in accordance with the manufacturer's instructions. The cleaning operation shall consist of up to three passes of the hydrocleaning equipment. If three passes do not adequately clean the pipe, the Engineer may direct the Contractor to use other procedures covered by other item(s) of work.

Material removed during the pipe cleaning operation shall be disposed by the Contractor at a site approved by the Engineer.

Method of Measurement:

The quantity of drainage pipe cleaned will be measured as the actual number of linear feet (linear meters) of pipe cleaned and accepted measured from end to end.

Basis of Payment:

The quantity of pipe cleaned will be paid for at the Contract unit price per linear foot (linear meter). Price and payment will constitute full compensation for furnishing equipment and water, disposing of removed material and for all labor, equipment, tools and incidentals to complete the work.

12/8/09

614508 - WATER MAIN AND ACCESSORIES

Description:

The item shall consist of furnishing, transporting and installing the City of Wilmington water main and accessories in accordance with the locations, details and notes on the Plans, and as directed by the Engineer. The work shall be performed in accordance with these Special Provisions, Delaware Standard Specifications, and the requirements of the Standards and Specifications of the City of Wilmington. In case of conflict between these Special Provisions, Delaware Standard Specifications, and the Standards and Specifications of the City of Wilmington, the Standards and Specifications and all other requirements of the City of Wilmington shall prevail. The City of Wilmington from hereafter shall be addressed as the Owner. The existing water mains shall be abandoned or salvaged as specified on the Plans.

Materials:

All the materials including pipe, fittings, and all other accessories as listed under this Special Provision, shall conform to the material and quality requirements of the Standards and Specifications of the Owner of the utility. The Owner shall have the right to inspect and reject the materials, if his specification requirements are not met. It is recommended that the Contractor contact the Owner of the utility and become familiar with the applicable requirements of the materials required under this contract before submitting his bid.

The contractor shall be responsible for providing materials including pipe, fittings, and all other appurtenances necessary to make permanent connections to existing utility facilities of whatever material type encountered.

Portland Cement Concrete required for the job shall be Class B, and shall conform to Section 812 of the Delaware Standard Specifications.

Polyethylene encasement required to prevent pipe corrosion shall conform to ANSI/AWWA C105/A21.5-93.

Benzene resistant gaskets conforming to ASTM D1418 where noted on the Plans.

Special Requirements:

The Contractor's attention is directed to the following special requirements.

The owner shall have the sole right of determining at what times and in what order the Contractor shall undertake work, of making extensions, connections and modifications to the existing water system. Prior notice, a minimum of forty-eight (48) hours shall be given to the owner for inspection and supervision by the Contractor of his intention to begin work involving the water line installation. No work shall be started by the Contractor until he has received permission from both the Engineer and the owner to proceed. The Contractor shall immediately notify both the Engineer and the owner of all delays.

It is of prime importance that the Contractor, in the performance of his work, does not disrupt the operation of the existing water facilities in any manner or at any time, without the express prior approval of the owner. The Contractor shall construct, disinfect, maintain and remove, following construction, such temporary water bypasses as may be required during construction to maintain water mains in service. No separate payment shall be made for such temporary water bypasses.

The Contractor will be permitted to close down specific water mains and services for a period of time not exceeding four (4) hours after obtaining approval from the owner in order to make connections as shown on the Plans. The schedule for making connections will be so arranged that the water users will be out-of-service

for a minimum period of time. The Contractor will receive no additional compensation for working during off-peak hours, including premium time charges.

Before any shutdown, as specified above, the Contractor must give the utility owner and local 911 Center and Fire Department forty-eight (48) hours notice; and the Contractor must also furnish written notice to all water users in the area, a minimum of forty-eight (48) hours in advance of the closing of any water valves which may interrupt customer water service.

Shutdowns shall not be permitted if tapping sleeves and valves are specified for making the connections.

Any and all emergency repairs required during the period of this contract shall be the responsibility of the Contractor. The owner will notify the Contractor by telecommunication and the Contractor shall be required to attend to the repair immediately. In the event the owner is unable to contact the Contractor for immediate emergency repair work in the length of time as determined by the owner, the owner reserves the right to attend to any or all emergency repair work, and to submit the costs of repair directly to the Contractor for complete payment.

All materials and work, or parts thereof, which are unsatisfactory as to any or all requirements of the owner or the Engineer, and/or as specified herein, shall be removed and replaced or repaired in an acceptable manner by the Contractor at his own expense.

The Contractor shall guarantee that all workmanship, materials, and work performed under the contract, shall be in strict accordance with the Drawings, Specifications, and other Contract Documents. This guarantee shall be for a period of two years from and after the date of completion and acceptance of the work. The Contractor shall repair, correct or replace as required, promptly and without charge, all work, equipment and material, or parts thereof, which fail to meet the above guarantee, or which in any way fail to comply with or fail to be in strict accordance with the terms and provisions and requirements of the contract during such two-year period.

Construction Methods:

All work in connection with construction of water mains and water service connections shall conform to the applicable requirements of the Standard Specifications of the owner of the utility, except as modified by the Plans and these Special Provisions. In case of conflict, the Specifications of the owner of the utility shall prevail.

Excavation and Trenching - Excavation shall be performed in accordance with Section 208 - Excavation and Backfill for Pipe Trenches, except as amended herein. The bottom of the trench shall be cut true and even, so that the barrel of the pipe will have a bearing for the full length. The trenches for water mains shall be excavated to such depth as will provide pipe elevations as indicated on the Water Main Profiles. The trenches for water service connections shall be excavated to the minimum standard depth or to such depth as required to connect to existing mains or service pipes.

Payment for excavation and backfilling shall be in accordance with Section 208 of the Standard Specifications. Borrow for backfill will be paid for under Section 210.

The Engineer and the owner shall have the right to limit the amount of trench opened in advance of pipe laid, and the amount of pipe laid in advance of backfilling. They shall be empowered at any time to require the refilling of open trenches over completed pipelines, if in their judgment, such action is necessary and the Contractor shall therefore have no claims for extra compensation, even though to accomplish such refilling, he is compelled to temporarily stop excavation or other work at any place.

If work is stopped on any trench or excavation for any reason and the excavation is left open for an unreasonable length of time (in the opinion of the Engineer) in advance of construction, the Contractor shall, if so directed, refill such trench or excavation at his own expense and shall not again open said trench until he is ready to complete the work therein.

Where rock is encountered and blasting is required for trenching, all rock excavation work shall be performed in accordance with Subsection 107.11 of the Standard Specifications and as modified; and the trench shall be excavated an additional six inches (6") below grade. After the excavation is completed, a bed six inches (6") in depth of Borrow Type C shall be placed in the bottom of the trench, leveled off and thoroughly tamped. In absence of item for Rock Excavation under this contract, a fixed price of \$135.00 per cubic yard shall be paid for rock excavation.

Installation of Pipe and Fittings - The laying and jointing of water pipe shall be in accordance with the requirements of the owner's Specifications. All pipe and fittings shall be thoroughly cleaned before laying, and shall be kept clean until acceptance of the work. Benzene resistant gaskets shall be used where noted on the Plans. No pipe may be installed except under the supervision of the owner's inspector.

At the close of the work each day, the end of the pipe shall be tightly closed to prevent dirt, foreign substances, or small animals from entering the line until laying is again resumed.

Pipe and fittings shall be carefully handled and lowered into the trench. Special care shall be taken to make sure all pipes are well bedded on solid foundation. Any defects due to settlement shall be made good by the Contractor at his expense.

Where the manufacturer's recommended pipe joint deflection is exceeded, mechanical joint bends shall be required and installed to the satisfaction of the owner and the Engineer at no extra expense.

Thrust blocks of Portland Cement Concrete Class B of adequate size and weight shall be used on all pressure piping for all fittings and all bends including and in excess of 11 - 1/4 degrees unless specifically called for otherwise on the Plans. Thrust blocks (buttresses) shall conform to the details shown on the Plans and/or the owner's Standard Specifications. No separate payment shall be made for thrust blocks, couplings, service saddles and other required incidentals.

No pipe shall be laid upon a foundation into which frost has penetrated, nor at any time when the owner or the Engineer shall deem that there is danger of frost penetration at the bottom of the excavation, unless all requirements as to the minimum length of open trench and promptness of refilling are observed.

The Contractor shall keep all excavation free from water or other liquids during the progress of the work; and backfilling of trenches shall meet the applicable requirements of Sections 208 and 210 of the Standard Specifications. Pressure Testing - Water main relocations shall be pressure-tested by the Contractor and approved by the Engineer and the owner of the utility. All equipment and labor required to perform the tests shall be furnished by the Contractor. Testing shall be conducted as specified and as required by the owner.

Upon completion of the relocation and before connecting into the existing water main, the ends of the relocated line shall be adequately plugged and the system shall be tested at a hydrostatic pressure equal to 25% in excess of the average static head and proved tight at this pressure. Under this pressure, leakage shall be held to a maximum of seventy (70) gallons per twenty-four (24) hours per inch of diameter per mile of pipe. The Contractor shall install any taps required at all high points on the line to expel trapped air prior to the actual tests. Following the tests, all such taps shall be tightly plugged with suitable threaded brass plugs. All costs of tapping and plugging the line for this purpose shall be borne by the Contractor.

Water for testing purposes shall be furnished by the owner at the Contractor's expense. The Contractor shall furnish and install adequate pumping and gauging equipment to develop the required hydrostatic pressure and to measure the pressure and amount of water lost by leakage. Duration of the pressure test shall not be less than two (2) hours. All visible leaks shall be repaired regardless of total leakage as shown by test. If inspection or test shows defects, including visible leaks, such defective work or material shall be replaced at the expense of the Contractor, and inspection and tests shall be repeated. All repairs shall be made with new material; failure to meet the tests specified above will be sufficient cause to reject the work until the defects are satisfactorily repaired. All expenses and costs incurred in carrying out the specified tests shall be borne by the Contractor at no extra cost to the owner or to the State.

Sterilization of Main - Prior to the final connection of the newly installed pipe into the existing water main, and with the plugs used in the pressure test still in place on the installed pipe, the entire installed system shall be sterilized, using one of the procedures as specified in AWWA Standard C601-54 and as required by the owner of the utility.

The Contractor shall provide an adequate blowoff for use in flushing of the main. Before the water is turned on for use by the consumer from the relocated mains, the owner will conduct bacteriological tests on water samples taken from the blowoff. All expenses incurred in the making of these tests by the owner will be borne by the Contractor. No water shall be turned on for use by the consumer from the newly installed water main until the owner gives final sanitary approval.

Before the final connection is made, all surfaces of the relocated line, and the existing water main that are to become part of the closing joint, including all gaskets and glands, shall be thoroughly cleaned, and shall be treated with a 5% solution of Sodium Hypochlorite. Extreme care is to be exercised in order to prevent the entrance of any contaminants into the main.

All expenses and cost incurred in carrying out the specified sterilization work shall be borne by the Contractor at no extra cost to the owner or the State.

Abandoning and/or Removing Existing Water Mains - All existing water mains which are to be abandoned and are located within the limits of excavation shall be removed and become the property of the Contractor. Adjacent pipe openings shall be plugged as required in accordance with the Subsection 202.04 of the Standard Specifications.

Final Location Drawings - Within thirty (30) days after completion of required work, the Contractor shall submit an accurate print or prints showing the horizontal and vertical location of mains, bends and other appurtenances to the Engineer and the owner.

Method of Measurement:

The quantity of water main and accessories will not be measured.

Basis of Payment:

The quantity of mains and accessories will be paid for at the Contract lump sum. Price and payment shall constitute full compensation for furnishing, transporting and installing the materials, concrete buttresses, benzene resistant gaskets, pressure testing, sterilizing the water mains and connecting to the existing water main, maintaining service as required and for all labor, equipment, tools and necessary incidentals to achieve and accept operational water main and services.

No separate payment shall be made for salvaging or abandoning or removing and disposing of existing water mains and cost for such required work shall be included in the Contract lump sum.

A breakout sheet attached to the Proposal lists the different elements of work or materials involved in completing 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 cost for Item 614508, shall be derived from the total sum of the cost of 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 being declared non-responsive and rejected.

The Department reserves the right to delete from the Contract one or more items listed and the right to add or subtract from the quantity of each item. The total price to be paid will be adjusted in accordance with the Contractor's unit prices as required above. There will be no extra compensation or increase in unit prices in the breakout sheet if such additions and/or deletions are made to the quantities.

1/22/2018

614589 - STEEL CASING PIPE, 10"
614602 - STEEL CASING PIPE, 16"
614603 - STEEL CASING PIPE, 20"
614605 - STEEL CASING PIPE, 12"
614660 - STEEL CASING PIPE, 24"
614661 - STEEL CASING PIPE, 26"
614662 - STEEL CASING PIPE, 28"
614663 - STEEL CASING PIPE, 32"
614678 - STEEL CASING PIPE, 14"
614744 - STEEL CASING PIPE, 18"
614746 - STEEL CASING PIPE, 48"
614777 - STEEL CASING PIPE, 6"
614778 - STEEL CASING PIPE, 8"
614783 - STEEL CASING PIPE, 30"
614825 - STEEL CASING PIPE, 36"

Description:

This work consists of furnishing all materials and encasing existing and/or proposed facilities such as water main pipe, sanitary sewer pipe, or telephone/electric duct as applicable to the Contract with steel pipe of specified diameter in accordance with the details, notes on the Plans and as directed by the Engineer.

Materials and Construction Methods:

Casing pipe shall be A-53 grade B black steel pipe with 3/8" (9 mm) wall thickness for pipes 30" (750 mm) diameter and less, and 1/2" (13 mm) wall thickness for pipes larger than 30" (750 mm) diameter, and shall conform to the requirements of API-5L, Grade B. Casing pipe shall be bituminous coated inside and outside, and joints shall be welded in accordance with requirements of AWWA C-206. After welding or cutting the pipe, the welded and cut section shall be recoated with bituminous material to the satisfaction of the Engineer or the Owner of the Utility.

The pipe/duct being encased shall be supported by treated lumber, or other device, sitting on the bottom of the casing pipe or other device as shown on the Plans and/or as directed by the Engineer. Space between the casing pipe and the pipe/duct being encased shall be closed with 12" (300 mm) thick Class B concrete at each end of the casing pipe or closed by an alternative method if shown on the Plans.

As shown on the Plans or as directed by the Engineer, a galvanized steel pipe of 1" (25 mm) diameter shall be installed through the concrete seal at the bottom of the down grade end of the casing pipe for draining the entrapped water.

Method Measurement:

The quantity of steel casing pipe will be measured as the actual number of linear feet (linear meters) of each size placed and accepted. Measurement will be made along the centerline from end to end of the steel casing pipe.

Basis of Payment:

The quantity of steel casing pipe will be paid for at the Contract unit price per linear foot (linear meter) for each size of casing pipe. Price and payment will constitute full compensation for furnishing all materials, welding, coating, closing the ends with concrete, galvanized steel pipe for drainage, backfill Borrow Type C, backfilling; and for all labor, equipment, tools and incidentals necessary to complete the work.

For pipe under 24" (600 mm), internal diameter, the excavation (excluding rock), backfill and backfilling shall be included in the price for this item unless otherwise excavation has been included in the pipe item being encased. For pipe of internal diameter 24" (600 mm) and over, payment for excavation and backfill shall be in accordance with Section 208. Furnishing of borrow type C for pipe with inside diameter of 24" (600 mm) and over will be paid for under Section 210.

8/28/01

614898 - FIRE HYDRANT REMOVAL

Description:

This work consists of removal and disposal or salvage of fire hydrants in accordance with the details shown on the Plans and the standards of the utility owner, and as directed by the Engineer. The location of the fire hydrants to be removed shall be as shown on the Plans.

Materials:

Materials for removing fire hydrants shall conform to the following Sections of the Standard Specifications:

Backfill Material, Borrow Type C Section 209

Construction Methods:

Fire hydrants shall be removed in accordance with the details shown on the Plans and the standards and specifications of the utility owner, and as directed by the Engineer. Dispose of materials as specified in Section 202.03.2(b). Backfill cavities created by fire hydrant removal with Borrow Type C.

Method of Measurement:

The quantity of fire hydrants removed will be measured as the actual number of fire hydrants removed from the site.

Basis of Payment:

The quantity of fire hydrants removed will be paid for at the Contract unit price per each. Price and payment will constitute full compensation for all excavating, backfill, backfilling, compacting, disposing of excess material, and capping water lines; and for all labor equipment, tools and incidentals required to complete the work.

1/22/2018

617515 - HEADWALL

Description:

This work consists of furnishing and placing a concrete drainage headwall as shown on the Plans.

Materials:

Materials shall conform to the requirements of Section 612, 812 and 824 of the Standard Specifications.

Construction Methods:

Concrete headwalls shall be placed in conformance with the details, dimensions, and notes as shown in the details found in the Plans and at the location shown on the Plans.

Method of Measurement and Basis of Payment:

The quantity of headwalls will be measured and paid for at the Contract unit price per each. Price and payment will constitute full compensation for furnishing, hauling, and installing materials, including concrete and bar reinforcement; for excavating, backfilling, and compacting; for cribbing, shoring, and sheeting; and for all labor, equipment, tools, and incidentals required to complete the work.

618534 - CONSTRUCTION VIBRATION MONITORING

Description:

The work to be performed under this section includes, but is not limited to, monitoring the existing structures or utilities for vibration during all construction operations that have the potential to produce vibrations at damaging levels or as directed by the Engineer. Locations to be monitored include, but are not limited to: all structures and utilities within 100-ft of any construction operations as described above.

Submittals:

1. Detail showing actual seismograph locations.
2. Description of the vibration monitoring equipment to be used.

Materials:

1. Equipment: The Contractor shall provide a minimum of one seismograph to measure and record ground motion caused by construction under the Contract.

The seismograph shall be attached or located immediately adjacent to the nearest utility, or on top of the nearest pipeline, as approved by the Engineer. The seismograph equipment shall be an Everlet seismograph, GeoSonic 3000 LC seismograph, or equivalent, capable of producing a permanent record of the three components of ground motion in terms of particle velocity. The instrument shall be capable of internal dynamic calibration. The Contractor shall submit the latest manufactures calibration for the specific machine to be used in the field to the Engineer at least 30-days prior to the field work beginning. The manufactures calibration should be within the last 6-months. The record of each construction activity shall consist of the seismograph records identified by instrument number, location of the instrument positively identified, date, time and location of the construction activities, and all other data necessary for the proposed construction. These records, as a formal report, shall be made available to the Engineer as required.

Execution:

1. The Contractor shall make every effort to avoid damages to all structures and existing utilities in the area of the proposed construction. The Contractor is responsible for vibration damages to any structures and existing utilities.
2. Pre-Construction Survey
 - a. Data must be obtained by the Contractor during the pre-construction survey to establish a base for determining effects of construction, excavating, and other construction activities on adjacent to underground utilities.
 - b. All structural and cosmetic defects shall be thoroughly documented in writing, with annotated photographs and videos.
 - c. At least 30 days prior to any excavation or drilled shaft installation, the general plan for the seismic monitoring during construction of the pre-construction survey shall be submitted to the Engineer for review and approval.
 - d. Prior to starting, the Contractor shall retain the services of a qualified Professional Engineer licensed in the State of Delaware with experience in pre-construction condition surveys to make

a detailed inspection of all utilities within 100-ft of all construction or within a horizontal distance equal to twice the depth of any planned excavation.

- e. The inspection report shall include notes, sketch measurements, photographs, video and a DVD (with audio sound track) of all utilities and structures prior to the start of construction. The audio description of the inspection shall include the date, time, weather conditions, address/stationing/location, brief description of the facility and description of physical conditions encountered. The inspection should also include documentation of existing damage and other factors (both inside and outside) which could be affected by construction activity. Photographs shall be 8" x 10" in size and in color. The report shall also recommend any adjustments to the PPV contained in this Special Provision.
- f. The Contractor shall conduct a pre-condition survey for utilities as described in Paragraph E. This survey must include video of any storm drain or gravity sewer or any other utilities accessible to video camera. A survey must be completed under the supervision of a Delaware Registered Professional Surveyor or their representative to establish the elevations of all manholes, valves, pipe invert elevations or any other locations that provides direct access to the utility.

3. Seismic Monitoring

- a. Seismic monitoring is required for all construction operations with a distance of 100-feet of existing structures that have the potential to produce vibrations at damaging levels or as directed by the Engineer. These operations include, but are not limited to, pile driving, jack hammering, excavation, compaction, and utility installation.
- b. The Contractor shall submit the qualifications of the individual or subcontractor responsible for the seismic monitoring to the Engineer for approval. The individual or subcontractor responsible for the vibration monitoring shall also be present during the pre-construction survey of all structures within the influence area of the project.
- c. Qualifications: The supervisor of the seismic monitoring work shall be either a professional geologist or professional engineer with a minimum of 5 years experience of similar scope, size, and complexity. The supervisor of the seismic work shall submit a resumes with a minimum of five projects of similar scope, size, and complexity for the Engineers review and approval at least 30 days prior to start of the work. The field technician for the seismic monitoring shall have experience with at least three projects of similar scope, size, and complexity in addition to having a BS in Engineering or Geology. The field technician's resumes shall be submitted for review and approval of the Engineer.
- d. The Contractor shall monitor construction activities adjacent to freshly placed concrete utilizing one of the two seismic monitoring options listed below. Construction activities to be limited during this period include, but not limited to, drilled shaft installation and use of any type of construction equipment.

i. Option 1:

Where vibration monitoring around freshly poured concrete is performed the following Peak Particle Velocity (PPV) limits and distances shall be maintained:

Peak Particle Velocities for Concrete at Different Ages.

Age of concrete at which vibration occurs Permitted peak particle velocity, (in/sec)

0-10 hrs	0.2
10-24 hrs	0.4
More than 24-hrs	2.0

Clear Distance between construction operations and freshly poured concrete at different ages.

Age of concrete Clear Distance (ft)

0-2 days 50

2-14 days 20

The vibration shall be monitored continuously with a real time data acquisition system with an alarm system to notify the Contractor if vibration exceeds the limiting values.

ii. Option 2:

Where vibration is not monitored the following limits shall be maintained:

Clear distance between construction operations and freshly poured concrete at different ages

Age of concrete Clear Distance (ft)

0-2 days 100

2-14 days 20

- e. Peak particle velocity (PPV) at existing adjacent structures or utilities shall not exceed that shown in the OSM Method 3 Figure below. PPV allowed for bridge abutments shall be 2.0 in/sec at all frequencies. Peak particle velocity is defined as the vector sum of the three velocity components in three mutually perpendicular directions, measured at any point by an instrument approved by the Engineer. The criteria for drywall shall be used for all structures and utilities except those that actually are constructed of plaster and otherwise noted above. These limits may be adjusted by the Engineer based on any evidence of damage to structure.

All data submitted by the Contractor shall be presented in tabular and graphical form. The record for each instrument shall consist of the seismograph records identified by instrument number, location of the instrument positively identified, date and time.

All construction operations should be monitored in accordance with the Office of Surface Mining (OSM) Method 3 and the following figure.

Method of Measurement:

The vibration monitoring program including all material, labor, equipment, expendables, all readings, data reduction and reports, and necessary incidentals will not be measured and shall be paid for at the Contract lump sum price.

Basis of Payment:

The payment shall be full compensation for all materials, labor, equipment, expendables, all readings, data reduction and reports, and necessary incidentals to complete the Work in conformance with the Plans and specifications.

2/16/2018

701505 - PORTLAND CEMENT CONCRETE PARKING BUMPER

Description:

This work consists of furnishing and installing portland cement concrete bumpers in accordance with the details and notes shown on Plans. The locations of installing the parking bumpers shall be in accordance with Plans or will be determined in the field by the Engineer.

Materials and Construction Methods:

Portland cement concrete shall be Class B, and shall conform to the requirements of Section 812, and bar reinforcement shall conform to Section 603 of the Standard Specifications.

Unless specified otherwise on the Plans, each parking bumper shall be anchored with two (2) 18 inch (450 mm) number 3 rebars driven flush with the top of the bumper. Any surface preparation necessary to provide a stable installation of the bumpers will be considered incidental to this item.

Method of Measurement:

The quantity of P.C.C. parking bumpers will be measured as the actual number of bumpers installed and accepted.

Basis of Payment:

The quantity of P.C.C. parking bumpers will be paid for at the Contract unit price per each. Price and payment will constitute full compensation for furnishing all materials including, but not limited to, concrete, bar reinforcement, anchor pins, installing the bumper as directed, for all labor, equipment, tools and incidentals necessary to complete the item.

1/22/2018

701507 - PORTLAND CEMENT CONCRETE CURB, SPECIAL

Description:

This work consists of furnishing all material and constructing P.C.C. curb in accordance with these specifications and in reasonably close conformity with lines, grades, dimensions, and shown on the Construction Details or as established by the Engineer.

Materials and Construction Methods:

Materials and construction methods of the curb shall conform to the applicable subsections of Section 701 of the Standard Specifications, Section 824 Embedded Reinforcement and Hardware, and/or as indicated on the Plans.

Method of Measurement:

The quantity of P.C.C. curb will be measured as the actual number of linear feet (linear meters) of curb constructed and accepted. Measurement will be taken along the centerline of the curb.

Basis of Payment:

The quantity of P.C.C. curb will be paid for at the Contract unit price per linear foot. Price and payment will constitute full compensation for furnishing; and placing all materials including rebar for forming, placing, finishing, and curing concrete; for backfilling, compacting, and disposing of surplus materials; for sealing joints; and for all labor equipment, tools, and incidentals required to complete the work. If rock is encountered, measurement and payment for removal of the rock will be made under Section 206.

1/22/2018

705503 - BRICK EDGED 4" CONCRETE SIDEWALK
705535 - BRICK EDGED 6" CONCRETE SIDEWALK

Description:

This work consists of furnishing all materials and constructing brick edged concrete sidewalk in accordance with these specifications and in reasonably close conformity with the lines, grades, dimensions, and notes on the Plans, and as established by the Engineer.

Materials:

Portland Cement Concrete Sidewalk shall conform to the requirements of Section 705.

The clay brick single header course edging on both sides of the portland cement concrete sidewalk shall meet the requirements of ASTM C902, Class SX, Type I. Unless otherwise noted, the Contractor shall supply clay brick approved by the Engineer, matching exactly the clay brick material, shapes, styles, sizes, and colors of the clay brick used for Item 705504, Brick and/or Block Sidewalk.

The intent of the brick, referred to as "pavers" elsewhere in this special provision, is to match as closely as possible the brick material, shapes, styles, sizes, and colors of the adjacent existing clay brick (South Madison Street north of Beech Street on the west side of the Christina River, and Market Street north of the project limits to A Street on the east side of the Christina River). Sample pavers shall be submitted for approval.

Brick Paver for 4" Sidewalk: 4" x 8" x 2 1/4" extruded brick paver. Color to be pathway red or equivalent.

Brick Paver for 6" Sidewalk: 4" x 8" x 2 5/8" clay vehicular paver intended for heavy vehicular traffic meeting ASTM C1272-17. Color to be pathway red or equivalent.

The brick edge restraint system shall be as specified on the Plans.

Sand for brick bedding shall conform to the requirements of Section 804 - Fine Aggregate.

Material for filling brick joints shall be polymeric sand, requiring special care during application per the manufacturer's recommendation. Color shall be beige.

Portland Cement Concrete for brick edge base shall conform to the requirements of Section 812, Class B.

Expansion for sidewalk shall conform to the requirements of Subsection 808.06.

Construction Methods:

Place concrete for sidewalk and brick edge base to depths shown on plans and construct in accordance with Section 705 of the Standard Specifications. Haunch concrete bottom elevation of center sidewalk edges to meet bottom elevation of adjoining brick edge concrete base as shown on the Plans.

Install the edge restraint system on the approved base as shown on the Plans where existing conditions do not provide edge restraint for bricks.

Spread a leveling course of bedding sand 1 to 1-1/2 inches thick, taking care that moisture is constant and the density is loose until the unit pavers are set and compacted. Place a material such as geotextile, or other approved material at curb joints to prevent sand from bleeding through.

Place pavers in single header course as designated on the Plans. If a joint spacing is not noted on the Plans, place the pavers with a tight joint. Select pavers from 4 or more cubes to blend color and texture variations. Do not use pavers with chips, cracks, discolorations, or other defects. Cut pavers with a motor driven masonry wet saw to provide clean, sharp, unchipped edges. Cut pavers to fit pattern specified and to neatly fit adjoining material.

Vibrate the pavers into the sand leveling course with a low amplitude plate vibrator capable of a 3,500 to 5,000 pound compaction force. Perform at least 3 passes across paving with vibrator. Protect paver face and edges by spreading a cushion of sand over the surface. Be careful not to destroy edges.

Spread dry polymeric sand and fill joints immediately after vibrating the pavers into leveling course. Brush and vibrate polymeric sand until joints are completely filled, then remove excess sand.

Prior to acceptance, any pavers that are chipped, broken, stained, or damaged shall be replaced at the contractor's expense.

Method of Measurement:

The quantity of brick edged concrete sidewalk will be measured as the number of square feet of sidewalk completed in-place and accepted.

Basis of Payment:

The quantity of brick edged concrete sidewalk will be paid for at the Contract unit price per square foot. Price and payment will constitute full compensation for excavation, furnishing and installing portland cement concrete, expansion material, brick pavers, restraint system, bedding sand, geotextile, PVC weeps with filter fabric, polymeric sand for filling joints and for all labor, equipment, tools, and incidentals necessary to complete the work.

1/15/2018

705504 - BRICK AND/OR BLOCK SIDEWALK
705506 - BRICK AND/OR BLOCK ROADWAY

Description:

This work consists of furnishing all materials and constructing brick and/or block sidewalk/roadway in accordance with these specifications and in reasonably close conformity with the lines, grades, dimensions, and notes on the Plans, and as established by the Engineer.

Materials:

The intent of the brick/block, referred to as "pavers" elsewhere in this special provision, is to match as closely as possible the brick material, shapes, styles, sizes, and colors of the adjacent existing clay brick (South Madison Street north of Beech Street on the west side of the Christina River, and Market Street north of the project limits to A Street on the east side of the Christina River).

Clay brick pavers shall meet the requirements of ASTM C902, Class SX, Type I. Unless otherwise noted, the Contractor shall supply clay brick in a color approved by the Engineer.

Sample pavers shall be submitted for approval, and if requested by the Engineer, 3' x 3' sample panels shall be constructed for approval at no additional cost.

Brick Paver Type 1: (herringbone field and running bond fields as noted on plans): 4" x 8" x 2 1/4" extruded brick paver. Color to be pathway full range red or equivalent.

Brick Paver Type 2: (header courses): 4" x 8" x 2 1/4" extruded brick paver. Color to be pathway red or equivalent.

Brick Paver Type 3: (brick roadway areas as noted on plans): 4" x 8" x 2 5/8" clay vehicular paver intended for heavy vehicular traffic meeting ASTM C1272-17. Color to be pathway red or equivalent.

The edge restraint system shall be as specified on the Plans.

Sand for bedding shall conform to the requirements of Section 804 - Fine Aggregate.

Material for filling joints shall be polymeric sand, requiring special care during application per the manufacturer's recommendation. Color shall be beige.

Portland Cement Concrete for sidewalk base shall conform to the requirements of Section 812, Class B.

Expansion for sidewalk shall conform to the requirements of Subsection 808.06.

Construction Methods:

Place concrete for sidewalk base to depths shown on plans and construct in accordance with Section 705 of the Standard Specifications.

Install the edge restraint system on the approved base as shown on the Plans where existing conditions do not provide edge restraint.

Spread a leveling course of bedding sand 1 to 1 1/2 inches thick, taking care that moisture is constant and the density is loose until the unit pavers are set and compacted. Place a material such as geotextile, or other approved material at curb joints to prevent sand from bleeding through.

Place pavers in patterns as designated on the Plans. If a joint spacing is not noted on the Plans, place the pavers with a tight joint. Select pavers from 4 or more cubes to blend color and texture variations. Do not use pavers with chips, cracks, discolorations, or other defects. Cut pavers with a motor driven masonry wet saw to provide clean, sharp, unchipped edges. Cut pavers to fit pattern specified and to neatly fit adjoining material.

Vibrate the pavers into the sand leveling course with a low amplitude plate vibrator capable of a 3,500 to 5,000 pound compaction force. Perform at least 3 passes across paving with vibrator. Protect paver face and edges by spreading a cushion of sand over the surface. Be careful not to destroy edges.

Spread dry polymeric sand and fill joints immediately after vibrating the pavers into leveling course. Brush and vibrate polymeric sand until joints are completely filled, then remove excess sand.

Prior to acceptance, any pavers that are chipped, broken, stained, or damaged shall be replaced at the contractor's expense.

Method of Measurement:

The quantity of brick and/or block paving will be measured as the number of square feet of sidewalk and/or roadway completed in-place and accepted.

Basis of Payment:

The quantity of brick and/or block paving will be paid for at the Contract unit price per square foot. Price and payment will constitute full compensation for excavation, furnishing and installing portland cement concrete, expansion material, brick pavers, restraint system, bedding sand, geotextile, PVC weeps with filter fabric, polymeric sand for filling joints and for all labor, equipment, tools, and incidentals necessary to complete the work.

1/22/2018

705505 - RESET STONE/BRICK SIDEWALK AND/OR STONE/BRICK ROADWAY

Description:

This work consists of removing and resetting the existing stone/brick sidewalk and/or roadway in accordance with details, notes on the Plans and as directed by the Engineer.

Materials and Construction Method:

The stone/brick blocks from the existing sidewalks and/or roadway shall be removed, cleaned and stored for later use. Sand and/or mortar required for setting the stones/bricks shall comply with the applicable requirements of Section 610 of the Standard Specifications.

The installation pattern and spacing of stones/bricks shall match the existing sidewalk and/or roadway setting, unless otherwise specified on the Plans. The stones/bricks shall be set on an approved compacted foundation with 2" (50 mm) of sand over it. Joint filler material (sand or mortar) shall be compatible with the original sidewalk and/or roadway.

After completion of stone/brick setting, the sidewalk and/or roadway surface area shall be thoroughly cleaned of mortar and/or as applicable to the contract.

Method of Measurement:

The quantity of stone/brick sidewalk and/or roadway reset will be measured as the number of square feet (square meters) measured at the surface of the sidewalk and/or roadway, reset and accepted.

Basis of Payment:

The quantity of stone/brick sidewalk and/or roadway reset will be paid for at the Contract unit price per square foot (square meter). Price and payment will constitute full compensation for removal, storage and cleaning of stones/bricks, furnishing all materials, resetting and cleaning the sidewalk and/or roadway, disposal of discarded materials, for all labor, tools, equipment, and all necessary incidentals to complete the work. The cost of providing replacement stone/brick for those which are damaged is incidental to this item.

3/5/05

705509 - PATTERNED PORTLAND CEMENT CONCRETE SIDEWALK, 4"
705519 - PATTERNED PORTLAND CEMENT CONCRETE SIDEWALK, 6"
705521 - PATTERNED PORTLAND CEMENT CONCRETE SIDEWALK, 8"

Description:

This work consists of furnishing all materials and constructing a patterned/ imprinted Portland cement concrete sidewalk in accordance with the notes and details on the Plans, these specifications and as directed by the Engineer.

Materials:

Materials shall conform to Subsections 705.02, 705.03 and 705.04, and others as modified herewith. In case of a conflict, the requirements of the manufacturer shall govern.

The imprinted concrete shall be colored using ready to use dry-shake type hardener and shall be streak free integrands of pigments, include surface conditioning and dispersing agents. The color hardener shall have a sufficient history of use with proven durability and stability. All shake hardener shall be distributed evenly by mechanical spreader.

The dispersing/ releasing agent shall be clear liquid compatible with color hardener. This shall be specifically formulated to prevent bonding of texturing tools to the concrete surfaces. The powdered pigmented dispersing/-releasing agent can be allowed, if this is of the same color as hardener and recommended by the manufacturer.

The imprinted concrete shall be sealed with penetrating sealer of acrylic polymer in the organic solvent having sufficient resistant to discoloration, abrasion, acids and alkalis.

All materials including hardener, dispersing agent, sealer shall be compatible and preferably manufactured by the same manufacturing firm.

The colors shall be as depicted on the Plans. Modifications of color during the sample approval process shall not affect bid prices.

To assure a high quality imprinted/stamped concrete, work shall be performed by an experienced contractor having a minimum 5-year experience dealing with stamped concrete and must be approved by the manufacturer. The contractor shall submit source of materials and previous successful history of work to Materials & Research for approval. A sample of minimum size 3'x3' for each pattern of patterned concrete sidewalk shall be submitted for color and design approval from the Engineer. Any necessary changes to the color will be directed by the Engineer.

Construction Methods:

Construction methods shall conform to the applicable requirements of Subsections 705.05 through 705.10, the recommendations of the manufacturer, and as modified herewith. In case of a conflict, the requirements of the manufacturer shall govern.

Special concrete mix shall be placed and screened to the proper grade and floated to a uniform surface in the normal manner. The depth of the concrete sidewalk shall be as noted on the Plans.

Color hardener shall be applied evenly to the concrete while in the plastic stage of set by dry shake method using a minimum of 60 lbs per 100 sq-ft. It shall be applied in two or more shakes, floated after each and trowel led only after the final floating. The first shake shall consume two third of materials, one third being

withheld for the second shake and final touch up. Release agent and sealer shall be applied in accordance with manufacturer's instructions.

While concrete is still in plastic stage of set, the imprinting tools shall be applied to make the desired pattern and texture. The patterns shall be as noted on the Plans.

Method of Measurement and Basis of Payment:

Method of Measurement and Basis of Payment shall be in accordance with Subsection 705.11 Method of Measurement and 705.12 Basis of Payment respectively.

1/22/2018

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 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, and notes with details on 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.

10/29/01

708521 - CATCH BASIN CIRCULAR COG, 5'
708522 - CATCH BASIN CIRCULAR COG, 10'
708523 - CATCH BASIN CIRCULAR COG, 15'
708524 - CATCH BASIN CIRCULAR COG, 20'
708525 - CATCH BASIN CIRCULAR COS, 5'
708526 - CATCH BASIN CIRCULAR COS, 10'
708527 - CATCH BASIN CIRCULAR COS, 15'
708528 - CATCH BASIN CIRCULAR COS, 20'
708541 - CATCH BASIN SQUARE COS, 5'
708542 - CATCH BASIN SQUARE COG, 5'
708543 - CATCH BASIN SQUARE COG, 10'
708544 - CATCH BASIN SQUARE COG, 15'
708545 - CATCH BASIN SQUARE COS, 10'
708546 - CATCH BASIN SQUARE COS, 15'
708549 - CATCH BASIN SQUARE COS, 20'

Description:

The item shall consist of furnishing all materials and constructing COG and/or COS Catch Basin, Circular and/or Square as applicable to the contract in accordance with locations, notes, details on Plans and as directed by the Engineer.

Materials and Construction Methods:

Materials and construction methods for Catch Basin, Circular and Square COG and/or COS shall conform to the applicable requirements of Section 708 of the Standard Specifications, and notes with details on the Plans. Concrete shall be Class B conforming to the requirements of Section 812, and bar reinforcement shall conform to the requirements of Section 603. Delaware No. 57 stone shall conform to the requirements of Section 813 of the Standard Specifications.

The Contractor may use precast catch basins after approval of the submission showing the details including joints, bar reinforcement, etc.

Method of Measurement and Basis of Payment:

Measurement and payment for the item Catch Basins, Circular and Square COG and/or COS as applicable shall be made in accordance with the Subsections 708.13 and 708.14 of the Standard Specifications and shall include #57 stone as indicated on the Plans.

1/22/2018

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

708599 - ELECTRIC DUCTBANK AND MANHOLE SYSTEM

Description:

This work consists of furnishing, transporting and installing the electric ductbank and manhole system and accessories, including service risers, in accordance with the locations, details and notes on the Plans, and as directed by the Engineer. The work shall be performed in accordance with these Special Provisions, Delaware Standard Specifications, and the requirements of the Standards and Specifications of the Owner of the electric utility, Delmarva Power. In case of conflict between these Special Provisions, Delaware Standard Specifications, and the Standards and Specifications of the Owner of the Utility, the Standards and Specifications and all other requirements of the Owner of the utility shall prevail. The existing electric facilities shall be removed as specified on the Plans.

This work includes encasing all ductbank in concrete as shown on the plans. This section includes all necessary labor and materials to furnish and install 2-way Delmarva Electric manholes on 12" Delaware No. 57 stone base as shown on the Plans and on drawings to be provided by Delmarva Electric and included in this specification. This work also consists of providing labor to assist in setting the manhole/vault sections and placing sealing compound, applying dampproofing, furnishing and installing ladder and 36" Delmarva frame and cover, and installing ground wire as required by local utility company.

This work consists of furnishing all design, labor, tools, products, accessories, services, transportation, equipment, materials and supervision associated with the preparation and installation of helical anchors to support precast concrete manholes according to the specifications contained herein, including the installation of steel plates, pile caps and necessary mechanisms to connect helical anchors to the precast manhole foundation slabs.

The Contractor shall select the helical anchor type, size, installation means and methods and means and methods of connecting the helical anchor caps to the precast manhole foundation slabs. The Contractor shall design and install helical anchors that will develop the load capacities required. The Contractor is required to coordinate with the precast manhole manufacturer and the Engineer to determine the anticipated loads. At a minimum, the foundation shall be designed for the precast manhole weight, utility weights, and the maximum possible number of axles of an HS-25 truck loading which can be on the precast manhole at one time. The helical anchors shall be designed with a Factor of Safety equal or greater than 2.0.

The Contractor shall coordinate with the precast manhole manufacturer to insure that any holes, sleeves, etc. are provided in the bottom slab of the precast manhole to insure that the connection of the helical anchor to the manhole bottom slab may be made. It is the Contractor's responsibility to insure that this coordination is performed prior to the fabrication of the precast manhole structure.

A subsurface exploration can be conducted as part of the construction if the Contractor deems more soil information is required. This exploration will be incidental to the cost of construction.

Submittals:

Qualifications -

- A. The Contractor shall be experienced in the installation of helical anchors and have successfully constructed at least 3 projects in the last 5 years involving installation of helical anchors.
- B. The Contractor shall have previous helical anchor installation experience in soil and rock similar to the project conditions. The Contractor shall submit construction details and structural details for at least two previous successful projects utilizing helical anchor foundations of similar scope to this project.

- C. The Contractor shall assign an Engineer to supervise the work with experience on at least 2 projects of similar scope to this project completed over the past 5 years. The Contractor shall not use a manufacturer's representatives to satisfy the supervising Engineer requirement of this section. A manufacturer's representative, however, is recommended to be on-site during installation. The on-site foreman, who will be in charge full time of all operations shall also have experience on at least 2 projects over the past 5 years installing helical anchor foundations.
- D. The helical anchors shall be designed by a Registered Professional Engineer, licensed in the State of Delaware, with experience in the design of at least 3 successfully completed helical anchor foundation projects over the past 5 years. The helical anchor designer may be either an employee of the Contractor or a separate Consultant designer meeting the stated experience requirements.
- E. At least 14 days prior to the start of the helical anchor installation, the Contractor shall submit to the Engineer for review and approval, 5 copies of the completed project reference list and personnel. The project reference list shall include a brief project description with the owner's name and current phone number. The personnel list shall identify the supervising project Engineer, personnel who will install the helical anchors, and on-site foremen to be assigned to the project. The personnel list shall contain a summary of each individual's experience and be complete for the Engineer to determine whether each individual satisfies the required qualifications. The Engineer will approve or reject the Contractor's qualifications within 5 days after receipt of a complete submission. Additional time required due to incomplete or unacceptable submittals will not be cause for time extension or impact or delay claims. All costs and delays associated with incomplete or unacceptable submittals shall be borne by the Contractor.

Design/Working Drawing Submittals -

- A. At least 14 days prior to the start of the helical anchor installation, the Contractor shall submit 5 sets of complete design calculations and Working Drawings to the Engineer for review and approval. The drawings and calculations shall be signed and sealed by the Contractor's Professional Engineer.
- B. The design calculations shall include, but not be limited to the following:
 - 1. Written summary describing the overall helical anchor design;
 - 2. Applicable code requirements and design references;
 - 3. Helical anchor critical design cross section which includes the soil and rock strata and magnitude and direction of design applied loadings;
 - 4. Design criteria including soil and rock shear strengths, unit weight, and helical anchor strength;
 - 5. Safety factors used in the design;
 - 6. Design calculation sheets with the project number, helical anchor structural location, designation, date of preparation, initials of designer and checker, and page number at the top of each page. Provide an index page with the design calculations;
 - 7. Design notes including an explanation of any symbols and computer programs used in the design. If a computer program is used for design, provide a hand calculation for verification;
 - 8. Clear identification of the estimated installation torque and available options to revise pile configuration if this installation torque is not achieved;
 - 9. Anchor to precast manhole foundation slab connection calculations.
- C. The working drawing submission shall include the location and orientation of each helical anchor.
- D. An elevation view of the structures (or a typical structure) identifying helical anchor locations and elevations; horizontal spacing and alignment.
- E. Design parameters.
- F. General notes for constructing and installing the structures with a helical anchor foundation including construction sequencing or other special construction requirements.

- G. A listing of the summary of quantities on the elevation drawing of each structure with a helical anchor foundation showing pay item estimated quantities.
- H. Details, dimensions, and schedules for all helical anchors.
- I. Within 30 days after completion of the work, submit as-built drawings to the Engineer, including installation records. Provide revised design calculations signed by the approved Registered Professional Engineer for all design changes made during the construction and installation of the helical anchors.

Construction Submittal -

The Contractor shall prepare and submit to the Engineer, for review and approval, 5 copies of a detailed step-by-step description of the proposed helical anchor installation procedure, including personnel, and equipment to assure quality control. This step-by-step procedure shall be indicated on the working drawings in sufficient detail to allow the Engineer to monitor construction and quality. The helical anchors shall be designed with a Factor of Safety equal to or greater than 2.

Final Location Drawings -

Within thirty (30) days after completion of required work, the Contractor shall submit an accurate print or prints showing the horizontal and vertical location of mains, bends and other appurtenances to the Engineer and the Owner.

Quality Assurance:

- A. Utility Compliance: Comply with local utility regulations and standards.
- B. NFPA Compliance: Equipment and components shall be designed, fabricated and installed in compliance with NFPA 70.
- C. UL and NEMA Compliance: Provide components that are listed and labeled by UL and comply with NEMA standards.
- D. Contractor shall utilize experienced personnel regularly engaged in this type of work using standard and generally accepted practices and procedures. Installation of spacers, conduit, fittings, and pull rope shall only be performed by a Delmarva- approved contractor.
- E. Deliver, store, protect and handle products in a manner to ensure installation of materials in new condition. Protect materials in on-site storage from weather.
- F. Accept conduit on-site and inspect for damage.
- G. Protect non-metallic conduit from entrance of debris, and provide appropriate covering to protect from sunlight.

Materials:

The Contractor shall be responsible for providing materials including conduit, fittings, manholes and manhole foundations, and all other appurtenances necessary to construct the proposed ductbank and manhole system as shown on the Plans.

All the materials including manholes, conduit, fittings, and all other accessories as listed under this Special Provisions, shall conform to the material and quality requirements of the Standards and Specifications of the Owner of the utility. The Owner shall have the right to inspect and reject the materials, if his specifications requirements are not met. It is recommended that the Contractor should

contact the Owner of the utility and get himself familiarized with the applicable requirements of the materials required under this contract before submitting his bid. Manhole drawings to be provided by Delmarva Electric, and are included in this specification.

- A. Conduit, service risers, and Fittings: Non-metallic conduits shall be PVC schedule 40 meeting DelDOT Standard Specification Section 745. Fittings shall be from the same manufacturer as conduit, solvent type.
- B. Marker tape shall be plastic, vinyl, or mylar, 6 inches wide, red for electrical power and orange for telecommunications and labeled to indicate the type of circuit buried below.
- C. Non Metallic Spacers: Non metallic spacers shall be Carlon or equivalent and shall be sized according to the conduit being held.
- D. Portland Cement Concrete required for the job shall be Class B, and shall conform to Section 812 of the Delaware Standard Specifications.
- E. Manholes to be furnished by Contractor. Sealing compound to be furnished by supplier.
 - a. Del. No. 57 Stone Base shall conform to the requirements of Section 302 of the Delaware Standard Specifications.
 - b. Reinforcement shall conform to the requirements of State of Delaware Standard Specifications Sections 603 and 604.
- F. Dampproofing: Cold applied asphalt shall conform to the following when tested as specified in MSMT 423, Procedure A. The material shall not contain isocyanide or any derivative of cyanide.

TEST AND METHOD		SPECIFICATION LIMITS		
		GRADE I	GRADE II	GRADE III
R&B Softening Point T 53		104 - 143 F	145 - 170 F	172 - 200 F
Penetration, 0.10 mm, T49	32 F, 200 g, 60 sec	10 min	5 min	5 min
	77 F, 100 g, 5 sec	30 - 100	25 - 50	20 - 40
	115 F, 50 g, 5 sec	100 min	130 max	100 max
Permeability, g/cm ³ , max, MSMT 423		0.09	0.09	0.09
Flow test, mm, max, MSMT 423 20 15		---	20	15
Flexibility, 60 F, MSMT 423		No peeling or loss of adhesion		
Imperviousness Test, MSMT 423		No pitting or discoloration		
Sag test, MSMT		423 No movement		

Grade I - Suitable for below ground and horizontal applications.

Grade II - Suitable for below ground and above ground where surface temperatures do not exceed 120° F.

Grade III - Suitable for below ground and above ground where surface temperatures exceed 120° F.

- G. All materials required for construction and installation of the helical anchors shall be new and without defect. Defective materials shall be removed from the jobsite at no additional cost. Each

precast manhole shall be supported by a minimum of four (4) helical anchors. All helical anchors shall be hot dipped galvanized for corrosion protection.

Special Requirements:

The Contractor's attention is directed to the following special requirements.

Installation of manholes, service riser, spacers, conduit, fittings, and pull rope shall only be performed by a Delmarva-approved contractor.

The Department and Engineer shall determine at what times and in what order the Contractor shall undertake work, of excavating, installing conduit, and installing and connecting manholes to ductbank. Soil excavation activities in the areas shown on the Contaminated Materials Plans are subject to Department of Natural Resources and Environmental Control (DNREC) restrictions and shall be performed in accordance with Item 202560, Contaminated Material.

It is recommended that the Contractor review the Contaminated Material specification, Contaminated Materials Plans and Utility Profiles before submitting his bid, in order to understand the scope of his responsibilities when working in designated contaminated areas. The Contaminated Materials Plans present approximate locations of known contaminants within the project area. Other areas of contamination may be present and shall be subject to the provisions of the project's "Contaminated Material and Water Management Work Plan" and "Health and Safety Plan" included in the contract documents.

No work shall be started by the Contractor until he has received permission from both the Engineer and the Department to proceed. The Contractor shall immediately notify both the Engineer and the Department of all delays.

Any and all emergency repairs required due to this project's construction during the period of this contract shall be the responsibility of the Contractor. The Owner will notify the Contractor by telecommunication and the Contractor shall be required to attend to the repair immediately. In the event the Owner is unable to contact the Contractor for immediate emergency repair work in a length of time as determined by the Owner, the Owner reserves the right to attend to any or all emergency repair work, and to submit the costs of repair directly to the Contractor for complete payment.

All materials and work, or parts thereof, which are unsatisfactory as to any or all requirements of the Owner or the Engineer, and/or as specified herein, shall be removed and replaced or repaired in an acceptable manner by the Contractor at his own expense.

The Contractor shall guarantee that all workmanship, materials, and work performed under the contract, shall be in strict accordance with the Drawings, Specifications, and other Contract Documents. The Contractor shall repair, correct or replace as required, promptly and without charge, all work, equipment and material, or parts thereof, which fail to meet the above guarantee, or which in any way fail to comply with or fail to be in strict accordance with the terms and provisions and requirements of the contract.

Construction Methods:

All work in connection with construction of electric ductbank and manhole system shall conform to the applicable requirements of the Standard Specifications of the Owner of the utility, except as modified by the Plans and these Special Provisions. In case of conflict, the Specifications of the Owner of the utility shall prevail.

The Contractor shall keep all excavation free from water or other liquids during the progress of the work in compliance with the project's Contaminated Material and Water Management Work Plan; and backfilling of trenches shall meet the applicable requirements of Sections 208 and 210 of the State of Delaware Standard Specifications.

Excavation and Trenching -

Excavation shall be performed in accordance with Section 208 - Excavation and Backfill for Pipe Trenches, except as amended herein. The bottom of the trench shall be cut true and even for the full length. The trenches for electric ductbanks shall be excavated to the elevations shown on the Plans or to the minimum standard depth where not specified on the Plans, provided they are coordinated with proposed crossing facilities to minimize impacts to proposed and existing facilities. Trench width shall be as shown on plans.

Payment for excavation and backfill shall be in accordance with Section 208 of the Standard Specifications.

The Engineer and the Owner shall have the right to limit the amount of trench opened in advance of conduit laid, and the amount of conduit laid in advance of encasing in concrete and backfilling. They shall be empowered at any time to require the refilling of open trenches over completed conduit lines, if in their judgment, such action is necessary and the Contractor shall therefore have no claims for extra compensation, even though to accomplish such refilling, he is compelled to temporarily stop excavation or other work at any place.

If work is stopped on any trench or excavation for any reason and the excavation is left open for an unreasonable length of time (in the opinion of the Engineer) in advance of construction, the Contractor shall, if so directed, refill such trench or excavation at his own expense and shall not again open said trench until he is ready to complete the work therein.

Where rock is encountered and blasting is required for trenching, all rock excavation work shall be performed in accordance with Subsection 107.11 of the Standard Specifications and as modified; and the trench shall be excavated an additional six inches (6") below grade. After the excavation is completed, a bed six inches (6") in depth of Borrow Type C shall be placed in the bottom of the trench, leveled off and thoroughly tamped. In absence of item for Rock Excavation under this contract, a fixed price of \$135.00 per cubic yard shall be paid for rock excavation.

Installation of Conduit and Fittings -

The laying and jointing of conduit shall be in accordance with the requirements of the Owner's Specifications. All conduit and fittings shall be thoroughly cleaned before laying, and shall be kept clean until acceptance of the work. No conduit may be installed except under the supervision of the Owner's inspector.

At the close of the work each day, the end of the conduit shall be tightly closed to prevent dirt, foreign substances, or small animals from entering the line until laying is again resumed.

Conduit and fittings shall be carefully handled and lowered into the trench. Special care shall be taken to make sure all conduits are well bedded on a solid foundation. Any defects due to settlement shall be made good by the Contractor at his expense.

Conduit sections between manhole or terminal points shall be laid in basically horizontal layers within the limitations imposed by the trench. Configurations will be as specified by the drawings. Conduit shall not contain traps between manholes where water may accumulate and shall slope downward toward manholes.

Bends or curves shall be kept to a minimum radius of thirty feet unless preformed factory-fabricated sweeps or bends are used, which shall have a maximum angle of 45 degrees.

Standard size ducts as specified by the drawings, shall be used. Standard couplings or joints for the types of conduit being installed shall be used. Joints or couplings shall be staggered. Bring conduit to the shoulder of the fittings and fasten securely using cement recommended by the manufacturer.

Wipe non metallic conduit dry and clean before joining, apply full even coat of cement to entire area inserted in fitting and allow to cure for 20 minutes, minimum.

Where required, conduit shall be saw cut, with all cut ends perpendicular to conduit centerline, smooth and free of burrs and fins.

Prior to concrete encasement, ducts shall be secured with nonmetallic straps or cable ties to nonmetallic duct spacers at intervals not exceeding five feet. Duct spacers shall be sized for the ducts being held, and shall provide the minimum spacing between ducts required for concrete flow. Duct spacers shall be anchored to the ground using nonmetallic bands and stakes to prevent movement during concrete placement. Contractor shall not place concrete until conduits have been inspected by Delmarva Electric representative.

Ducts entering manholes shall be terminated with the bell ends set flush with the inside face of manhole walls and in accordance with Delmarva Electric standards and details. Install temporary plugs to protect installed conduit from entrance of liquids and debris. Contractor shall be responsible for the concreting-in or mortaring-in of the bell ends.

Place concrete on 6" minimum bed of Delaware No. 57 stone as specified by the drawings, provide a minimum of 3 inches of concrete cover at bottom and 4 inches of concrete cover on sides and top of conduit duct bank. If necessary to split conduit ductbank because of obstructions, each part will be treated as a separate duct bank with concrete envelope as required.

All conduit shown on drawings for use by Delmarva Electric shall be mandreled using a device $\frac{1}{4}$ inch smaller than the duct inside diameter, or foam carrier for plastic/fiberglass duct, swabbed and observed by Delmarva Electric representative before acceptance. Duct through which mandrel will not pass shall be re-laid as directed by Delmarva Electric and re-tested to Delmarva Electric satisfaction, all for which additional compensation will not be allowed. Leave polypull rope or equivalent, secured at each end, in all completed ducts.

Conduit shown to be terminated above ground or at poles shall be coupled to a 90 degree PVC Schedule 40 bend and capped or plugged. Clean conduit and leave polypull rope as specified.

A marker tape indicating the specific utility shall be buried approximately 12 inches above the duct banks for the entire length of the duct run.

No conduit shall be laid upon a foundation into which frost has penetrated, nor at any time when the Owner or the Engineer shall deem that there is danger of frost penetration at the bottom of the excavation, unless all requirements as to the minimum length of open trench and promptness of refilling are observed.

Backfill of pipe trench may not be started until such time that the concrete is sufficiently hardened, as determined by the Engineer.

Manhole Installation -

The excavation depth and width will be governed by the top of manhole elevation as shown on the contract drawings and the size of manhole to be installed. Excavate and remove to depths shown on drawings, coordinate excavation as necessary to support the delivery and placement of manhole. Provide sheeting and shoring of the excavation and any adjacencies as required.

Install helical anchors to support the manhole. Contractor is responsible for helical anchor design. Provide sufficient labor to assist in setting the manhole/vault sections on a 12" bed of Delaware No. 57 stone and placing sealing compound furnished by the supplier in the joints between sections as they are set. Upon completion of setting the manholes, dampproof the sections as shown on drawings.

Furnish and install ladder and 36" frame and cover with Delmarva Electric marked on lid. Install ground wire as required by local utility company and shown on Delmarva manhole drawings.

Helical Anchor Foundations -

Work shall not be started, nor materials ordered until the Engineer's written approval of the Contractor's experience qualifications is given. The Engineer may suspend work if the Contractor uses non-approved personnel. If work is suspended, the Contractor shall be fully liable for all resulting costs and no adjustment in contract time will result from the suspension.

The Contractor shall visit the site to assess the site geometry, equipment access conditions, and location of existing structures and utilities. The Contractor is responsible for field location and verifying the locations of all utilities shown on the plans prior to starting work.

The Contractor shall carefully monitor the torque applied to the helical anchor as it is installed, recording the torque at one foot intervals, and in accordance with the manufacturer's recommendations. The torque values provided in the design computations shall be achieved and the raw field data shall be provided to the Engineer for review and acceptance. If the estimated torque values are not achieved, the Contractor shall modify the anchor configuration to achieve such torque.

All helical anchor material shall be handled and transported carefully to prevent any deformation or damage. Care should be taken to prevent the accumulation of dirt, mud or other foreign matter on the steel materials. Such accumulation shall be completely removed prior to the installation.

Method of Measurement:

The measurement of payment shall be for the installation of the materials listed in the breakout sheet in accordance with the units indicated, installed in place, complete and accepted.

Basis of Payment:

The quantity of Electric Ductbank and Manhole System will be paid for at the Contract lump sum. Price and payment shall constitute full compensation for furnishing, transporting and installing the materials and for all labor, equipment, tools and necessary incidentals to achieve and accept Electric Ductbank and Manhole System.

No separate payment shall be made for salvaging, abandoning or removing and disposing of existing electric facilities and cost for such required work shall be incidental to the respective sizes for installing electric ductbank.

A breakout sheet attached to the Proposal lists the different elements of work or materials involved in completing 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 cost for Item 708599, shall be derived from the total sum of the cost of 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 being declared non-responsive and rejected.

The Department reserves the right to delete from the Contract one or more items listed and the right to add or subtract from the quantity of each item. The total price to be paid will be adjusted in accordance with the Contractor's unit prices as required above. There will be no extra compensation or increase in unit prices in the breakout sheet if such additions and/or deletions are made to the quantities.

3/1/2018

710501 - CONVERTING EXISTING CATCH BASIN TO MANHOLE

Description:

This work consist of furnishing all materials, and constructing a manhole from an existing catch basin in accordance with the locations, notes and details shown 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 708 of the Standard Specifications, and as specified on the Plans.

Portland Cement Concrete shall meet the requirements of Class B, Section 812 of the Standard Specifications.

Method of Measurement:

The quantity of catch basins converted to manholes will be measured as the number of catch basins converted to manholes and accepted.

Basis of Payment:

The quantity of catch basins converted to manholes will be paid for at the Contract unit price per each. Price and payment will constitute full compensation for constructing the manhole from the existing catch basin, for all materials including reinforcing steel, cover & frames and for all labor, equipment, tools, and incidentals necessary to complete the item. The cost for salvaging and delivering gratings to the location as specified on the Plans shall be included in the unit price bid for the item.

7/9/02

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

710508 - CONVERTING EXISTING MANHOLE TO DRAINAGE INLET

Description:

This work consists of furnishing all materials, and constructing a drainage inlet from an existing manhole in accordance with the locations, notes and details shown on the Plans, these specifications, and as directed by the Engineer.

Materials and Construction Methods:

Materials and construction methods shall conform to the applicable requirements of Section 708 of the Standard Specifications, and as specified on the Plans.

Portland Cement Concrete shall meet the requirements of Class A, Section 812 of the Standard Specifications.

Method of Measurement:

The quantity of manholes converted to drainage inlets will be measured at the actual number of manholes converted to drainage inlets and accepted.

Basis of Payment:

The quantity of manholes converted to drainage inlets will be paid for at the Contract unit price per each. Price and payment will constitute full compensation for constructing the drainage inlet from the existing manhole, for all materials necessary to construct the drainage inlet cover slab, top unit, grate and frame and for all labor, equipment, tools, and incidentals necessary to complete the item. The cost for salvaging and delivering existing cover and frame to the location as specified on the Plans shall be included in the unit price bid for the item.

1/25/08

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

718501 - TRENCH DRAIN, 12" WIDE
718503 - TRENCH DRAIN, 10" WIDE
718505 - TRENCH DRAIN, 30" WIDE
718506 - TRENCH DRAIN, 20" WIDE
718510 - TRENCH DRAIN, 6" WIDE

Description:

This work consists of furnishing all materials and constructing drain at the location(s) as called for on the Plans, and shall include excavation and backfilling with required material, aggregate base course, concrete with reinforcement, installing trench frames and grates conforming to the details shown on the Plans.

Materials:

Portland Cement Concrete Class B shall conform to the requirements of Section 812 of the Standard Specifications.

Reinforcing bars and wire mesh as called for by the Contract shall conform to the respective requirements of Sections 603, and 824.

Trench drain castings shall be as manufactured by Zurn, Neenah Foundry Company (Catalog number specified on the Plan), or approved equal. All required hardware shall be of the type as recommended by the manufacturer.

Construction Methods:

The excavation shall be made to the required depth, and the subgrade for the drain shall be compacted to a firm and even surface. Aggregate shall be placed in the excavated trench, and shall be compacted to a firm and unyielding surface to the satisfaction of the Engineer. After placing the concrete and wire reinforcement, the trench frame shall be embedded as shown on the plan and as directed by the Engineer. Curing of concrete shall conform to the applicable requirements of Section 501.

Method of Measurement:

The quantity of trench drain will be measured as the actual number of linear feet (meters) of drain installed in place and accepted, measured from end to end of drain.

Basis of Payment:

The quantity of trench drain will be paid for at the Contract unit price per linear foot of specified width. Price and payment will constitute full compensation for excavation, aggregates, concrete, bar reinforcement, wire reinforcement, furnishing and installing trench frames, grate(s) and related hardware, backfilling and disposal of surplus and discarded materials, for all labor, equipment, tools and incidental to complete the work.

12/13/2017

718511 - CURB/SIDEWALK OPENING

Description:

This work consists of furnishing all materials and constructing curb/sidewalk openings at the location(s) as called for on the Plans and in accordance with the Standard Construction Details

Materials:

Portland Cement Concrete Class B shall conform to the requirements of Section 812 of the Standard Specifications.

Construction Methods:

Excavation or fill embankment shall be made to the required height and compacted to a firm and even surface. After the subbase is compacted to the satisfaction of the Engineer, the concrete forms shall be constructed. Curing of the concrete shall conform to the applicable requirements of Section 501 of the Standard Specifications.

Method of Measurement:

The quantity of curb/sidewalk openings will be measured as the actual number of installed in place and accepted.

Basis of Payment:

The quantity of curb/sidewalk openings will be paid for at the Contract unit price per each. Price and payment will constitute full compensation for excavation, concrete, rebar reinforcement, furnishing and installing trench, backfill, and for all equipment, labor, tools and incidentals necessary to complete the work.

6/13/2012

720533 - PERMANENT WOOD BARRICADE

Description:

This work consists of furnishing all materials, constructing, and erecting permanent, pressure treated wood barricades at the locations shown on the Plans, in accordance with the Standard Construction Details, and as directed by the Engineer.

Materials:

Lumber shall be yellow pine or fir, No. 1 common, Surfaced four Sides (S4S) or as shown on the Plans. Preservative oil for the preservative treatment of the wood posts shall be a waterborne preservative, chromated copper arsenate (CCA), in accordance with Section 814 of the Standard Specifications. Sign panels for the object markers shall be 18 inches by 18 inches consisting of aluminum sheet type conforming to ASTM Designation B209 (alloy 6061-T6 or 5052-H38). The minimum panel sheet thickness shall be 0.125 inches. All sign panels shall be fully reflectorized unless otherwise indicated on the Plans. Sign sheeting for the barricade rails shall be red and white wide-angle, prismatic, retroreflective sheeting. Sign sheeting for the object markers shall be red wide-angle, prismatic, retroreflective sheeting. The coefficients of retroreflection, Ra, shall not be less than the minimum values specified in Table 1 for Type IX grade, when tested in accordance with ASTM E-810.

**Table 1: Type IX Grade
Minimum Coefficient of Retroreflection
(cd/lux/m²)**

Red				White			
Observation Angle	Entrance Angle			Observation Angle	Entrance Angle		
	-4.0	30.0	45.0		-4.0	30.0	45.0
0.1	130	74	24	0.1	660	370	120
0.2	98	65	26	0.2	380	225	90
0.5	70	32	10	0.5	275	135	35
1.0	20	11	3	1.0	80	45	10

Hardware shall be of steel conforming to the requirements of ASTM A 307 and Section 601. Bolts, nuts, and washers shall be galvanized conforming to the requirements of AASHTO M 232/M 232M.

Construction Methods:

Fabrication shall be in accordance with the Standard Construction Details.

All sides, bottoms, and tops of the wood posts and rails shall be treated with a preservative treatment in accordance with subsections 618.06 and of the Standard Specifications.

Method of Measurement:

The quantity of wood barricades will be measured as the actual number of wood barricades constructed, permanently placed, and accepted.

Basis of Payment:

The quantity of wood barricades will be paid for at the Contract price per each. Price and payment will constitute full compensation for furnishing and installing all materials, including hardware, retroreflective sheeting, sheet aluminum sign panels, preservative treatment, excavation and backfilling, and for all labor, equipment, tools, and incidentals necessary to complete the work.

727519 - RELOCATE CHAIN LINK FENCE

Description:

This work consists of furnishing any required new materials and resetting the chain link fence shown on the Plans. The fence shall be reset at locations as directed by the Engineer. Footings shall conform to local building Codes and as directed by the Engineer.

Materials:

All materials lost or in any way damaged shall be replaced with new material matching the present fences. Concrete for the new post footings for the fences shall conform to Section 812, Class B, Portland Cement Concrete.

Construction Methods:

The fences shall be reset true to line and grade. The elevation of the top of the fences shall be uniform. Necessary grading to accomplish these requirements shall be performed by the Contractor as part of the Contract.

Method of Measurement:

The quantity of relocated chain link fence will be measured as the actual number of linear feet (meters) of fence relocated and accepted, measured in place along the line of the fence in the area of relocation only.

Basis of Payment:

The quantity of relocated chain link fence will be paid for at the Contract price per linear feet (meter). Price and payment will constitute full compensation for resetting the present fence, connecting to existing fence, all fittings, hardware, barbed wire, corner supports, and braces; clearing the line of the fence, grading the area to conform to the contours of the adjacent area, furnishing and placing concrete for posts and for any backfill required, furnishing and placing all materials required to make any repairs to the existing fences and in resetting the fence, and for all labor, equipment, tools, and incidentals necessary to complete the item.

1/22/2018

727522 - DECORATIVE FENCE

Description:

This work consists of furnishing all materials and erecting the aluminum decorative fence in accordance with these specifications and as shown on the Plans.

The fencing system shall be Industrial Strength Aluminum Decorative Fence as manufactured by:

1. Ameristar Fence Products, 1555 N. Mingo Rd, Tulsa, OK 74116. Echelon II Series, Majestic Style. Telephone number 1-888-333-3422. (www.ameristarfence.com)
2. Master Halco Colonial Plus, Universal. Telephone number 1-800-229-5615. (www.masterhalco.com)
3. Or approved equal approved by the Engineer.

The industrial ornamental aluminum fence system shall be 48" in height with a 3-Rail style. Post caps shall be flat. The color of the fence system shall be polyester powder coated black.

Materials:

Aluminum Extrusions: Aluminum material for fence framework (i.e., tubular pickets, rails and posts) shall conform to the requirements of ASTM B221. The aluminum extrusions for posts and rails (outer channel) shall be Alloy and Temper Designation 6005-T5. The aluminum extrusions for pickets and rail inner slide channels shall be Alloy and Temper Designation 6063-T5 or aluminum alloy having a minimum strength of 35,000 psi and pickets shall have a minimum strength 15,000 psi.

Fasteners: All screws shall be 302 stainless steel self-drilling head. All screws shall be painted to match the finish of fence.

Accessories: Aluminum castings shall be used for all post caps, brackets, finishes and other miscellaneous hardware.

Finish:

Pretreatment: A three stage non-chrome pretreatment shall be applied. The first step shall be a chemical cleaning, followed by a water rinse. The final stage shall be a dry-in-place activator which produces a uniform chemical conversion coating for superior adhesion. Screws shall be plated with zinc dichromate to ensure corrosion resistance.

Coating Fence materials shall be polyester powder coat finish with a minimum thickness of 2 mils. The color shall be black. Epoxy powder coatings, baked enamel or acrylic paint finishes are not acceptable. In addition, the screw heads shall be painted to match the color of the fence.

Tests: The cured finish shall meet the following:

- 1) Humidity resistance of 3,000 hours using ASTM D2247.
- 2) Salt spray resistance of 3,000 hours using ASTM B117.
- 3) Accelerated weathering for 1,000 hours under Method 5152 of Federal Test Method 141 shall show no adhesion loss with only a slight fading, chalking and water staining.
- 4) Outdoor weathering shall meet minimum standards of D822, D2244, and D523.
- 5) Minimum hardness of 2H using ASTM D3363.

If the Contractor selects any material that differs from the above special provision, the material shall be pre-approved by the Engineer before installation.

Construction:

- 1) During the construction of retaining wall, fence post footings shall be formed directly behind the wall as recommended by the wall manufacturer, meeting necessary structural requirements at the spacing specified on the drawings.
- 2) Set fence post plumb in concrete footing and brace at on center maximum as specified in the Contract drawings.
- 3) Insert stringer ends into pre-punched post and fasten with specified screws.
- 4) Recheck vertical and top alignment of posts, and make necessary corrections.
- 5) Fence panels shall be attached to posts with brackets supplied by the manufacturer.
- 6) When cutting/drilling rails or posts adhere to the following steps to seal the exposed surfaces:
 - a) Remove all metal shavings from cut area.
 - b) Apply custom finish paint supplied by manufacturer matching fence color to any exposed surfaces.

Method of Measurement:

The quantity of decorative fence will be measured in linear feet of decorative fence installed and accepted. Measurement will be made from center of end post to center of end post.

Basis of Payment:

The quantity of decorative fence will be paid for at the Contract unit price per linear feet. Price and payment will constitute full compensation for furnishing and installing all materials including footing, fittings and hardware and for all labor, equipment, tools and incidentals required to complete the work.

1/22/2018

727538 - RELOCATE GATE

Description:

The item shall consist of removing and resetting the gate and gate posts in accordance with the notes and at the location listed below, and/or as directed by the Engineer.

Materials:

Any material for relocate gate shall conform to the requirements of the following Section and Subsections:

Portland Cement Concrete, Class B, (812)

Construction Methods:

The Contractor shall carefully remove the gate from the existing location and reset at the location designated on the Plans, exercising every precaution to avoid and/or minimize damage to the gate. The Contractor shall safely store the gate, if necessary, until it can be reset. If, in the opinion of the Engineer, damage to the gate was caused due to the negligence of the Contractor, the Contractor shall make the repairs to the gate at his own expense to the satisfaction of the Engineer.

The gate posts shall be cleaned of any existing debris including existing foundation concrete. If in the opinion of the Engineer the existing posts are not satisfactorily cleaned, the Engineer may request that the Contractor supply new posts, at no additional cost to the project. The size, type and length shall match the existing posts. The posts shall be set plumb, true to the line and grade shown on the plans. Each gate post shall be embedded in a concrete footing with the minimum dimensions as specified in Section 727.07 - Concrete Footings.

Method of Measurement:

The quantity of Relocate Gate will be measured as the actual number of gates relocated and accepted by the Engineer.

Basis of Payment:

The quantity of Relocate Gate will be paid for at the unit price bid for Relocate Gate. The payment will constitute full compensation for all of the work necessary to remove and relocate the gate and gate posts, including, but not limited to connection to existing fence, fittings and hardware, support posts and braces, removing the existing gate and posts, cleaning the posts, supplying new posts when requested by the Engineer, removing the existing post foundations, backfill, backfilling the existing foundation hole, relocating the gate and posts, storing the gate and posts, excavation for the foundation, foundation concrete, placing the concrete, resetting the gate and posts, disposing of surplus materials, backfill, backfilling around the foundation, and for all labor, tools, equipment and incidentals necessary to complete the work.

12/13/2017

727548 - PORTABLE CHAINLINK FENCE

Description:

This item shall consist of furnishing, erecting and installing Temporary Portable Chainlink Security Fence and associated material at the required location(s) and in accordance with the notes and details on the Plans and as directed by the Engineer.

After the completion of the project, the Temporary Portable Chainlink Security Fence and associated materials shall become the property of the Contractor and shall be removed from the project site.

Materials and Construction Methods:

The Temporary Portable Chainlink Security Fence shall be used as identified on the Plans during construction as directed by the Engineer. The temporary chainlink fence shall be 6' in height and be free standing not to damage the existing paved ground.

When applicable, the Contractor shall submit the final locations of temporary fence during each stage of construction to the Engineer for approval. The Engineer shall approve the Temporary Portable Chainlink Security Fence materials including the posts, portable concrete footer, hardware and methods of securing prior to installation.

Method of Measurement:

The measurement of the item shall be made along the centerline of the Temporary Portable Chainlink Security Fence as the number of linear feet actually furnished and used as required and approved by the Engineer.

Basis of Payment:

The quantity of Temporary Portable Chainlink Security Fence measured as described above, shall be paid for at the contract unit price bid per linear foot. Price and payment shall be full compensation for furnishing, placing, maintaining, removal and disposal of the temporary fence and related accessories, furnishing all labor, materials, portable concrete footer, locking mechanisms, gates, equipment, tools and all incidentals necessary to complete the work. Temporary Portable Chainlink Fence stolen or damaged shall be replaced at the Contractor's expense.

8/30/16

727554 – RELOCATE FENCE AND GATES

Description:

This work consists of relocating the existing fence and gates, furnishing and installing new fence to match existing, relocating and removing gate posts, removing fence sections, removing vegetation, removing the treadle/trip, installing new bollards, installing new gate posts, installing new gate pin lock, excavation, backfill, backfilling, and furnishing and placing concrete foundations per local building Codes and as directed by the Engineer.

Materials and Construction Methods:

All new fence, gate, gate posts, bollards and hardware shall match the existing in every way.

Contractor shall make the removal and relocation with care so that all elements to be reused will remain in the condition it was found in prior to performing the work.

Portland Cement Concrete shall be Class B and shall conform to the requirements of Section 801 of the Standard Specifications.

All shims and materials and hardware that will be needed to make any adjustments to the fence and gate to make the assembly work properly will match the existing fence and gate in every way.

Backfill material shall be Borrow Type C and shall conform to the requirements of Section 209 of the Standard Specifications.

Method of Measurement:

This item will not be measured directly.

Basis of Payment:

This work will be paid for at the contract lump sum price bid. Price and payment shall constitute full compensation for furnishing and installing all materials, labor and incidentals required to complete the work as described above and as shown on the plans and as directed by the Engineer.

1/22/2018

737523 - PLANTINGS

The requirements of Section 737 shall be followed except as modified below:

Subsection 737.03 Trees.

Delete the paragraph and insert the following:

Trees shall have straight trunks according to their habit of growth and shall be well branched and rooted. Shade trees of standard variety shall have a single leader and shall be branched at 8 to 10' height unless otherwise directed.

Subsection 737.04 Shrubs

Delete paragraphs (a) and (b).

Subsection 737.06 Topsoil.

Delete entire paragraph.

Subsection 737.07 Peat Moss and Peat Humus.

Delete paragraphs (a) and (b).

Add the following:

(C) Composed leaf mold free of wood, metallic substances, glass or other contaminates should be used in lieu of peat moss or peat humus.

Subsection 737.08 Fertilizer.

Delete 'Fertilizer shall be formulated in tablet form weighing a minimum of 20g per tablet.'

Add the following:

Fertilizer shall be a slow-release granular application to the surface of the soil under the mulch.

Where tablets are mentioned in subsequent recommendations granular fertilizer shall be applied as per manufacturers recommendation.

Subsection 737.09 Mulch.

Delete paragraphs (b), (c) and (e).

Subsection 737.10 Stakes, Guys, and Related Materials.

Delete paragraphs (e),(f) and (h).

Subsection 737.16 Planting.

Delete paragraph (d).

Add the following:

Wire baskets shall be cut away and removed from the top half of the root ball.

Section 737.17 Plant Establishment.

Delete this subsection in its entirety and add the following:

The plant establishment period for all planting shall begin immediately after all planting and replacements (as specified under Section 737.16, Planting) are complete and acceptable to the Engineer. The plant establishment period will consist of one full growing season during which time the Contractor shall be responsible for all work necessary to keep the plants in a live and healthy condition. A growing season is defined as the period from May 1 through September 30. If the Contractor completes all planting (as specified under Planting) by May 1, the inspection will be held on or about October 1 of that year. In the event the Contractor does not complete all planting by May 1, the inspection will be held on or about October 1 of the following year. All replacement plant material determined to be necessary at the inspection must then be approved at the replacement plant source by October 15. At this time, the Engineer will direct the Contractor to replace those plants determined to be dead or unhealthy by December 1. The Contractor will notify the Engineer in writing that all replacement planting has been accomplished. The Engineer will conduct an inspection within 15 days after such notification to determine the acceptability of the replacements. If all replacements are determined satisfactory by the Engineer, the Contractor will be relieved of all further responsibility for care and replacement.

All planting areas shall be kept free of weeds and grass during the life of the Contract. The Contractor may utilize a pre- or post-emergent herbicide to control such grass and broadleaf weeds incidental to the cost of planting and be totally responsible for the proper use and placement of any such herbicide. As requested in writing by the Engineer, the Contractor shall be responsible to weed within all plant beds and within the saucer limits of individual plants, beginning 10 calendar days after the date of notification. The Contractor shall prune and apply insecticides or fungicides as required, repair or replace stakes and guy wires, tighten guy cable or wire and repair plant saucer washouts when and as specified by the Engineer.

Any plants that settle below or rise above the desired finished grades shall be reset at the proper grades. All replacements shall be plants of the same kind, size and quality as originally specified in the Contract and they shall be furnished, planted, mulched, guyed, watered, etc. as specified herein for new plant material.

If dead or unhealthy plants are discovered, they shall be removed within 10 calendar days and replaced with the next appropriate planting season.

The Contractor shall be responsible for all damage incurred to plant material, tree protection, wire or staking regardless of the cause.

The cost of the above described work shall be incidental to Section 737, Planting.

The Contractor shall water all plants as required to sustain them in a healthy condition. The Contractor shall give 24 hours written notice to the Engineer prior to each watering.

Subsection 737.18 Method of Measurement.

Delete the paragraph in its entirety and insert the following:

The quantity of planting will not be measured.

Subsection 737.19 Basis of Payment.

Delete the first two paragraphs in their entirety and insert the following:

The quantity of planting will be paid for at the Contract lump sum. Price and payment will constitute full compensation for furnishing and placing all materials, including plants, soil mixes, and mulch; for protecting plants after digging and prior to planting; for staking, excavating plant pits, pruning, wrapping, and guying; for all watering until final acceptance, for the cultural care of the plants until the completion and acceptance of all landscape work; for disposing of excess and waste materials; for replacement planting; for cleanup; for repairs

to plant material, tree protection, wire, or staking due to fire, theft, vehicular damage, or acts of vandalism; for repairs to damaged grassed, planted, or other landscaped area due to the Contractor's operations; for ensuring that topsoil meets the sieve analysis, acidity, and organic matter requirements; for applying sufficient materials to fertilizer that originally failed to meet the specified analysis; for using pre- or post-emergent herbicide to control grass and weeds; for the work outlined under Subsection 737.17; and for all labor, equipment, tools and incidentals required to complete the work.

The breakout sheet attached to the proposal shows all plant material 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 species and size listed. The lump sum price bid for item 737523 - Planting shall be the sum of the total cost for all species and sizes listed. The completed typewritten 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 the furnishing and installing of one or more of the species and/or sizes listed and the right to add or subtract from the quantity of each species and 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 deletion are made.

80% of the payment for the planting as described above may be processed if, in the opinion of the Engineer all work required, except that specified under Subsection 737.17 is satisfactorily completed. No partial payment will be made for any living plant until and unless planted in accordance with these specifications. No additional payment will be made for using plants larger than specified. The remaining 20% payment will be made after all replaced plantings have been approved.

1/23/2018

737529 - PLANTING SOIL

Description:

This work consists of furnishing and placing planting soil in all newly created planting and lawn areas where there is no existing soil which includes but is not limited to shrub beds, planters, and tree pits, lawn panels (between curb and sidewalks) and lawn areas. Planting soil, also referred to as topsoil throughout this specification, shall be a rich, friable material conforming with the requirements of these specifications. This special provision supersedes Section 732 - Topsoil.

On site material is not suitable for use as planting soil. All planting soil must be obtained from a pre-approved off-site location. Planting soil shall be placed so that the grade shown on the plans is the final grade of soil at 85% compaction. Contractor shall place soil to allow for settlement.

Materials:

Planting Soil

- A. Friable loam topsoil of uniform quality, containing less than 3 percent subsoil, and free from clods, stones and other materials retained on a 2 inch sieve. Topsoil shall be free of plants, roots, sticks, and toxic substances (i.e. residual herbicides) and other foreign materials harmful to plant growth.
- B. Topsoil shall be reasonably free of noxious perennial weeds and completely void of Johnson Grass (*Sorghum halapense*) as determined through prior inspection by an authorized representative of the Department.
- C. On site material is not suitable for use as topsoil. All topsoil must be obtained from a pre-approved off-site location.
- D. Manufactured topsoil is acceptable.
- E. Topsoil shall meet the following requirements:

1. Physical Analysis:

a. Sieve	Standard	Min. Mass (Wt.)
Designation	Alternate	% Passing
2	2 In.	100
0.2	No. 4	90
0.08	No. 10	80

Passing 0.08 in. (No. 10) and retained on 0.003 in. (No. 200) sieve	Min. %	Max. %
Sand:	40	60

Passing 0.003 in. (No. 200) sieve		
Silt:	30	40
Clay:	5	20

- b. Pore space: 35 - 50 percent
- c. Bulk density: 1.5 - 1.75 gr./cubic cm
- d. Water permeability: 2.0 - 2.75 in/hour

2. Chemical Analysis:

- a. pH between 6.0 and 6.5.
- b. Cation Exchange Capacity (CEC) 12 or greater
- c. Carbon/Nitrogen Ratio less than 33:1.
- d. Magnesium - Mg 125 - 265 lbs/acre

- e. Phosphorus - P₂O₅ 103 - 205 lbs/acre
- f. Potassium - K₂O 161 - 320 lbs/acre
- g. Calcium - Ca 861 - 1720 lbs/acre
- h. Soluble salts Not to exceed 900 ppm
- i. The following elements shall not exceed the indicated amount:
 - 1) Boron 3 lbs/acre
 - 2) Manganese 50 lbs/acre
 - 3) Potassium 450 lbs/acre
 - 4) Sodium 20 lbs/acre
- j. Toxic elements and compounds shall be below a maximum level as recommended by the approved soil testing facility for the plants being grown.

Organic Matter

Triple ground pine bark fines, between 3% and 8% of composition of finished product.

Construction Methods:

Submittals

- A. At least 30 days prior to ordering materials, submit certified tests and records for materials specified herein to the Engineer for review and approval.
- B. Product Data: For each unique source, submit the following:
 - 3. Submit the source locations of all topsoil to be used.
 - 4. Submit a list of all chemicals and herbicides applied to the topsoil for the last five years and a list of any plants grown in the topsoil.
- C. Test Reports: Submit results of analysis for the following:
 - 5. Topsoil (all planting beds and lawn areas).
 - a. Include Soil Testing Laboratory's recommendations for amendments and application rates to produce acceptable planting soil.
 - 6. Installed planting soil (as backfill amendments to planting pits).

Quality Assurance

Soil Testing Laboratory Qualifications: A public agricultural extension service agency or other testing facility capable of all testing required under these specifications and approved by the Owner's Representative. The testing laboratory for physical analysis shall have a minimum of five years of experience with the test protocols of the USDA.

Source Quality Control

- A. Submit one composite soil sample for testing, for each stock pile of topsoil to be used.
- B. Soil Sampling: Take soil samples as follows and as directed by the soil testing laboratory:
 - 7. Use stainless steel or chrome plated sampling tools.
 - 8. Use a clean plastic container to collect samples. Do not use a galvanized or metal container.
 - 9. Composite samples to be derived from ten 150 ml samples taken from random locations and mixed together.
 - 10. Composite samples to be a minimum of 500 ml.
 - 11. Air-dry composite samples prior to sealing in plastic bags.
 - 12. Label plastic bags with name and sample number that corresponds to sample information sheet.
- C. Soil Testing: The method of testing topsoil shall be in accordance with the requirements of AASHTO T 88, Modified; AASHTO T 89, Method B; AASHTO T 90, and AASHTO T 267.

- D. Do not transport topsoil to the site without the proper testing, certifications, and approval by the Engineer. Topsoil transported to the site without prior approval will not be accepted.
- E. The area or areas from which topsoil is secured shall possess such uniformity of material depth, color, texture, drainage, and other characteristics as to offer assurance that when removed in commercial quantities, the product will be homogeneous in nature and will conform to the requirements of these specifications.
- F. Delivered materials shall match the approved samples. Approval shall not constitute final acceptance. The Engineer reserves the right to reject, on or after delivery, any material that does not meet these specifications.

Examination

- A. Verify the following items are in place, and have been accepted by the Engineer: Rough grading of subgrade, landscape paving, walls, steps, planters, and other hardscape elements.
- B. Examine rough grading and subgrade prior to topsoil installation. Alert Engineer to unacceptable rough grading or subgrade or areas that may appear to be holding water or percolating insufficiently.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.
- D. Provide erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff to drainage systems and adjacent properties.

Soil Placement

Planting Soil shall be placed at a depth:

1. Of 24 inches in tree planting panels (zone between curb and sidewalk) for a length of 20 feet centered on each tree in street tree zones, which include: 1) east side of Stadium Drive; 2) south side of Shipyard Drive; 3) east and west sides of S. Madison Street (excluding tree pits); 4) east and west sides of Market Street from Sta. 105+50 to Sta. 111+00.
 2. Of 24 inches in all new parking lot islands which are planted with a tree(s);
 3. Of 36 inches in tree pits on S. Madison Street;
 4. Of 12 inches in hedgerow planting panels between sidewalk and parking lot edges/curbs
 5. Of 36 inches in Riverwalk planters adjacent to Christina River Bridge abutment and stairway;
 6. Of 36 inches in the new median on Market Street south of New Sweden Street intersection;
 7. Of 6 inches in all other disturbed unpaved areas to be planted with shrubs and feathered to the fill line.
- A. Install topsoil in 6 inch lifts and compact to 85 percent. Tamp each layer to eliminate air pockets and to control settling. Do not over compact; soil to drain properly.
 - B. The grade shown on the plans is the final grade of soil at 85% compaction. Overfill deep placements to allow for settlement.
 8. Set elevation of trees and top of backfill in tree pits 3 inches higher than surrounding grade to compensate for settling.
 - C. Grade topsoil to eliminate rough, low or soft areas, and to ensure positive drainage. Rake topsoil to a smooth, even surface.

Cleaning and Protection

- A. Upon completion of the Work, clean adjacent paved areas and remove surplus materials and debris resulting from the Work and dispose of legally off site.

- B. Use yellow caution tape to protect completed Work from erosion and compaction during installation. Treat, repair, or replace damaged areas as directed by the Owner's Representative.
- C. Maintaining the Topsoil. The contractor shall maintain the topsoil at his/her own expense until final completion and acceptance of the contract. Maintenance shall consist of preserving, protecting, replacing, and such other work as may be necessary to keep the topsoil in a satisfactory condition which shall be defined as not allowing erosion or compaction to occur.
- D. Final Cleaning. Upon completion of this section, final cleaning shall be done within the limits of the project, and shall consist of completely cleaning the project of excess material, sweeping pavements and structures of dirt and rubbish, and the removal of any unused materials which will mar the appearance of the contract or repairing any areas as determined by the Engineer as not meeting the specifications.

Method of Measurement:

The quantity of planting soil will be measured as the actual number of cubic yards of planting soil placed and accepted.

Basis of Payment:

The quantity of planting soil will be paid for at the Contract unit price per cubic yard. Price and payment will constitute full compensation for furnishing, hauling, placing, spreading and grading the topsoil, for all labor, equipment, tools, and incidentals necessary to complete the work.

1/22/2018

743552 – PEDESTRIAN CHANNELIZING BARRICADE SYSTEM

Description:

Furnish, place, relocate, and maintain a pedestrian channelizing barricade system in accordance with the requirements of the Americans with Disabilities Act (ADA), the Delaware Manual on Uniform Traffic Control Devices (DE MUTCD), these specifications, the plans and details, and as directed by the Engineer.

Materials:

Furnish a pedestrian channelizing barricade system meeting the National Cooperative Highway Research Program (NCHRP) Report 350 or the Manual for Assessing Safety Hardware (MASH) Test Level 2 certification. The approved system must have been tested as a barricade in accordance with the NCHRP 350 and/or MASH testing criteria. Submit a copy of the FHWA certification letter and associated documentation to the Engineer prior to acceptance by the Department and prior to installation of the device on the project.

- A. *Barricade Rails:*
 - 1. Manufactured from high density polyethylene (HDPE) with UV inhibitors.
 - 2. Barricade rails must accommodate a minimum of 7 3/4" (197 mm) wide retroreflective sheeting on both sides of the rails.
 - a. Use white prismatic and fluorescent orange retroreflective sheeting where the white and fluorescent orange colors are placed at 45-degree angles.
- B. *Barricade supports:*
 - 1. Manufactured from high density polyethylene (HDPE) with UV inhibitors and internally ballasted.
 - a. Use ballast material in accordance with manufacturer recommendations.

Construction Methods:

Construct the barricade with continuous delineation along the designated walkway for use as a channelization device.

- A. Assemble the barricade without hardware and in accordance with manufacturer's recommendations.
- B. Provide continuous upper and lower rails for hand or cane trailing.
 - 1. Install upper rail of barricade a minimum 36" (1 m) above the ground, measured from the ground to the top of the upper rail.
 - 2. Install lower rail of the barricade a minimum of 1 1/2" (38 mm) above the ground, measured from the ground to the bottom of the lower rail.
- C. No portion of the barrier structure or supports may extend into the walkway more than 3/4" (19 mm) further than the common plane formed by the upper and lower rails.
- D. Ensure that barricade joints are smooth and snag-resistant to accommodate safe hand trailing.
- E. Provide accommodations for attachment of audible information devices.
- F. Pedestrian channelizing barricades cannot be used as road closure barricades or provide positive protection between the temporary walkway and vehicular traffic.
- G. Remove pedestrian channelizing when it is no longer needed.
 - 1. Dispose of all materials in accordance with Subsection 106.09

Method of Measurement:

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Pedestrian channelizing barricade will be measured along the linear centerline of the barricade in units of linear feet per day (LF/DY), acceptably installed, maintained, removed and completed as specified

Basis of Payment:

Pedestrian channelizing barricade will be paid for at the contract unit price bid per linear feet per day for the item Pedestrian Channelizing Barricade. Price and payment includes full compensation for providing certification, furnishing, placing, maintaining, and relocating the barricades as required, all labor, equipment, tools, and all incidentals necessary to complete the work. Replace barricades stolen or damaged at no cost to the Department.

2/23/12

743553 – TEMPORARY PEDESTRIAN PATHWAY

Description:

Furnish, place, relocate, and maintain temporary pedestrian pathway in accordance with the requirements of the Americans with Disabilities Act, locations, notes and details in the Plans and as directed by the Engineer.

Surface Materials:

Portland Cement Concrete	Section 812
Hot-mix	Section 823
Cold-Patch	Section 815
Milled Hot-Mix Base Course	Section 821

Construction Methods:

1. Construct a temporary pedestrian pathway having a smooth, continuous hard surface using one of these materials: Portland cement concrete (PCC), hot-mix, cold patch or milled hot-mix base course.
 - A. Placement of Portland Cement Concrete in accordance with Section 500
 - B. Placement of Hot-Mix in accordance with Section 400
 - C. Placement of Milled Hot-Mix Base Course in accordance with Section 300
2. Meet the requirements of the Americans with Disabilities Act for running slope, cross slope, vertical differences and openings.
3. Remove temporary pedestrian pathway when it is no longer needed.
 - A. Dispose of all materials in accordance with Subsection 106.09

Method of Measurement:

The quantity of temporary pedestrian pathway will be measured as the number of square yards of surface area acceptably installed, maintained, removed and completed as specified.

Basis of Payment:

The quantity of temporary pedestrian pathway will be paid for at the Contract unit price per square yard acceptably installed, maintained, removed and completed as specified by the Contract. Price and payment will constitute full compensation for preparing, furnishing, placing, finishing and compacting the materials, maintaining the pathway, removal and disposal of the pathway when it is no longer needed, restoring and seeding the area to its original configuration, and for furnishing all labor, equipment, tools and incidentals required to complete the work.

Any necessary seeding will be paid under the respective item.

2/24/12

- 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 "DeIDOT" (Types 6, 8, and 10) or "DeIDOT 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 "DeIDOT 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 CONDUIT (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 Existing 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 908. 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.

Install engineer-approved expansion or expansion/deflection fittings where the conduit crosses between fixed bridge elements and bridge elements subject to movement.

Installation Of Conduit In Structure

Install conduit by embedding in concrete. Hold conduit rigidly in place while pouring concrete. Unless specifically provided otherwise, do not leave openings in the structure for subsequent conduit placement.

Install engineer-approved expansion fittings where the conduit crosses an expansion joint in the structure to allow for expansion and contraction of the conduit relative to the structure. The conduits entering and leaving the expansion fitting shall be bonded across the fitting with an accompanying bonding strap sized in accordance with the manufacturer's recommendations.

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 conduit. A weatherhead matching the diameter of the conduit shall be installed on the upper end of the conduit. A conduit 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 conduit. 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.

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For conduit installed on a structure, the linear foot payment also includes furnishing and installing anchors and hangers, expansion fittings, expansion/deflection fittings, 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.

For conduit installed in concrete barrier walls or in structural elements, payment shall be incidental to the cost of the barrier wall or appropriate structure item and shall include expansion fittings, expansion/deflection fittings, and all other requirements and incidentals listed in the body of this specification.

1/22/2018

- 746515 - INSULATED GROUND CABLE, 1/#6
- 746564 - INSULATED GROUND CABLE, 1/#4
- 746598 - INSULATED GROUND CABLE, 1/#2
- 746605 - INSULATED GROUND CABLE, 1/#10
- 746658 - INSULATED GROUND CABLE, 1/#1/0
- 746690 - INSULATED GROUND CABLE 1/#12
- 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 COPPER
- 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
- 746923 - FURNISH & INSTALL 14/5 TRAFFIC CONTROL CABLE
- 746927 - FURNISH & INSTALL 1-CONDUCTOR #3 AWG STRANDED COPPER

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 #14 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:
 - a. Wire Nuts: Ideal 74B or 76B, 3M Highland H-33, or approved equal
4. For Lighting Cable Splicing:
 - a. H-Tap, C-Tap and Butt Splice Compression Connectors in junction wells or transformer bases:
 - i. Fabricated from high strength copper alloy.
 - ii. Plated connectors fabricated from metals other than copper are prohibited.
 - iii. Use bolted type connectors for splicing bare ground conductors.
 - b. Submersible, breakaway connector kits in lighting transformer bases:
 - i. Unfused, quick disconnect inline connector kit containing:
 1. A copper pin crimpable to a conductor
 2. A receptacle having a centrally located, recessed locking socket constructed so that it is filled and retained by its housing and a disposable assembly pin.
 3. A plug housing for retention of the copper pin.
 4. A receptacle housing with disposable protective sleeve.
 - ii. Fused, quick disconnect inline connector kit containing:
 1. A pair of spring loaded copper fuse contacts suitable for gripping the specified cartridge fuse.
 2. A fuse of specified amp rating, rated 600V, 100 000 amps AIC.
 - iii. Fused, quick disconnect Y connector kit containing:

1. A pair of spring loaded copper fuse contacts suitable for gripping the specified cartridge fuse. One contact shall be crimpable on a conductor and after insertion into its proper position within the load side plug housing, be capable of being securely retained therein. The other contact shall be preassembled for retention within a Y insert body.
 2. A line side Y housing with two water seal cable ports.
 3. Two terminal lugs, each having a mounting hole.
 4. A bolt and a self-locking nut.
 5. A Y insert body with preassembled line side fuse contact and a ring tongue terminal.
 6. A load side plug housing permanently marked "Load Side".
 7. A disposable assembly pin.
 8. A fuse of specified amp rating, rated 600V, 100 000 amps AIC.
- iv. Unfused, quick disconnect Y connector kit containing:
1. A copper pin crimpable to a conductor and suitable for retention in the load side receptacle housing.
 2. A Y insert body with preassembled load side copper socket and ring tongue terminal.
 3. A line side Y housing with two water seal cable ports.
 4. Two terminal lugs, each having a mounting hole.
 5. A bolt and self-locking nut.
 6. A load side receptacle housing.
- v. Each kit contains sufficient silicone compound to lubricate metal parts and the housing for each assembly along with complete installation instructions.
- vi. All housings are made of water resistant synthetic rubber suitable for burial in the ground or exposure to sunlight.
- vii. Each housing forms a watertight seal around the cable at the point of disconnection and between the insert body and enveloping Y housing.
- viii. All copper pins, sockets, and fuse contacts have a minimum conductivity of 90 percent.
- ix. The crimpable portion is fully annealed while the rest of the device is maintained in its original state.
- x. Plastic sleeves shall be rigid, molded insulating plastic material of sufficient outside diameter to form a watertight fit with its related housing.
- xi. One contact is crimpable on a conductor and after insertion into its proper position within the load side plug housing, and is capable of being securely retained therein.
- xii. The other contact is preassembled for retention within the line side of the connector body.

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.

Lighting Cable and Single Conductor Stranded Wire:

1. H-Tap and C-tap Compression Connectors in junction wells or transformer bases:
 - a. Installed in transformer bases for "pass-through" cables; Conductors serving luminaire spliced with breakaway connector kits.
 - b. Compression type, applied by means of a compression tool.
 - c. Compression connector is wrapped in 2 layers of vinyl tape and 2 layers of rubber tape. Tape is "half-lapped" around connector.
2. Submersible, breakaway connector kits in lighting transformer bases:
 - a. Install for splices in light pole base that service the luminaire.
 - b. Install connector kits in conformance with the Manufacturer's recommendations.

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.

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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.

1/23/2018

746537 RELOCATING EXISTING LIGHT STANDARDS

Description:

This work consists of removing, storing, and installing existing light standard(s) at location(s) shown on the Plans and as directed by the Engineer.

Materials and Construction Methods:

Any material required and furnished under this item, shall be in accordance with the notes on the Plans.

The light standard shall be carefully removed from the existing location to avoid any damage. Should any damage occur to the light assembly, and in the opinion of the Engineer adequate precaution was not exercised by the Contractor during the relocation operation, the Contractor shall at his/her expense replace damaged component in kind or equivalent to the satisfaction of the Engineer.

Supply and install new anchor bolts, per the manufacturer's recommendation.

Final acceptance of the light standard shall be made only after its satisfactory operation as determined by the Engineer.

Method of Measurement:

The quantity of light standards relocated will be measured as the actual number of light standards relocated and accepted.

Basis of Payment:

The quantity of light standards relocated will be paid at the Contract for unit price per each. Price and payment will constitute full compensation for removing, storing and installing the entire light standard unit, including but not limited to, pole, luminaire, transformer base, installing new fuse, connectors, access door, hardware, etc. if required by the Engineer, labor, tools, equipment, and all incidentals to complete the work.

1/19/18

746556 - INSTALLING PULL BOX

Description:

This item consists of installing utility pull boxes furnished by a utility company at the locations shown on the Plans, or as directed by the Engineer.

Materials:

Pull boxes shall be as provided by the respective utility company.

Construction Methods:

Pull boxes shall be installed in accordance with the respective utility company's and pull box manufacturer's recommendations.

Method of Measurement:

The number of pull boxes to be paid for under this item shall be the actual number of pull boxes installed according to these Specifications, complete in place and accepted. Conduit will not be measured or paid for under this section, but will be measured with the adjoining conduit and paid for at the Contract unit price per linear foot bid for conduit.

Basis of Payment:

The number of pull boxes as determined above shall be paid for at the Contract unit price bid for the item "Installing Pull Box", complete in place, which price and payment shall constitute full compensation for excavating, installing the utility pull box (furnished by others) stone, backfill, backfilling, furnishing and placing all other materials, for any necessary fittings, ground studs and for all labor, equipment, tools and incidentals necessary to complete the work.

3/1/2018

746610 - INSTALLING CONDUIT, 4-INCH
746646 - INSTALLING CONDUIT, 8-INCH

Description:

This item consists of installing conduits provided by the utility company. Installation shall include all necessary fittings, materials, trenching, backfilling, directional boring, and equipment required to install the conduits as indicated on the Plans and/or as directed by the Engineer.

Materials and Construction Methods:

All trenching and backfilling, concrete, sand, and other incidental material or equipment needed to install conduit in the indicated ductbank configuration shall be provided.

Backfill in conduit trenches shall be compacted thoroughly as it is being placed. Pull wires shall be furnished and installed in all empty conduits.

In the case of a directional bore that more than one conduit shall be installed, the Contractor shall, at the same time as the initial installation, install one (1) or more additional conduits. The Engineer shall indicate the quantity of conduits to be installed during a build. The additional conduits may be stacked one on top of the other, side by side or in a matrix. The orientation shall be at the Contractor's discretion, but conduits shall not twist around one another or be allowed to deviate from straight line paths except in the case of a gentle bend. Conduits installed at the same time, in the same bore shall remain oriented in the same relation to one another throughout the conduit run.

Method of installation shall be applicable to the materials supplied by the utility company. All conduits shall be installed to the satisfaction of the Engineer and the utility company.

Contractor shall submit an installation plan to the Department for approval. The installation plan shall detail the method of installation and equipment being used and shall be sealed by a Professional Engineer registered in the state of Delaware.

Method of Measurement:

The length of Installed Conduit to be paid for under this item shall be the number of linear feet of installed conduit, complete in place, and accepted. Measurement will be made along the conduit.

Basis of Payment:

The number of linear feet of Installed Conduit measured as provided above shall be paid for at the contract unit price per linear foot for "Installing Conduit, 4-Inch" or "Installing Conduit, 8-Inch". The price and payment shall constitute full compensation for furnishing and installing all materials, labor, equipment, tools, and incidentals necessary to complete the item.

9/17/12

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.

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.

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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 will be supplied by the same entity that supplies the poles.

“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 1/2" diameter stainless steel bolts. Anchors shall be Concrete Fastener Systems Model DIS 12, 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 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 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 of the outer edge.

Excavation for the pole bases may not exceed the dimension of the foundation by more than 12 inches in any one direction. If a form is used in the excavation more than 18 inches 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 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.
 - 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 (d) below, or 9 feet, 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, and the two conduit sweeps in the base are included in this item.

Should excavated material be unsuitable for trench backfill, the Contractor shall furnish material meeting the requirements of Borrow, Type C from other excavations or from borrow sites within the contract limits. Payment will be made using the item under which the material was initially excavated. Hauling, placement, and compaction are incidental to the item being backfilled.

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:

No payment will be made for backfill material meeting Borrow, Type C requirements that is placed outside of the vertical plans located 18" outside of the neat line perimeter of the vertical face of the pole base foundation.

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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, 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.

9/30/15

746877 – PARKING LOT LIGHTING MODIFICATIONS

Description:

This work consists of modifications to privately-owned parking lot lighting systems as shown on the plans and as directed by the Engineer. This includes removal of existing pole foundations, construction of new foundations, and the supply and installation of conduit necessary to make a complete and operational system. Delmarva Power (DP&L) will be responsible for removal and relocation of impacted light poles and luminaires. DP&L will be responsible for any wiring modifications required to make the system complete and will make final connections at the light poles and transformers. The contractor is responsible for contacting and coordinating with DP&L. DP&L Utility Agreement Rev. 7/18/2017 is attached for contractor's reference. The agreement outlines DP&L responsibility.

Materials:

Pole foundations for relocated light poles shall meet the requirements of the pole manufacturer and shall be of a type similar to the existing foundations.

Ground rods shall be 10 feet long with a diameter of 3/4 inch at a minimum, copper clad, approved by the Underwriter's Laboratory and be supplied with approved clamps for connecting the grounding conductor to the rod.

Conduit shall be per DP&L standards and specifications.

Conduit junction wells shall be per DelDOT Standard Specifications and Special Provisions

Pavement patching and backfill shall be per DelDOT Standard Specifications and Special Provisions.

Material as necessary to match the area surrounding area per DelDOT Standard Specifications and Special Provisions.

Construction Methods:

The Contractor shall contact DP&L prior to start of construction to coordinate all light pole removals, relocations, system service disconnections and proposed conduit routing. DP&L will be responsible for removing, relocating and storing light poles and luminaires. DP&L will furnish and install all necessary cabling/wiring to make lighting system complete. DP&L will make final connections. The Contractor shall abandon any existing conduit and cable no longer needed for the lighting system. DP&L work is outlined in the attached Utility Agreement.

Excavation for the pole foundations 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 and tamped on all sides in layers not to exceed 6 inches (150 mm).

Pole foundation dimensions shall be in accordance with the pole manufacturer's recommendations. Pole foundation locations shall be approved by the Engineer. The Contractor shall contact the manufacturer of the existing light pole to determine the appropriate anchor bolt size. This will require supplying the manufacturer with existing pole information, dimensions and design criteria. Anchor bolts shall be hot dipped galvanized and meet the requirements of AAHSTO M 314. Anchor bolts shall have a minimum yield strength of 55,000 PSI. Once the manufacturer has determined the anchor bolt size, detailed drawings and design information shall be

supplied to the Engineer for approval prior to installation. Design shall be in accordance with the 2009 edition of AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals".

Junction boxes for parking lot lighting systems shall have an inscription on the cover that reads "DP&L".

The Contractor shall replace any existing parking lot lighting electrical service conduit that is disturbed by construction. Conduit shall be installed in a trench, bore or open-cut per the Construction Methods contained in the DelDOT's Standard Specifications and Special Provisions.

For conduits installed in open-cut sections, 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 that are required to restore the roadway will be included in this item. Backfill and pavement patching shall be per DelDOT Standard Specifications and Special Provisions.

To avoid impacts to existing curb and gutter, the Contractor shall hand dig around existing curb and gutter. If impacts cannot be avoided, curb and gutter shall be replaced in kind.

The Contractor is responsible for coordinating any and all disturbances to parking lot lighting electrical services with DP&L.

Contractor shall minimize the time which is required for the lights to be out of service by installing new conduit and pole foundations for the new locations prior to DP&L disconnecting the existing service connections and removing the lights. The lights shall not be out of service during nighttime hours.

Upon completion of establishing the new service connections to the lighting assemblies, Contractor shall remove the existing facilities and related materials and backfill pavement and/or soil to previous condition. Concrete pole bases shall be removed to a depth of six inches below final grade or below the proposed pavement section.

Method of Measurement:

The quantity of Parking Lot Lighting Modifications will not be measured.

Basis of Payment:

The quantity of Parking Lot Lighting Modifications will be paid for at the Contract lump sum. Price and payment will constitute full compensation for furnishing and placing all materials, including but not limited to constructing new pole foundations, removing existing pole foundations, installing new conduit, junction boxes, excavation and backfill, pavement patching, disposing of the unusable materials, coordination with DP&L; and for all labor, equipment, tools and all incidentals required to complete the work and provide for an operational system.

The breakout sheet attached to the proposal shows the items of work anticipated for this item of work. The Contractor shall fill in the unit price and the cost (unit price times the proposed quantity) for each item of work listed. The lump sum price bid for item 746877 - Parking Lot Lighting Modifications shall be the sum of the total cost for all items of work listed. The completed typewritten 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.

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The Department reserves the right to delete from the Contract one or more of the items of work listed, and the right to add or subtract from the quantity of each item of work 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.

12/13/2017

746926 – FURNISH & INSTALL ELECTRICAL UTILITY SERVICE EQUIPMENT 120/240

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 the Contract Documents. This work 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 a cabinet, wood post, or other structure.

Disconnect Switches:

Disconnect switches shall be NEMA standard KS 1-1990. The disconnect switch enclosure shall be Type 4 stainless steel, with external operating handle, enclosure cover interlock, and external switch mechanism handle with provisions for securing in both the ON and OFF positions by padlock. The switch mechanism shall be of heavy duty design with quick make, quick break type operations and visible blades.

The disconnect switch shall be fusible with integral fuse puller. Single phase disconnect switches shall have 2 poles with solid neutral and shall be rated at 240 Volts. Three phase disconnect switches 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.

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 - Electrical Utility Service Equipment shall be installed per the standard construction or applicable plan details.

Measurement and Payment:

Electrical Utility Service Equipment will be measured and paid for at the Contract unit price per each at the phasing and amperage specified. The payment will be full compensation for the disconnect switch, meter socket, meter, shunts, cover plate, ground rods, wiring, conduit risers, elbows, conduit nipples and adapters, and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

Underground conduit will be measured and paid for separately under the applicable conduit item(s).

Service lateral cable will be measured and paid for separately under the applicable cable item(s).

Contract No. T200512102.01

Utility connection coordination with the utility company will not be measured, but the cost will be incidental to other pertinent items.

Utility company energizing, connection, and disconnection costs will be the responsibility of the Department.

2/29/12

746960 - ALUMINUM LIGHTING STANDARD WITH SINGLE DAVIT ARM, LED, 30' 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 or anchor base, anchor bolts, and LED 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 2009 edition of AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals". Computations, signed and sealed by a professional engineer licensed in the State of Delaware, 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 anchor bolts are to be supplied by the Contractor. The anchor 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 AASHTO M 314, 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 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 4" x 8" (min.) handhole which after pole is set should face the roadway such that the maintainer can access it from the shoulder.

Bracket arms shall be of the davit type. The davit arm shall be designed to slip over the top of the lighting standard shaft. The luminaire end of the davit arm shall be fitted with a 2" (50 mm) NPS aluminum pipe tenon. 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.

Each lighting standard shall be provided with a permanent tag that shall be 2" x 4" and fabricated from clear, anodized 1/16" 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" 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" high with stroke width of not less than 3/16". Identifying letters and/or numerals shall be as designated on the Plans.

Transformer Base: Transformer bases, when required, shall conform to the 2009 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.

LED Luminaire:

The complete fixture shall have a heavy-duty, cast-aluminum housing, door with extruded aluminum heat sink, tool-less entry, hinged removable power tray door for easy maintenance, and have fastening hardware that is stainless steel or zinc plated steel. The fixture shall meet ANSI 136.31 3.0 G vibration requirements. Fixture shall have a two-bolt slip fitter system for mounting on a 1-1/4 inch to 2-3/8 inch mounting arm connection. A grey powder coat finish shall be applied to the fixture unless otherwise shown on the plans, or as directed by the engineer.

The fixture shall also meet the following criteria:

1. Lamps: LED
2. Wattage:
 - a. For 250W HPS Equivalent: 175 Watt Maximum
 - b. For 400W HPS Equivalent: 250 Watt Maximum
3. Voltage: 120V – 277V
4. CRI: 70 Minimum
5. Lumens:
 - a. For 250W HPS Equivalent: 16,000 to 20,000
 - b. For 400W HPS Equivalent: 27,000 to 31,000
6. Rated L70 Lamp Life: 100,000 Hours Minimum when operated at 25 Degrees C (77 Degrees F)
7. Distribution: Type II or Type III (unless otherwise indicated)
8. Color Temperature: 3,000 K - 4,500 K
9. Drive Current: 850mA Maximum

10. Driver: 0-10V Dimming
11. IP66 Rating for optical portion of the housing
12. 10kV/10kA minimum internal surge suppression module, meeting UL 1449/ANSI C62.41.2 Category C
13. 3 Pin NEMA Photocontrol Receptacle with a Shorting Cap.

Luminaire mounting height shall be as indicated on drawings.

Luminaire shall provide point illumination of not less than the given values in the table below.

Point 1 coordinates are 90 feet longitudinal distance. Point 2 coordinates are 90 feet longitudinal and 30 feet transverse. The point values given in the table are based on a 30-foot mounting height with a Light

Loss Factor of 1. The point values produced by the submitted fixture shall be included with the fixture submittal.

Foot-candle Point Table	
Point 1	Point 2
0.28	0.39

Metal Parts shall be free of burrs and sharp corners and edges. Doors, frames, and other internal access shall be smooth operating and free of light leakage under operating conditions.

Factory applied labels shall comply with UL 1598. Labels shall be located where they will be readily visible to service personnel, but not seen from normal viewing angles when lamps are in place. Labels shall include the following lamp characteristics:

1. 1.CCT and CRI for all luminaires

Luminaire finish shall be manufacturers standard paint applied to factory-assembled and tested luminaire before shipping.

The following installation requirements shall be followed:

1. Comply with NECA 1.
2. Fasten luminaire to pole.
3. Install luminaires at height indicated on drawings and level and square with finished grade.
4. Perform an illumination test.

After installation of luminaires and control devices and after electrical circuitry has been energized, test units to confirm proper operation.

Inspect each installed luminaire for damage. Replace damaged luminaires and components.

Luminaires will be considered defective if they do not pass tests and inspections.

Contractor shall provide fixture cut sheets, details, and the IESNA LM-79 and LM-80 test reports to the engineer for shop drawing review before purchasing.

Provide documentation that demonstrates that the proposed model of LED luminaire has been tested for electromagnetic compliance following the measurement protocols specified in ANSI standard C63.4-2003, and required by 47 CFR 15.31.

If Contract Documents require each light fixture to be provided with an independent photoelectric control device, a photocell shall be provided with each lighting fixture in place of the shorting cap. Provide photoelectric control using solid state circuitry, cadmium sulfide type with hermetically sealed silicone rectifier rated 120volt, 60 cycle AC and 1000 watts maximum load. Photoelectric control shall be provided with "Fail On" functionality such that in the event of a photocell becoming inoperative, the light fixture will remain in a permanent "On" state through day and nighttime hours. Photo control shall be twist lock type, with suitable mounting bracket with locking type receptacle.

The photoelectric control shall be set to operate, by default factory setting or by field adjustment, using the following criteria:

- Turn on the light fixture at a minimum vertical illumination value of 3 foot-candles.
- Turn off the light fixture at a maximum vertical illumination value of 6 foot-candles.

All electrical Materials shall conform to the requirements of the National Electrical Code of the National Fire Protection Association, and to all local and state laws and/or ordinances governing such installations.

Provide a warranty for the luminaire to be free from defects and operate as indicated for a period of 5 years from the date of delivery.

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 or 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 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 labor, equipment, hardware, anchor bolts, washers, shims and nuts for the foundations, supply and installation of the transformer base or anchor base, supply and installation of poles and davit arm(s), and supply and installation of the LED 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.

746961 - DECORATIVE LIGHT STANDARD AND FIXTURE, LED, SINGLE
746962 - DECORATIVE LIGHT STANDARD AND FIXTURE, LED, DOUBLE

Description:

This work consists of furnishing and installing street lighting fixtures as detailed and at locations shown on the Plans.

Materials:

General.

1. All luminaires shall embody the highest standards of electrical and mechanical design, materials and workmanship, and shall be subject in all respects to the approval of the Engineer.
2. All luminaires shall be installed complete with lamps by the manufacturer specified or an equal approved by the engineer.
3. Manufacturers' packaging shall be marked to include identification by type, quantity of contents, and manufacturer's component designation.
4. Lighting standards shall meet or exceed the requirements of the 2009 edition of AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals".
5. All electrical Materials shall conform to the requirements of the National Electrical Code of the National Fire Protection Association, and to all local and state laws and ordinances governing such installations.

Warranty.

1. Provide manufacturer's standard form in which manufacture agrees to repair or replace luminaires or components of luminaires and lamps that fail in materials or workmanship, corrode, fade, stain, or chalk due to the effects of weather or solar radiation within specified warranty period.
2. Warranty period for luminaires: Minimum five years from date of Substantial Completion.
3. Warranty period for lamps: Replace lamps and fuses that fail within 12 months from the date of Substantial Completion; furnish replacement lamps and fuses that fail within the second 12 months from date of Substantial Completion.

Fabrication.

1. Fit and shop assemble components in largest practical sizes for delivery to site.
2. Fabricate components with joints tightly fitted and secured.
3. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with the design of component, except where specifically noted otherwise.
4. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

5. Continuously seal joined pieces by continuous welds.
6. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

City of Wilmington Luminaire.

1. The luminaire shall be a prismatic glass refractor globe with IES Type III, powered from a nominal 240 Volt, 60-Hertz source, and with NEMA twist lock photocell receptacle.
2. The fixture shall meet the following criteria:
 - a. Lamps: LED
 - b. Voltage: Auto-Sensing Voltage (120V – 277V)
 - c. CRI: 70 Minimum
 - d. Rated L70 Lamp Life: 100,000 Hours Minimum when operated at 25 degrees C (77 degrees F)
 - e. Lamp Lumen Depreciation: 0.92 maximum at 50k hours (derived from LM-80 and LM-21 reports)
 - f. Color Temperature: 4,000 K
 - g. Driver: 0-10V Dimming
 - h. IP66 Rating for optical portion of the housing
 - i. IP55 Rating for the housing
 - j. 10kV/10kA minimum internal surge suppression module, meeting UL 1449/ANSI C62.41.2 Category C
 - k. Wattage and Distribution as specified on the plans
 - i. 60 Watt LED
 1. IES Type III – Initial Delivered Lumens: 7,200 minimum
 2. IES Type V – Initial Delivered Lumens: 6,700 minimum
 - ii. 100 Watt LED
 1. IES Type III – Initial Delivered Lumens: 10,700 minimum
 2. IES Type V – Initial Delivered Lumens: 9,900 minimum
3. Contractor shall provide cut sheets, details, and the IESNA LM-79, LM-80 and TM-21 reports for respective LED light source.
4. The optical assembly shall be a precisely molded thermal resistant borosilicate glass reflector and refractor. The upper portion of this system shall include a series of reflecting prisms that redirects over 50% of the upward light into the controlling refractor. The lower portion shall use precisely molded refracting prisms to control the distribution of light to maximize utilization, uniformity, and luminaire spacing. The top of the assembly shall consist of a prismatic glass cover with decorative finial.
5. The housing shall be cast aluminum. The housing / door shall be removable without the use of tools and be retained by an insulated line attached to the door and to the housing. The housing shall contain an acrylic “window” to allow light to reach the photocell. The housing shall contain a slip-fitter capable of accepting a 3 inch O.D. tenon.
6. A custom kit with black trim ribs, bands with a panel and “W” medallion shall also be installed. The photocell shall line-up vertically with the "W" and shall face the traveled roadway.
7. Provide a NEMA label on the outside of the luminaire housing.

8. All electrical components shall be UL recognized and the fixture shall carry a UL label suitable for wet locations.
9. Electrical components shall be mounted on a steel plate that is removable with minimal use of tools. Provide a five conductor plug to connect to the receptacle in the luminaire housing to complete the wiring.
10. The luminaire shall withstand for an unlimited duration stresses caused by peak vibration acceleration of 1g. An adequate Vibration Test Report shall be submitted for approval.
11. Ensure the nominal operating levels turn on photocontrol at a minimum vertical illumination value of 3 foot-candles and turn off at a maximum vertical illumination value of 6 foot-candles.

Decorative Post and Base.

1. The lighting post shall be all aluminum, one-piece construction, with a 12-flute base design. The shaft shall be 5" diameter, straight, fluted, with a tenon for luminaire mounting.
2. The post height and base diameter shall be as specified on the plans. The fluted shaft shall be 5 inches in diameter. At the top of the post, an integral 3 inch O.D. tenon with a transitional donut shall be provided for luminaire mounting.
3. The post assembly shall be shipped with a black powder coat finish.
4. The decorative base shall be heavy-wall, cast aluminum (ASTM 356.1) formed true to pattern with complete detail. The shaft material shall be fluted aluminum extrusion (6061-T6). A grounding screw shall be provided inside the base, opposite the door.
5. The shaft shall be double welded to the base casting and shipped as one piece for maximum structural integrity. The shaft shall be circumferentially welded inside the base casting at the top of the access door, and externally where the shaft exits the base. All exposed welds below 8 feet shall be ground smooth.
6. All hardware shall be tamper resistant stainless steel.
7. The post shall be provided with four hot-dip galvanized anchor bolts to be installed on an 11" diameter bolt circle. A door shall be located in the base for anchorage and wiring access.

Crossarm.

1. For double configurations, provide cross-arm as shown on the plans with 36" spread.
2. Crossarms shall be one-piece construction, heavy wall, cast aluminum (ASTM 356.1).
3. All hardware shall be stainless steel. All exterior hardware shall be tamper resistant.
4. Cross arms shall have 3 inch O.D. tenons for luminaire mounting.

Construction:

1. Luminaires shall be installed complete with all equipment, materials, parts, attachments, devices, hardware, cables, and supports necessary to make a safe, complete and fully operative installation.

Manufacturer of each luminaire shall supply complete installation instructions including diagrams, illustrations, etc. The Contractor shall install in strict conformance with such instructions.

2. Each pole and luminaire shall be installed at location shown on the plans. Where field conditions require deviation from location shown, the Engineer shall be so notified by the Contractor and final installation made as directed by the Engineer.
3. Install in accordance with manufacturer's shop drawings.
4. Crossarms shall slip-fit a post-top tenon and attach with socket set screws.
5. Thoroughly clean any dirt and residue from luminaires prior to installation.
6. Install components plumb and level, accurately fitted, free from distortion or defects.
7. Attach appropriate grounding straps where specified on drawings to form a continuous grounding circuit where required.
8. Touch-up welds with primer. Grind welds smooth.
9. Conceal bolts and screws whenever possible.
10. Maximum allowable offset from true alignment: 1/4 inch.
11. Protect poles and luminaires from damage and defacement until acceptance by Owner. Replace any damaged or defaced fixtures with new units prior to acceptance at no additional cost to the Owner.

Method of Measurement:

The quantity of decorative light standards and fixtures will be measured as the actual number of decorative light standards and fixtures of each type provided and installed in accordance with these plans, specifications, complete, in place and accepted by the Engineer.

Basis of Payment:

The quantity of decorative light standards and fixtures will be paid at the Contract unit price per each decorative light standard and fixture. Price and payment will constitute full compensation for furnishing all materials, labor, materials, tools, equipment and incidentals to complete the work.

1/19/18

747508 - LIGHTING CONTROL CENTER - 100 A
747509 - LIGHTING CONTROL CENTER - 200A

Description:

This work consists of providing and installing load center cabinets with all necessary conduits, underground facilities, equipment, wiring, supports, and concrete pad as indicated on the Plans or as directed by the Engineer. This work includes coordination with the local Utility Company.

Coordination of Electrical Work. Use experienced personnel in the type of work required by the Contract Documents to provide a complete and satisfactory fitting and fully operational installation. Perform all electrical work either by, or under the immediate supervision of an electrical journeyman. Meet NEC, NESC, local utility company requirements, and State and local laws and ordinances governing the work.

Catalog Cuts. Submit catalog cuts and shop drawings for approval.

Materials:

General. Use new materials, equipment and installations, UL listed or labeled, and meet NEC, NESC, NEMA, IES, and local codes and ordinances applicable to the installation.

Steel Posts. Square Steel Tube Posts, A570 Grade 50. Minimum 12 gauge with 7/16" die punched circular holes or perforated knock-outs.

Mounting Panels. Aluminum, minimum 0.08" thickness.

Bolts. Stainless steel bolts, flat washers, and nylon lock nuts.

Concrete. Portland Cement Concrete, Class B.

Conduits. Galvanized steel conduits and fittings shall be as specified under Section 745 of the Standard Specifications.

Service conduit. Provide 2" rigid galvanized steel conduit from the lighting control center to nearest utility facility as indicated on plan or directed by the Engineer. Conduit will include mounting to utility pole. Installation is to meet utility company requirements.

Wiring. Wiring internal to the cabinet shall be 600 V, copper, plastic insulated, nylon jacketed and shall meet UL Type THWN/THHN and bear the applicable UL labels denoting type, size, stranding, manufacturer's name and surface marking or molded ridges for phase and neutral identification. Ground wire shall be solid, bare copper. Sizes shall be as specified on the plans.

Ground Rod. Ground Rod shall be sectional, copper-clad 3/4" DIA by 10 feet long. Provide approved clamps for connecting the ground conductor to the ground rod. Provide #6 AWG bare stranded copper ground wire to connect to ground rod(s).

Enclosures. Enclosures shall meet the NEMA type specified and be dead front type weatherproof metal enclosed self-supporting structures, as specified. Free standing enclosures shall be fabricated from sheet aluminum and be as specified herein. Panel and control equipment cabinets shall be the manufacturer's standard enclosure for the type and application specified. They shall have door clamps, solid neoprene gaskets, welded seams, stainless steel

external hardware, and continuous hinges with stainless steel pins. Enclosures shall have two weep holes in the bottom and shall be equipped for padlocking.

Circuit Breakers. Circuit breakers shall be molded case type having a minimum rating of 22,000 amp interrupting capacity (AIC) and be quick make, quick break, thermal magnetic, trip indicating, and have common trip on all multiple breakers with internal tie mechanism. Use of single pole breakers with handle ties is prohibited. Breakers shall conform to Federal Specification W-C-375. They shall have the current and voltage ratings and number of poles as specified in the Contract Documents, and shall be treated to resist fungus and be ambiently compensated for the enclosure and proximity to adjacent breakers. All circuit breakers shall be the bolt in type. Breakers shall be capable of accepting up to a #2AWG conductor. Provide spare circuit breakers where indicated on the plans.

Disconnect Switch. Disconnect switch shall be NEMA standard KS 1-1990. The disconnect switch enclosure shall be Type 4 stainless steel, with external operating handle, enclosure cover interlock, and external switch mechanism handle with provisions for securing in both the ON and OFF positions by padlock. The switch mechanism shall be of heavy duty design with quick make, quick break type operations and visible blades. The disconnect switch shall be fusible with integral fuse puller. Single phase disconnect switches shall have 2 poles with solid neutral and shall be rated at 240 Volts. The design of the neutral bar may be factory or field installable.

Panel Boards. Federal Specification W-P-115 and shall be suitable for operation on the voltage and type service specified. They shall be UL listed and labeled. Panel boards shall be equipped with the number and size circuit breakers specified. Circuit breakers in panel boards shall meet Federal Specification W-C-375 and shall be bolted to copper busses. Buss ratings shall be as specified.

Photoelectric Controls. Photocell control shall be integral to each installed luminaire.

Power Distribution and Terminal Blocks. Sized per NEC and wire size required by the project plans.

Construction Methods:

Service conduit shall be installed in accordance with DelDOT standard specification and utility company requirements. Extend the service conduit 10 ft. up the utility pole. Coil sufficient slack cable at the top of the conduit for the utility company to run wire to the top of pole and make connections.

Set concrete footings for square tube steel posts. Install 12"x12"x36" footing with 3"x3"x7/16" square tube anchor base. Install square tube anchor so that at least 1'-6" is in the concrete footing and +/-1" sticks out (enough for one full hole to be above grade). Maintain 3" clearance on the base of footing.

Backfill around the conduit and concrete footings and dispose of excess or unsuitable materials to grade of the bottom of concrete footings. Backfill may be placed after the first twenty-four (24) hours and is to be accomplished in six (6) inch (150 mm) layers, and each lift mechanically tamped. All excess material is to be removed and used elsewhere on the project as approved by the Engineer.

Set square tube steel posts. Finished length of the Tubular Steel Posts shall be determined by adding the total height of the disconnect and lighting control cabinet to 5 Ft.

Attach pedestal board to square tube steel posts using long grade bolts, nylon lock nuts and flat washers.

Install ground rods as specified. Measure the ground resistance as indicated in Item 746653 – Electrical Testing.

Electrical equipment shall be installed as indicated on the plans. Mount components to the back panel with manufacturer supplied mounting brackets or permanently attached screw studs.

Neatly arrange all wiring, firmly lace or bundle it, and mechanically secure the wiring without the use of adhesive fasteners. Route and secure all wiring and cabling to avoid sharp edges and to avoid conflicts with other equipment or cabling.

Install wiring identification tags that indicate the circuit number for each lighting circuit. Each tag shall be marked with minimum ¼ inch letters using lettering dies, engraving devices, or other permanent marking process approved by the Engineer.

Method of Measurement:

The quantity of load centers will be measured as the actual number of load centers, each consisting of the cabinets, all equipment, conduit and wiring, complete in place, operational and accepted.

Basis of Payment:

The quantity of load centers will be paid for at the Contract unit price per each. Price and payment will constitute full compensation for furnishing all materials, excavation and backfilling for the footings, excavation and backfilling for service conduit and for all labor, equipment, tools and incidentals necessary to complete the item.

Underground conduit will be measured and paid for separately under the applicable conduit item(s).

Service lateral cable will be measured and paid for separately under the applicable cable item(s).

Utility connection coordination with the utility company will not be measured, but the cost will be incidental to other pertinent items.

1/22/2018

747513 - LIGHTING CONTROL AND DISTRIBUTION ENCLOSURE (120/240 100 AMP)

Description:

This work consists of furnishing all materials and installing light panels, control and distribution equipment for any highway lighting system.

Coordination of Electrical Work. Use experienced personnel in the type of work required by the Contract Documents to provide a complete and satisfactory fitting and fully operational installation. Perform all electrical work either by, or under the immediate supervision of an electrical journeyman. Meet NEC, NESC, local utility company requirements, and State and local laws and ordinances governing the work.

Catalog Cuts. Submit catalog cuts and shop drawings for approval.

Materials:

General. Use new materials, equipment and installations, UL listed or labeled, and meet NEC, NESC, NEMA, IES, and local codes and ordinances applicable to the installation.

Enclosures. Enclosures shall be dead front type weatherproof metal enclosed self-supporting structures. Free standing enclosures shall be fabricated from sheet aluminum. Enclosures shall conform to the NEMA 3R. They shall have door clamps, solid neoprene gaskets, welded seams, stainless steel external hardware and continuous hinges with stainless steel pins. Enclosures shall have two weep holes in the bottom and shall be equipped for padlocking.

For ventilation, all cabinets shall be provided with louvered vents in the front door with a removable air filter.

- (a) Louvers shall satisfy the NEMA Rod Entry Test for 3R rated ventilated enclosure.
- (b) Filters for all cabinets shall be 16 in. (400mm) long, 12 in. (300mm) wide, and 1 in. (25mm) thick. The filter shall cover the vents and be held firmly in place with top and bottom brackets and a spring loaded upper clamp.
- (c) Exhaust air shall be vented out of the cabinet between the top of the cabinet and the main access door. The exhaust area shall be screened with a screen type material having a maximum hole diameter of 1/8 in. (3.125mm)

Circuit Breakers. Circuit breakers shall be molded case type having a minimum rating of 22,000 amp interrupting capacity (AIC) and be quick make, quick break, thermal magnetic, trip indicating, and have common trip on all multiple breakers with internal tie mechanism. Use of single pole breakers with handle ties is prohibited. Breakers shall conform to Federal Specification W-C-375. They shall have the current and voltage ratings and number of poles as specified in the Contract Documents, and shall be treated to resist fungus and be ambiently compensated for the enclosure and proximity to adjacent breakers. All circuit breakers shall be the bolt in type. Breakers shall be capable of accepting up to a #2AWG conductor. Provide a minimum of 2 spare circuit breakers.

Photoelectric Controls. Photoelectric controls shall be solid state, cadmium sulfide type with hermetically sealed silicone rectifier rated 120/240 or 277 volts, 60 cycle AC and 1000 watts maximum load. Built in surge protection shall be provided, and a failsafe operating feature shall be included so that the lighting circuits will remain energized in the event the photo control components become inoperative. Nominal operating levels of this control shall turn on at a minimum vertical illumination value of 3 FC (32 lux) and turn off at a maximum vertical illumination value of 6 FC (65 lux). These limitations shall

be set by the manufacturer, and tolerances of plus or minus 20 percent for the specified value will be acceptable. Photoelectric controls for luminaires and lighting controls shall be twist lock type. A suitable mounting bracket with locking type receptacle and all other necessary mounting hardware shall be furnished.

Contactors and Relays. Contactors of the current ratings and number of poles specified in the Contract Documents shall be held by permanent magnets. They shall be fully rated for all classes of load to 600 volts AC and shall have an interrupting rating of 600 percent of rated current. A HAND-OFF-AUTOMATIC selector switch shall be provided in the photoelectric cell circuit. Relays shall be the type, size and contact ratings as specified in the Contract Documents.

Panel Boards. Panel boards shall conform to Federal Specification W-P-115 and shall be suitable for operation on the voltage and type service specified in the Contract Documents. They shall be listed and labeled by the Underwriters' Laboratories, Inc. Panel boards shall be equipped with the number and size circuit breakers specified. Circuit breakers in panel boards shall conform to Federal Specification W-C-375 and shall be bolted to copper busses. Buss ratings shall be as specified. Panel shall be provided with modular Transient Voltage Surge Suppressors. (TVSS).

Lightning Arresters. Lightning arresters shall be secondary type, having the specified number of poles and 0-650 volts RMS. Arresters shall be provided with suitable mounting brackets and all other necessary mounting hardware.

Control Power Transformers. Control power transformers shall be the dry type, two windings, of the size and voltage ratings specified in the Contract Documents.

Thermostats and Fans. A thermostatically controlled cooling fan shall be provided for all cabinets. The fan and thermostat shall be rated for 125 percent of capacity and they shall be mounted at the top of the cabinet.

- (a) Thermostats shall be the inline type, single pole, 120 volts, 10 amps with a minimum range of 70F to 160F.
- (b) The fan shall have a minimum rated capacity of 100 CFM air flow and a minimum rated design life of 100,000 hours.

Identification Tags. Nylon, self-clinching type, non-conductive band with adequate sized tab for labeling.

Wiring. Wiring internal to the cabinet shall be 600 V, copper, plastic insulated, nylon jacketed and shall meet UL Type THWN/THHN and bear the applicable UL labels denoting type, size, stranding, manufacturer's name and surface marking or molded ridges for phase and neutral identification. Sizes shall be as specified.

Construction Methods:

Type M and Type R Cabinets. Furnish and install all equipment necessary to provide a complete functioning lighting cabinet as specified. Mount cabinets on concrete base. Place a bead of sealant under the cabinet on three sides. Do not seal side with the lowest elevation to provide drainage from within the cabinet. Coat bolts with anti-seize compound. Bolt cabinet to base. Place a bead of sealant on the outside of the cabinet on the same three sides as before. Install photoelectrical control on the side of back of the lighting control cabinet using and LB conduit fitting. After installing the photoelectrical control and LB conduit fitting, seal the area around the hole in the cabinet so that water cannot enter the cabinet.

Mount components to the back panel with manufacturer supplied mounting brackets or permanently attached screw studs.

Neatly arrange all wiring, firmly lace or bundle it, and mechanically secure the wiring without the use of adhesive fasteners. Route and secure all wiring and cabling to avoid sharp edges and to avoid conflicts with other equipment or cabling.

Install wiring identification tags that indicate the circuit number for each lighting circuit. Each tag shall be marked with minimum ¼ inch letters using lettering dies, engraving devices, or other permanent marking process approved by the Engineer.

Seal all unused conduits install in cabinets at both ends to prevent water and dirt from entering the conduit and cabinet with approved sealing material.

Method of Measurement:

The number of Lighting Control and Distribution Enclosures to be measured per each under these items shall be the actual number in accordance with these special provisions complete in place and accepted.

Basis of Payment:

The number of Lighting Control and Distribution Enclosure as determined above, shall be paid for at the contract unit price bid for each item "Lighting Control and Distribution Enclosure 120/ 240 Volts" installed in accordance with the requirements contained herein, complete in place and accepted, which price and payment shall constitute full compensation for furnishing all materials, including panels, control devices concrete pad foundation and for all labor and equipment necessary for the installation of the electrical equipment specified.

12/13/2017

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
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 collar 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.

10/9/2012

- 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% TiO₂ (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 ± 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 ± 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 $73^{\circ} \pm 5^{\circ} \text{F}$. ($23^{\circ} \pm 3^{\circ} \text{C}$).

- a. Color. The white epoxy composition when applied at a minimum wet film thickness of 20 ± 1 mils ($500 \mu\text{m}$) 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 ± 1 mils ($500 \mu\text{m}$) 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 ± 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 ± 1 mils (500 or 625 μm) 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 polytetrafluorethylene (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 $75^{\circ} \pm 5^{\circ}\text{F}$ ($24^{\circ} \pm 3^{\circ}\text{C}$).

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 $1" \pm 0.002"$ (25 mm \pm 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.

<u>M247 AASHTO Type 1 Glass Spheres</u>		
<u>U.S. Standard Sieve</u>	<u>% Retained</u>	<u>% Passing</u>
#20 (850 μm)	0	100
#30 (600 μm)	5-25	75-95
#50 (300 μm)	40-65	15-35
#100 (150 μm)	15-35	0-5
Pan	0-5	

<u>Type 4 Large Spheres</u>		
<u>U.S. Standard Sieve</u>	<u>% Retained</u>	<u>% Passing</u>
#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:

<u>Composition:</u>	<u>Component</u>	<u>Percent By Weight</u>
	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:

<u>Sieve Size</u>	<u>Percent Retained</u>
#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.

<u>Hardness:</u>	The black aggregate hardness shall be 6.5-7 on Moh's Mineral Scale.
<u>Porosity:</u>	The black aggregate porosity shall be less than two (2) percent.
<u>Moisture Content:</u>	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° (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

Contract No. T200512102.01

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 50°F (10°C) 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 ft² (9.3 m²) and the AASHTO at 3 lb.(1.4 kg) per 100 ft² (9.3 m²). In combination, the total glass bead coverage shall be 7-8 lb. (3.2-3.6 kg) per 100 ft² (9.3 m²). 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-applied 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 70°F and 80°F (21°C and 27°C) 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 50°F 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 50°F±2 degrees (10°C) for a minimum of four hours. At least two specimens tested must meet the flexibility requirements at 50°F (10°C) 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±3°F) (23°C) in accordance to ASTM Standard Test

Method for Bond Strength of thermoplastic marking Material D4796-88. Place a coarse brick in a 400°F (204°C) oven for 5 minutes. Prepare a 4 square inch test specimen. Place the test specimen on the brick and further heat in the 400°F (204°C) 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 $\pm 3^\circ\text{F}$ ($-9.4\pm 2^\circ\text{C}$) 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 $73.4\pm 3^\circ\text{F}$ (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 Symbol shall be 3' x 6' and accompanying 2' x 6' Arrow Symbol.

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.

6/2/16

749516 – REINFORCED CONCRETE SIGN FOUNDATION, W-6
749517 – REINFORCED CONCRETE SIGN FOUNDATION, W-8
749518 – REINFORCED CONCRETE SIGN FOUNDATION, W-10
749519 – REINFORCED CONCRETE SIGN FOUNDATION, W-12
749520 – REINFORCED CONCRETE SIGN FOUNDATION, W-14

Description:

This work consists of furnishing all material and installing sign foundations.

Materials:

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.

Anchors shall be fabricated from 304 Stainless Steel for the threaded ferrule portion, and 1058 steel rod and coil for cage portion of anchor.

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 M232/M 232M.

Construction Methods:

The bases shall conform to the dimensions and details as indicated on the Plans.

Excavation for the foundation may not exceed the dimension of the foundation by more than 1 foot (300 mm) in any one direction. If a form is used in the excavation more than 18 inches (460 mm) below the ground surface, it is necessary that the excavation be filled and tamped on all sides in layers not to exceed 6 inches (150 mm).

The excavated material shall be disposed of and the area shall be properly graded. After grading, the area shall be returned to its original condition around the supports with mulching, seeding or other landscaping as necessary or as directed by the Engineer. 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 sign foundations will be measured as the number of foundations for the specified size of beam constructed in accordance with these specifications, complete in place, and accepted.

Basis of Payment:

The quantity of sign foundations will be paid for at the contract unit price per each foundation of the type specified. Price and payment will constitute full compensation for all materials and sign foundation installation complete in place and for all labor, equipment, tools, and incidentals required to complete the work. Payment will also include returning the area around the sign post to its original conditions by mulch, seeding or other landscaping necessary.

10/27/2009

749550 - INSTALLATION OF BREAKAWAY I-BEAM SIGN POSTS
749551 -REMOVAL OF BREAKAWAY I-BEAM SIGN POSTS

Description:

This work consists of installing or removing breakaway I-beam sign posts and breakaway assemblies on sign bases previously installed or installed under other items in this contract.

Materials:

Steel I-beams and all mounting hardware to be used will be paid for under other items of this contract or may be furnished by the Department. The supply of the material will be designated in the job order. All I-beams will be cut to the correct length and marked for the area they are to be installed.

Construction Methods:

The I-beams are to be installed in a manner as not to damage the base that the I-beam is to be installed on and care taken to not interfere with overhead utility lines.

When re-installing an existing sign post and breakaway assemblies, removal of broken couplings and bolts in existing I-beams and removal of broken anchor bolts in existing bases shall be considered part of this item.

Where an existing sign has been knocked down, this item will pay for the repair of breakaway couplings and standing up the existing sign. No additional compensation will be made for removal or installation of sign unless a new sign is required.

In the removal of the I-beams, all hardware is to be returned to the Department at the Dover Sign Shop.

Method of Measurement:

The quantity of installation or removal of breakaway posts and breakaway assemblies will be measured as the number of breakaway posts and breakaway assemblies installed as specified, complete and in place, or removed and returned to the Department at the Dover Sign Shop.

Basis of Payment:

The quantity of installation or removal of breakaway posts and breakaway assemblies will be paid for at the contract unit price per each. Price and payment will constitute full compensations for all labor, equipment, tools, and incidentals required to complete the work.

10/26/05

749552– INSTALLATION OF SIGN ON OVER HIGHWAY STRUCTURE
749553- REMOVAL OF SIGN ON OVER HIGHWAY STRUCTURE
795544– INSTALLATION OF SIGN ON SPAN WIRE OR MAST ARM
749555 - REMOVAL OF SIGN ON SPAN WIRE OR MAST ARM
749556 – INSTALLATION OF SIGN ON GROUND MOUNT POSTS
749557 - REMOVAL OF SIGN ON GROUND MOUNT POSTS

Description:

This item consists of installing or removing a sign on ground mount posts, an over highway structure, span wire, or mast arm. The sign may be mounted to existing supports or ones installed under this contract.

Materials:

All materials shall be either supplied by the Contractor or by the Department as indicated in the job order.

There are no materials required for the removal of overhead signs. All existing materials under this section will be returned to the Department.

Construction Methods:

Sign installation shall be performed as specified by the Engineer. Care shall be taken to prevent any damage to the sign panel, over highway structure, roadside I-beam and wood posts, span wire, mast arm, or any electrical cable attached to the above structures, or any lights attached to the sign panel.

Sign installation on over-highway structures or roadside I-beam and wood posts may require the sign to be assembled in panels. The sign may be made from several panels to make one complete sign. Signs on roadside I-beam and wood posts shall be installed at a height of 7 feet (2.1 m) from the bottom of the sign to the near edge of the pavement.

It is not anticipated that there will be any sign panels that 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 the approval of the Engineer and shall be included as part of this item and no separate payment will be made. The Engineer will indicate to the Contractor which signs, if any, must be covered, and when to remove the covers.

Sign Cover: Sign covers shall be 10 ounce cotton duck conforming to ASTM D-320, Army Duck, and dyed to a dark green approximating the green for sign backgrounds.

Sign removal shall be performed as specified by the Engineer. Care shall be taken to prevent any damage to the sign panel, over highway structure, roadside I-beam and wood posts, span wire, mast arm, any electrical wire attached to the above structures or any lights attached to the sign panel. If the panel has lights attached to the sign panel, the Contractor will be required to disconnect the wiring prior to removing the sign panel. Removal of the wiring that operates the lights will be at the direction of the Engineer and will be included as part of this item and no separate payment will be made.

Installation and removal of supplemental sign panels and sign plaques, removal of wood posts, tubular and square steel posts, telspar, u-channel, and other small posts will be at the direction of the Engineer and will

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be included as part of this item and no separate payment will be made. All materials removed shall be returned to the Department at the Dover Sign Shop.

Method of Measurement:

The quantity of installation or removal of overhead and ground mount signs will be measured as the actual number of signs installed or removed for the type of posts or structure specified as per these specifications, complete, in place and accepted or removed and returned to the Department at the Dover Sign Shop.

Basis of Payment:

The quantity of installation or removal of overhead and ground mount signs will be paid for at the contract unit price per each sign per the type of structure or posts specified. The cost of furnishing, installing and removing sign covers, removal of wiring that operates the lights, installation and removal of supplemental sign panels and sign plaques, removal of wood posts, tubular and square steel posts, telspar, u-channel, and other small posts shall be considered incidental to the cost of installation or removal of signs. Price and payment will constitute full compensation for all labor, equipment, tools, and incidentals required to complete the work.

9/11/07

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 DeIDOT 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 DeIDOT 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 sign posts 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

749690 - INSTALLATION OR REMOVAL OF TRAFFIC SIGN ON MULTIPLE SIGN POSTS

Description:

This work consists of installing traffic sign(s) on multiple sign posts at the locations indicated on the Plans or as directed by the Engineer.

Materials:

All materials shall be supplied by the Contractor. Signs, post and all mounting hardware to be used will be paid for under other items of this contract. The Contractor is responsible for the delivery of the signs and sign material to the site without any damage.

Construction Methods:

The Contractor shall install the signs in the locations indicated on the Plans in accordance with the plans or as directed by the Engineer. Signs and post are to be installed in a manner not to damage the sign nor post. The Contractor shall be responsible for obtaining all necessary utility clearances before the signs may be installed.

Method of Measurement:

The quantity of sign installations will be measured as the total square foot of the sign(s) installed and accepted.

Basis of Payment:

The quantity of sign installations will be paid for at the Contract unit price per square foot. Price and payment will constitute full compensation for installing signs, posts, and for all labor, equipment, tools, and incidentals required to complete the work. Signs that are not installed in accordance with the plans or signs installed in the incorrect location shall be moved at no additional cost to the Department.

12/13/2017

759502 - FIELD OFFICE, SPECIAL I

Description:

The field office work shall consist of furnishing, erecting, equipping, maintaining, and removing a doublewide modular office and adjacent parking area. Equivalent rented space may be substituted for the modular field office and its parking area as approved by the engineer. Rented space may be no more than one mile from the project limits. The Contractor shall submit a specific location layout drawing and construction details for the proposed field office and its parking area for approval by the Engineer. The field office and parking area shall be for the exclusive use of Department Officials, Engineers, Designers, South Region Construction (SRC) Personnel, Consultants, and Inspectors.

The field office structure shall be free of asbestos and/or other hazardous materials. The field office 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 the field office and its parking area. The costs of obtaining such licenses and permits to be incidental to the "Field Office, Special I" Item. The field office shall be available for use by the Department continuously throughout the duration of the project.

Construction and Equipment:

The field office shall be new and have a minimum floor space of 1200 square feet with minimum exterior dimensions of 50'-0" length by 12'-0" width. The floor to ceiling height shall be nominal 8'-0". The exterior walls, ceiling, and floor shall be insulated. The 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 the 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 the office of at least 2500 square feet and having a minimum of 10 functional parking spaces striped for full size cars. All weather pathways from the parking area to the entrances of the field office shall also be constructed and maintained. This parking area and entrance pathways shall have a minimum of 2" type "C" hot mix on top of minimum 6" graded aggregate subbase. Snow and/or ice shall be removed from the parking area and from the entrance pathways to the field office within 12 hours after each occurrence. Costs for furnishing, placing, and maintaining the aggregate base and hot mix, and for snow and/or ice removal, to be incidental to the Field Office, Special I" Item.

The ground area 30'-0" from around the perimeter of the field office to the 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 to be incidental to the "Field Office, Special I" Item.

The field office shall have full carpeting, kitchenette facilities, and interior and exterior paneling, lighting, and plumbing fixtures. The 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 6 complete sets of keys shall be supplied to the Engineer's representatives. The exterior doors shall be insulated or have storm doors. The field office shall have a minimum of six (6) windows, each window having a minimum glass area of 1150 square inches and a horizontal mini-blind covering the full glass area. The windows shall be insulated or have storm windows. All windows shall be equipped with a locking device. All doors and windows shall have screens installed and repaired when damaged.

At least two (2) outside water service connections shall be provided at the 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.

The field office shall be provided with sufficient natural and artificial light and shall be adequately heated and cooled to provide comfortable working conditions.

The field office shall have satisfactory lighting, electrical outlets, heating equipment, 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 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. 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.

The Contractor shall provide an alarm system for field office security with electronic, direct connection to a security service provider. The security system shall have interior motion, window, and entrance detectors and built in manual fire alarm. All windows of the 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. 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 an adequate supply of cold potable water, a minimum 23 cubic foot new refrigerator, and a minimum 1000-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. When separate facilities for men and women are not available or required, a sign with the wording "Rest Room" (letter heights 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.

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 field office telephone system shall have a total of 3 lines consisting of 2 direct single lines with call forward busy feature, 2 dedicated computer use line with broadband connection for either DSL or cable, and 1 dedicated facsimile line and have 5 key sets consisting of 1 master key set having privacy feature, and 6 six-button key sets having privacy feature (1 set which may be for wall mounting) and 1 TLS or T1 circuit line for data transmission, all for the official and exclusive use of the Engineer and other representatives of the Department. 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 including phone company provision of a termination point with smart-jack.

For all other 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 interior 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. Placement of these furnishings shall be as directed by the Engineer. These furnishings consists of 2 drafting tables with sufficient drawers for standard size plans either attached to the tables or in cabinet form. Each drafting table to have fully adjustable ergonomic design spring back stool with five leg base wheel casters, 6 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 16 people with surrounding chairs with armrests, 2 folding tables minimum 6'-0" by 3'-0" each with ergonomic design straight back chair with armrests, 1 work table, 1 supply cabinet, 2 rough plan racks, 2 legal size filing cabinets with 4 drawers, 2 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 book shelves minimum 3'- 6" by 4'- 6", 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 height 3' by 2'. These office furnishings will remain the property of the Contractor at the conclusion of the project.

The Contractor shall also furnish new and maintain the following office equipment, all which are to be approved by the Engineer prior to installation in the field office. 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:

4 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 Image Runner advance 4245 MFX-2855D or Toshiba e-STUDIO 2051c or approved equal all-in-one copier which includes scanner, 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 60 sheet capacity with automatic stapling capacity;

1 compact plain paper copying machine and cabinet with stationary platen, bypass feeding, and dual loading cassette system with cassettes for letter, legal, and ledger size paper. Copy machine to have zoom and preset reduction and enlargement

features, automatic two (2) sided copying, automatic document feeder with minimum 30 sheet capacity, and 20 bin collator with automatic stapling capacity;

1 desktop model, compact facsimile machine with automatic paper cutter, 10-sheet feeder, halftones with 16 levels of gray, 50-number auto dialing, answering machine hook-up, large LCD readout, date and time stamp, and advanced telephone features;

1 DVD camcorder with on-screen programming, full-range auto focus, high-speed shutter, high-resolution, bookmark search, time-lapse recording, rechargeable batteries and charger, tripod, and protective carrying case;

1 integrated color monitor and DVD/VHS cassette recorder having minimum 20" screen, automatic on/play/rewind/stop, remote, full range speaker, and digital auto tracking;

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

2 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 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 minimum binding capacity of 150 sheets

Consumables as required to manage the business of the project 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 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 the Field Office:

Included in the unit price bid per month for the Field Office on this project will be three (3) IBM compatible Microcomputer Systems both which will be furnished and maintained by the Contractor for use by the Engineer. 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 Microcomputer Systems. The Microcomputer Systems shall be Laptop Computer Systems each with docking station. Each of the three (3) Microcomputer Systems shall consist of:

Central Processing Unit (CPU) – Lap Top

Intel Core i5 or Core i7 series processor and wireless networking capability included,

Minimum 1.0 GB RAM with expansion capability to at least 3.0 GB and clock/calendar card equivalent, and

Microsoft "Windows® 10 Pro" operating system with latest updates;

Memory (Storage)

DVD+rw or Blu Ray bd-re (rewritable) drive with support for DVD RW support capability, and 256GB hard drive minimum, integrated Ethernet 10/100. Included software shall support system and data backups with the DVD/Blue Ray device using double/dual layer DVD discs;

Monitor (Cathode Ray Tube)

Monitor for docking station and docking station. 21" minimum diagonal visual area flat panel capable of multiple frequency color graphics, 1440x900(wide) or 1280x1024 or better resolution, 16.7 million display colors, 5 ms response time, D-Sub and DVI video input ports and;

Laptop - shall have 15.4" display minimum;

Color Graphics Card

PCIe video card or integrated video.

Keyboard

Keyboard shall be ergonomic, enhanced layout minimum with keyboard interface cable;

Printers

Laser printer, color, capable of printing 8-1/2"x11", 11"x17" and envelope, having wireless and hard line network connectivity, printers 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® 10 Pro". The required applications software follows and is to be latest version unless noted:

office suite - "Microsoft® Office 2010 Business Professional",
Anti-virus - Norton™

Schedule - Primavera Project Planner version 3.1 SP3 or latest

Replication - Adobe Acrobat X Suite Software with Adobe Photoshop®CS5 Suite, 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 (802.11g or better) with all associated hardware (adapters, cables, etc) and soft to enable wireless networking and internet connection sharing for all office computers and printers,

An electrical outlet with dedicated circuit for the main computer unit,

A wireless optical mouse with proper driving software having complete Microsoft emulation,

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;

Related Equipment Wireless networking hub/router, 8002.11 g or better with all associated hardware(adapters, cables, etc.) and software to enable wireless networking for resource/equipment

sharing among all office computers and printers. The cost of wireless and network connections to be incidental to the "Field Office, Special I" Item.

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 for the length of the Contract. These consumables shall be furnished on request and include but not be limited to memory cards/sticks compatible with provided digital cameras having 8 GB or greater capacity and compatible with provided computers, 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 of the field office including its 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 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 a current copy of all validated field office, equipment, and computer maintenance, service, assistance and/or monitoring agreements and/or contracts as mentioned herein above to the Department's administrative office on or before the first day the 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 will be paid for on a unit price bid per month, which price shall be full compensation for performing the work specified, obtaining all licenses and permits, and the furnishing of all materials, labor, tools, equipment and incidentals necessary to maintain the field office and its adjacent parking area and restore the field office area and adjacent parking area to match the original site condition. Price shall also include making arrangements for all necessary utility connection and/or their maintenance; for payment of all utility connections, installations, service fees and bills; and for final disconnection of utilities. No separate payment will be made for costs involved for removing hazardous material or underground tanks to install these offices or the parking area. One (1) unit of payment will constitute erecting, furnishing, equipping, maintaining, and removing the double wide field offices, its entrance and parking area. No separate payment will be made for reimbursement of phone/internet or any other utility.

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Payment will be made only for the actual number of months that the office is acceptably provided by the Contractor. Per Standard Specification subsection 108.02, the Engineer shall issue a Notice to Proceed and stipulate the date on or before which the Contractor is expected to begin work. The field office, its entrance, and parking area and all materials and equipment shall be ready for use at least seven calendar days prior to the date which the Contractor is expected to begin work as stipulated in the Notice to Proceed and before any construction operations begin. Contract time charges shall begin on the daywork actually starts or on the date stipulated in the notice to proceed, whichever is earlier. There will be no delays in beginning the contract time charges due to delays in preparing the field office.

2/16/2018

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.

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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 $[3\text{mm}+2\text{ppmxD}]$ 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 DeIDOT 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. DeIDOT 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

763502 - MAINTENANCE OF RAILROAD TRAFFIC (NS)
Norfolk Southern Railway Company

I. AUTHORITY OF RAILROAD ENGINEER AND STATE ENGINEER:

- a. The authorized representative of the Railroad Company, hereinafter referred to as “Railroad Engineer”, shall have final authority in all matters affecting the safe maintenance of Railroad traffic of their Company including the adequacy of the foundations and structures supporting the Railroad tracks.
- b. The authorized representative of the State, hereinafter referred to as the “Engineer”, shall have authority over all other matters as prescribed herein and in the Project Specifications.

II. DEFINITIONS:

- a. For the purpose of this Contract, the following terms, names, titles, and/or abbreviations refer to the following:
 - i. The terms Railroad and NS shall mean the Norfolk Southern Railway Company.
 - ii. The terms DelDOT, State, Department, Agency, Owner of Contract shall mean the Delaware Department of Transportation.

III. NOTICE OF STARTING WORK:

- a. The Contractor shall not commence any work on Railroad rights-of-way until they have complied with the following conditions:
 - i. Given the Railroad written notice, with copy to the Engineer who has been designated to be in charge of the work, at least forty-five days in advance of the date they propose to begin work on the Railroad’s rights-of-way.

Crossing Surfaces

Chief Engineer - D&C
Norfolk Southern Corp.
175 Spring Street, SW
Building Box 142
Atlanta, Georgia 0303

Warning Devices

Chief Engineer - S&C
Norfolk Southern Corp.
99 Spring Street, SW
Building Box 123
Atlanta, Georgia 30303

Bridges & Structures

Chief Engineer
Bridges and Structures
Norfolk Southern Corp.
99 Spring Street, SW
Atlanta, Georgia 30303

- ii. Obtained written authorization from the Railroad to begin work on Railroad rights-of-way, such authorization to include an outline of specific conditions with which he/she must comply.

- iii. Obtained written approval from the Railroad of Railroad Protective Insurance Liability coverage as required by paragraph XV herein.
- iv. Furnished a schedule for all work within the Railroad rights-of-way as required by paragraph VIII.b.
- b. The Railroad's written authorization to proceed with the work shall include the names, addresses, and telephone numbers of the Railroad's representatives who are to be notified as hereinafter required. Where more than one representative is designated, the area of responsibility of each representative shall be specified.

IV. INTERFERENCE WITH RAILROAD OPERATIONS:

- a. The Contractor shall so arrange and conduct his/her work that there will be no interference with Railroad operations, including train, signal, telephone and telegraphic services, or damage to the property of the Railroad Company or to poles, wires, and other facilities of tenants on the rights-of-way of the Railroad Company. Whenever work is liable to affect the operations or safety of trains, the method of doing such work shall first be submitted to the Railroad Engineer for approval, but such approval shall not relieve the Contractor from liability. Any work to be performed by the Contractor which requires flagging service or inspection service shall be deferred by the Contractor until the flagging service or inspection service required by the Railroad is available at the job site.
- b. Whenever work within Railroad rights-of-way is of such a nature that impediment to Railroad operations such as use of runaround tracks or necessity for reduced speed is unavoidable, the Contractor shall schedule and conduct his/her operations so that such impediment is reduced to the absolute minimum.
- c. Should conditions arising from, or in connection with the work, require that immediate and unusual provisions be made to protect operations and property of the Railroad, the Contractor shall make such provisions. If in the judgment of the Railroad Engineer, or in their absence, the Engineer, such provision(s) are insufficient, either may require or provide such provisions as they deem necessary. In any event, such unusual provisions shall be at the Contractor's expense and without cost to the Railroad or the State.
- d. "One Call" services do not locate buried Railroad utilities. The contractor shall contact the Railroad's representative two (2) days in advance of work in those places where excavation, pile driving, or heavy loads may damage the Railroad's underground facilities. Upon request from the Contractor or Sponsor, Railroad forces will locate and paint mark or flag the Railroad's underground facilities. The Contractor shall avoid excavation or other disturbances of these facilities. If disturbance or excavation is required near a buried Railroad facility, the contractor shall coordinate with the Railroad to have the facility potholed manually with careful hand excavation. The facility shall be protected by the Contractor during the course of the disturbance under the supervision and direction of the Railroad's representative.

V. TRACK CLEARANCES:

- a. The minimum track clearances to be maintained by the Contractor during construction are shown on the Project Plans. If temporary clearances are not shown on the project plans, the following criteria shall govern the use of falsework and formwork above or adjacent to operated tracks.
 - i. A minimum vertical clearance of 22'-0" above top of highest rail shall be maintained at all times.

- ii. A minimum horizontal clearance of 13'-0" from centerline of tangent track or 14'-0" from centerline of curved track shall be maintained at all times. Additional horizontal clearance may be required in special cases to be safe for operating conditions. This additional clearance will be determined by the Railroad Engineer.
- iii. All proposed temporary clearances which are less than those listed above must be submitted to Railroad Engineer for approval prior to construction and must also be authorized by the regulatory body of the State if less than the legally prescribed clearances.
- iv. The temporary clearance requirements noted above shall also apply to all other physical obstructions including, but not limited to: stockpiled materials, parked equipment, placement or driving of piles, and bracing or other construction supports.

Before undertaking any work within Railroad right-of-way, or before placing any obstruction over any track, the Contractor shall:

- i. Notify the Railroad's representative at least 72 hours in advance of the work.
- ii. Receive assurance from the Railroad's representative that arrangements have been made for flagging service as may be necessary.
- iii. Receive permission from the Railroad's representative to proceed with the work.
- iv. Ascertain that the Engineer has received copies of notice to the Railroad and of the Railroad's response thereto.

VI. CONSTRUCTION PROCEDURES:

a. General:

Construction work and operations by the Contractor on Railroad property shall be:

- i. Subject to the inspection and approval of the Railroad.
- ii. In accord with the Railroad's written outline of specific conditions.
- iii. In accord with the Railroad's general rules, regulations and requirements including those relating to safety, fall protection and personal protective equipment.
- iv. In accord with these Special Provisions.

b. Submittal Requirements:

- i. The Contractor shall submit all construction related correspondence and submittals electronically to the Railroad Engineer.
- ii. The Contractor shall allow for 30 days for the Railroad's review and response.
- iii. All work in the vicinity of the Railroad's property that has the potential to affect the Railroad's train operations or disturb the Railroad's Property must be submitted and approved by the Railroad prior to work being performed.

- iv. All submittals and calculations must be signed and sealed by a registered engineer licensed in the state of the project work.
 - v. All submittals shall first be approved by the Sponsor's Engineer and the Railroad Engineer, but such approval shall not relieve the Contractor from liability.
 - vi. For all construction projects, the following submittals, but not limited to those listed below, shall be provided for review and approval when applicable:
 - 1. General Means and Methods
 - 2. Ballast Protection
 - 3. Construction Excavation & Shoring
 - 4. Pipe, Culvert, & Tunnel Installations
 - 5. Demolition Procedure
 - 6. Erection & Hoisting Procedure
 - 7. Debris Shielding or Containment
 - 8. Blasting
 - 9. Formwork for the bridge deck, diaphragms, overhang brackets, and protective platforms
 - 10. Bent Cap Falsework. A lift plan will be required if the contractor wants to move the falsework over the tracks.
 - vii. The Contractor shall include in all submissions a detailed narrative indicating the progression of work with the anticipated timeframe to complete each task. Work will not be permitted to commence until the Contractor has provided the Railroad with a satisfactory plan that the project will be undertaken without scheduling, performance or safety related issues. Submission shall also provide a listing of the anticipated equipment to be used, the location of all equipment to be used and insure a contingency plan of action is in place should a primary piece of equipment malfunction.
- c. Ballast Protection
- i. The Contractor shall submit the proposed ballast protection system detailing the specific filter fabric and anchorage system to be used during all construction activities.
 - ii. The ballast protection is to extend 25' beyond the proposed limit of work, be installed at the start of the project and be continuously maintained to prevent all contaminants from entering the ballast section of all tracks for the entire duration of the project.
- d. Excavation:
- i. The subgrade of an operated track shall be maintained with edge of berm at least 10'-0" (3.05 m) from centerline of track and not more than 24 (600 mm) below top of rail. Contractor will not be required to make existing section meet this specification if substandard, in which case existing section will be maintained.
- e. Excavation for Structures:
- i. The Contractor will be required to take special precaution and care in connection with excavating and shoring pits, and in driving piles or sheeting for footings adjacent to tracks to provide adequate lateral support for the tracks and the loads which they carry, without disturbance of track alignment and surface, and to avoid obstructing track clearances with working equipment, tools or other material. The procedure for doing such work, including need

of and plans for shoring, shall first be approved by the Engineer and the Railroad Engineer, but such approval shall not relieve the Contractor from liability.

VII. ERECTION & HOISTING PROCEDURES:

a. General

- i. Erection plans are required for all spans over the track(s), for all spans adjacent to the track(s), if located on (or partially on) Railroad right-of-way; and in all situations where cranes will be situated on, over, or adjacent to Railroad right-of-way and within a distance of the boom length plus 15'-0" from the centerline of the track.
- ii. Railroad tracks and other Railroad property must be protected from damage during the erection procedure.
- iii. A pre-erection meeting shall be conducted with the Sponsor, the Railroad Engineer or their representative, and the key Contractor's personnel prior to the start of the erection procedure.
- iv. The Railroad Engineer or his designated representative must be present at the site during the entire erection procedure period.
- v. For field spliced located over Railroad property, a minimum of 50% of the holes for each connection shall be filed with bolts or pins prior to releasing the crane. A minimum of 50% of the holes filled shall be filled with bolts. All bolts must be appropriately tightened. Any changes to previously approved field splice locations must be submitted to the Railroad for review and approval. Refer to Norfolk Southern's Overhead Grade Separation Design Criteria for additional splice details (Norfolk Southern Public Projects Manual Appendix H.1, Section 4.A.3.).

b. Submittal Requirements

- i. The Contractor shall submit the following for approval by the Railroad Engineer:
 1. As-built beam seat elevations - All as-built bridge seats and top of rail elevations shall be furnished to the Railroad Engineer for review and verification at least 30 days in advance of the erection, to ensure that minimum vertical clearances as approved in the plans will be achieved.
 2. A plan showing the location of cranes, horizontally and vertically, operating radii, with delivery or staging locations shown. The location of all tracks and other Railroad facilities as well as all obstructions such as wire lines, poles, adjacent structures, etc. must also be shown.
 3. Rating sheets showing cranes or lifting devices to be adequate for 150% of the actual weight of the pick, including all rigging components. A complete set of crane charts, including crane counterweight, and boom nomenclature is to be submitted. Safety factors that may have been "built-in" to the crane charts are not to be considered when determining the 150% factor of safety.
 4. Plans and computations showing the weight of the pick must be submitted. Calculations shall be made from plans of the proposed structure showing complete sufficient details with supporting data for the erection of the structure. If plans do not exist, lifting weights must be calculated from field measurements. The field measurements are to be made under the

supervision of the Registered Professional Engineer submitting the procedure and calculations.

5. The Contractor shall provide a sketch of all rigging components from the crane's hook block to the beam. Catalog cuts or information sheets of all rigging components with their lifting capacities shall be provided. All rigging must be adequate for 150% of the actual weight of the pick. Safety factors that may have been "built-in" to the rating charts are not to be considered when determining the 150% factor of safety. All rigging components shall be clearly identified and tagged with their rated lifting capacities. The position of the rigging in the field shall not differ from what is shown on the final plan without prior review from the Sponsor and the Railroad.
6. A complete erection procedure, including the order of lifts, time required for each lift, and any repositioning or re-hitching of the crane or cranes.
7. Design and supporting calculations for the temporary support of components, including but not limited to temporary girder tie-downs and falsework.

c. Blasting:

The Contractor shall obtain advance approval of the Railroad Engineer and the Engineer for use of explosives on or adjacent to Railroad property. The request for permission to use explosives shall include a detailed blasting plan. If permission for use of explosives is granted, the Contractor will be required to comply with the following:

- i. Blasting shall be done with light charges under the direct supervision of a responsible officer or employee of the Contractor and a licensed blaster.
- ii. Electric detonating fuses shall not be used because of the possibility of premature explosions resulting from operation of two-way radios.
- iii. No blasting shall be done without the presence of an authorized representative of the Railroad. At least 72 hours advance notice to the person designated in the Railroad's notice of authorization to proceed (see Section II. Notice of Starting Work) will be required to arrange for the presence of an authorized Railroad representative and such flagging as the Railroad may require.
- iv. Have at the job site adequate equipment, labor and materials and allow sufficient time to clean up debris resulting from the blasting without delay to trains, as well as correcting at his/her expense any track misalignment or other damage to Railroad property resulting from the blasting as directed by the Railway's authorized representative. If his/her actions result in delay of trains, the Contractor shall bear the entire cost thereof.

d. The Railroad representative will:

- i. Determine approximate location of trains and advise the Contractor the appropriate amount of time available for the blasting operation and clean-up.
- ii. Have the authority to order discontinuance of blasting if, in his/her opinion, blasting is too hazardous or is not in accord with these Special Provisions.

- e. Track Monitoring
 - i. At the direction of Railroad Engineer, any activity that has the potential to disturb Railroad track structure may require the Contractor to submit a detailed track monitoring program for approval by the Railroad Engineer.
 - ii. The program shall specify the survey locations, the distance between the location points, and frequency of monitoring before, during and after construction. Railroad reserves the right to modify the survey locations and monitoring frequency as necessary during the project.
 - iii. The survey data shall be collected in accordance with the approved frequency immediately furnished to the Railroad Engineer for analysis.
 - iv. If any movement has occurred as determined by the Railroad Engineer, the Railroad will be immediately notified. Railroad, as its sole discretion, shall have the right to immediately require all Contractor operations to be ceased and determine what corrective action is required. Any corrective action required by the Railroad or performed by the Railroad including the monitoring of corrective action of the Contractor will be at project expense.
- f. Maintenance of Railroad Facilities:
 - i. The Contractor will be required to maintain all ditches and drainage structures free of silt or other obstructions which may result from his/her operations and provide and maintain any erosion control measures as required. The Contractor will promptly repair eroded areas within Railroad rights-of-way and repair any other damage to the property of the Railroad or its tenants.
 - ii. If, in the course of construction, it may be necessary to block a ditch, pipe or other drainage facility, temporary pipes, ditches or other drainage facilities shall be installed to maintain adequate drainage, as approved by the Road Engineer. Upon completion of the work, the temporary facilities shall be removed and the permanent facilities restored.
 - iii. All such maintenance and repair of damages due to the Contractor's operations shall be done at the Contractor's expense.
- g. Storage of Materials and Equipment:
 - i. Materials and equipment shall not be stored within 25 (7.6 m) of the centerline of Railroad's track or where they will interfere with Railroad operations, nor on the rights-of-way of the Railroad Company without first having obtained permission from the Railroad Engineer, and such permission will be with the understanding that the Railroad Company will not be liable for damage to such material and equipment from any cause and that the Railroad Engineer may move or require the Contractor to move, at the Contractor's expense, such material and equipment.
 - ii. All grading or construction machinery that is left parked near the track unattended by a watchman shall be effectively immobilized so that it cannot be moved by unauthorized persons. The Contractor shall protect, defend, indemnify and save Railroad, and any associated, controlled or affiliated corporation, harmless from and against all losses, costs, expenses, claim or liability for loss or damage to property or the loss of life or personal injury, arising out of or incident to the Contractor's failure to immobilize grading or construction machinery.

- h. Cleanup:
 - i. Upon completion of the work, the Contractor shall remove from within the limits of the Railroad rights-of-way, all machinery, equipment, surplus materials, falsework, rubbish or temporary buildings of the Contractor, and leave said rights-of-way in a neat condition satisfactory to the Chief Engineer of the Railroad or his/her authorized representative.

VII. DAMAGES:

- a. The Contractor shall assume all liability for any and all damages to his/her work, employees, servants, equipment and materials caused by Railroad traffic.
- b. Any cost incurred by the Railroad for repairing damages to its property or to property of its tenants, caused by or resulting from the operations of the Contractor, shall be paid directly to the Railroad by the Contractor.

VIII. FLAGGING SERVICES:

- a. When Required:
 - i. Flagging will not be provided until the Contractor's insurance has been reviewed & approved by the Railroad.
 - ii. Under the terms of the agreement between the State and the Railroad, the Railroad has sole authority to determine the need for flagging required to protect its operations. In general, the requirements of such services will be whenever the Contractor's personnel or equipment are or are likely to be, working on the Railroad's right-of-way, or across, over, adjacent to, or under a track, or when such work has disturbed or is likely to disturb a Railroad structure or the Railroad roadbed or surface and alignment of any track to such extent that the movement of trains must be controlled by flagging.
 - iii. Normally, the Railroad will assign one flagman to a project; but in some cases, more than one may be necessary, such as yard limits where three (3) flagmen may be required. However, if the Contractor works within distances that violate instructions given by the Railroad's authorized representative or performs work that has not been scheduled with the Railroad's authorized representative, a flagman or flagmen may be required full time until the project has been completed.
 - iv. For Projects exceeding 30 days of construction, Contractor shall provide the flagmen a small work area with a desk/computer and chair within the field/site trailer, including the use of bathroom facilities, where the flagman can check in/out with the Project, as well as to the flagman's home terminal. The work area should provide access to two (2) electrical outlets for recharging radio(s), and a laptop computer; and have the ability to print off needed documentation and orders as needed at the field/site trailer. This should aid in maximizing the flagman's time and efficiency on the Project.
- b. Scheduling and Notification:
 - i. The Contractor's work requiring Railroad flagging should be scheduled to the limit the presence of a flagman at the site to a maximum of 50 hours per week. The Contractor shall receive Railroad approval of work schedules requiring a flagman's presence in excess of 40 hours per week.

- ii. Not later than the time that approval is initially requested to begin work on Railroad right-of-way, Contractor shall furnish to the Railroad and the State a schedule for all work required to complete the portion of the project within Railroad right-of-way and arrange for a job site meeting between the Contractor, the State, and the Railroad's authorized representative. This schedule may be submitted in the format of a bar graft chart. Flagman or flagmen may not be provided until the job site meeting has been conducted and the Contractor's work scheduled.
 - iii. The Contractor will be required to give the Railroad representative at least 10 working days of advance written notice of intent to begin work within Railroad right-of-way in accordance with this special provision. Once begun, when such work is then suspended at any time, or for any reason, the Contractor will be required to give the Railroad representative at least 3 working days of advance notice before resuming work on Railroad right-of-way. Such notices shall include sufficient details of the proposed work to enable the Railroad representative to determine if flagging will be required. If such notice is in writing, the Contractor shall furnish the Engineer a copy; if notice is given verbally, it shall be confirmed in writing with copy to the Engineer. If flagging is required, no work shall be undertaken until the flagman, or flagmen is present at the job site. It may take up to 30 days to obtain flagging initially from the Railroad. When flagging begins, the flagman is usually assigned by the Railroad to work at the project site on a continual basis until no longer needed and cannot be called for on a spot basis. If flagging becomes unnecessary and is suspended, it may take up to 30 days to again obtain from the Railroad. Due to Railroad labor agreements, it is necessary to give 5 working days' notice before flagging service may be discontinued and responsibility for payment stopped.
 - iv. If, after the flagman is assigned to the project site, an emergency arises that requires the flagman's presence elsewhere, then the Contractor shall delay work on Railroad right-of-way until such time as the flagman is again available. Any additional costs resulting from such delay shall be borne by the Contractor and not the State or Railroad.
- c. Payment:
- i. The State will be responsible for paying the Railroad directly for any and all costs of flagging which may be required to accomplish the construction.
 - ii. The charge to the State by the Railroad will be the actual cost based on the rate of pay for the Railroad's employees who are available for flagging service at the time the service is required.
 - iii. Work by a flagman in excess of 8 hours per day or 40 hours per week, but not more than 12 hours a day will result in overtime pay at 1 and 1/2 times the appropriate rate. Work by a flagman in excess of 12 hours per day will result in overtime at 2 times the appropriate rate. If work is performed on a holiday, the flagging rate is 2 and 1/2 times the normal rate.
 - iv. Railroad work involved in preparing and handling bills will also be charged to the State. Charges to the State by the Railroad shall be in accordance with applicable provisions of Subchapter B, Part 140, Subpart I and Subchapter G, Part 646, Subpart B of the Federal-Aid Policy Guide issued by the Federal Highway Administration on December 9, 1991, including all current amendments. Flagging costs are subject to change.
- d. Verification:
- i. Railroad's flagman will electronically enter flagging time via Railroad's electronic billing system. Any complaints concerning flagging must be resolved in a timely manner. If the need for flagging is questioned, please contact the Railroad Engineer. All verbal complaints will be

confirmed in writing by the Contractor within 5 working days with a copy to the Sponsor's Engineer. Address all written correspondence electronically to Railroad Engineer.

- ii. The Contractor and State will review and sign the Railroad flagman's time sheet (Form 11123), attesting that the flagman was present during the time recorded. Flagmen may be removed by the Railroad if form is not signed. If flagman is removed, the Contractor will not be allowed to re-enter the Railroad right-of-way until the issue is resolved. Any complaints concerning flagman or flagmen must be resolved in a timely manner. If need for flagman or flagmen is questioned, please contact Railroad's Engineer, Grade Separation Structures (404)529-1641. All verbal complaints will be confirmed in writing by the Contractor within 5 working days with a copy to the Engineer. Address all written correspondence to:

CROSSING SURFACES

Norfolk Southern Corp.
Office of Chief Engineer
Bridges & Structures
Attn: T. D. Wyatt
Engineer Grade Separation
99 Spring Street, SW
Atlanta, Georgia 30303

- ii. The Railroad flagman assigned to the project will be responsible for notifying the Project Engineer upon arrival at the job site on the first day (or as soon thereafter as possible) that flagging services begin and on the last day that he/she performs such services for each separate period that services are provided. The Project Engineer will document such notification in the project records. When requested, the Project Engineer will also sign the flagman's diary showing daily time spent and activity at the project site.

IX. HAUL ACROSS RAILROAD:

- a. Where the Plans show or imply that materials of any nature must be hauled across a Railroad, unless the Plans clearly show that the State has included arrangements for such haul in its agreement with the Railroad, the Contractor will be required to make all necessary arrangements with the Railroad regarding means of transporting such materials across the Railroad. The Contractor will be required to bear all costs incidental to such crossings whether services are performed by his/her own forces or by Railroad personnel.
- b. No crossing may be established for use of the Contractor for transporting materials or equipment across the tracks of the Railroad Company unless specific authority for its installation, maintenance, necessary watching and flagging thereof and removal, until a private crossing agreement has been executed between the Contractor and Railroad.

X. WORK FOR THE BENEFIT OF THE CONTRACTOR:

- a. All temporary or permanent changes in wire lines or other facilities which are considered necessary to the project are shown on the Plans; included in the force account agreement between the State and the Railroad or will be covered by appropriate revisions to same which will be initiated and approved by the State and/or the Railroad.
- b. Should the Contractor desire any changes in addition to the above, then he/she shall make separate arrangements with the Railroad for same to be accomplished at the Contractor's expense.

XI. COOPERATION AND DELAYS:

- a. It shall be the Contractor's responsibility to arrange a schedule with the Railroad for accomplishing stage construction involving work by the Railroad or tenants of the Railroad. In arranging his/her schedule he/she shall ascertain, from the Railroad, the lead time required for assembling crews and materials and shall make due allowance therefore.
- b. No charge or claim of the Contractor against either the State or the Railroad will be allowed for hindrance or delay on account of railway traffic; any work done by the Railroad or other delay incident to or necessary for safe maintenance of railway traffic or for any delays due to compliance with these special provisions.

XII. TRAINMAN'S WALKWAYS:

- a. Along the outer side of each exterior track of multiple operated track, and on each side of single operated track, an unobstructed continuous space suitable for trainman's use in walking along trains, extending to a line not less than 10' (3.05 m) from centerline of track, shall be maintained. Any temporary impediments to walkways and track drainage encroachments or obstructions allowed during work hours while Railroad's protective service is provided shall be removed before the close of each work day. If there is any excavation near the walkway, a handrail, with 10' - 0" (3.05 m) minimum clearance from centerline of track, shall be placed.

XIII. GUIDELINES FOR PERSONNEL ON RAILROAD RIGHT-OF-WAY:

- a. The Contractor and/or the Sponsor's personnel authorized to perform work on Railroad's property as specified above are not required to complete Norfolk Southern Roadway Worker Protection Training; However, the Contractor and the Sponsor's personnel must be familiar with Norfolk Southern's standard operating rules and guidelines, should conduct themselves accordingly, and may be removed from the property for failure to follow these guidelines.
- b. All persons shall wear hard hats. Appropriate eye and hearing protection must be used. Working in shorts is prohibited. Shirts must cover shoulders, back and abdomen. Working in tennis or jogging shoes, sandals, boots with high heels, cowboy and other slip-on type boots is prohibited. Hard-sole, lace-up footwear, zippered boots or boots cinched up with straps which fit snugly about the ankle are adequate. Safety boots are strongly recommended.
- c. No one is allowed within 25' (7.6 m) of the centerline of track without specific authorization from the flagman.
- d. All persons working near track while train is passing are to lookout for dragging bands, chains and protruding or shifted cargo.
- e. No one is allowed to cross tracks without specific authorization from the flagman.
- f. All welders and cutting torches working within 25' (7.6 m) of track must stop when train is passing.
- g. No steel tape or chain will be allowed to cross or touch rails without permission.

XIV. GUIDELINES EQUIPMENT ON RAILROAD RIGHT-OF-WAY:

- a. No crane or boom equipment will be allowed to set up to work or park within boom distance plus 15' (4.6 m) of centerline of track without specific permission from Railroad official and flagman.

- b. No crane or boom equipment will be allowed to foul track or lift a load over the track without flag protection and track time.
- c. All employees will stay with their machines when crane or boom equipment is pointed toward track.
- d. All cranes and boom equipment under load will stop work while train is passing (including pile driving).
- e. Swinging loads must be secured to prevent movement while train is passing.
- f. No loads will be suspended above a moving train.
- g. No equipment will be allowed within 25' (7.6 m) of centerline of track without specific authorization of the flagman.
- h. Trucks, tractors or any equipment will not touch ballast line without specific permission from railroad official and flagman.
- i. No equipment or load movement within 25' (7.6 m) or above a standing train or railroad equipment without specific authorization of the flagman.
- j. All operating equipment within 25' (7.6 m) of track must halt operations when a train is passing. All other operating equipment may be halted by the flagman if the flagman views the operation to be dangerous to the passing train.
- k. All equipment, loads and cables are prohibited from touching rails.
- l. While clearing and grubbing, no vegetation will be removed from Railroad embankment with heavy equipment without specific permission from the Railroad Engineer and flagman.
- m. No equipment or materials will be parked or stored on Railroad's property unless specific authorization is granted from the Railroad Engineer.
- n. All unattended equipment that is left parked on Railroad property shall be effectively immobilized so that it cannot be moved by unauthorized persons.
- o. All cranes and boom equipment will be turned away from track after each work day or whenever unattended by an operator.
- p. Prior to performing any crane operations, the Contractor shall establish a single point of contact for the Railroad flagman to remain in communication with at all times. Person must also be in direct contact with the individual(s) directing the crane operation(s).

XV. INSURANCE:

- a. In addition to any other forms of insurance or bonds required under the terms of the contract and specifications, the Prime Contractor will be required to carry insurance of the following kinds and amounts:
 - i. Commercial General Liability Insurance having a combined single limit of not less than **\$2,000,000** per occurrence for all loss, damage, cost and expense, including attorneys' fees, arising out of bodily injury liability and property damage liability during the policy period. Said policy shall include explosion, collapse, and underground hazard (XCU) coverage, shall be

endorsed to name Railroad specified in item XV.a.iii.3, below, both as the certificate holder and as an additional insured, and shall include a severability of interests provision.

- ii. Automobile Liability Insurance with a combined single limit of not less than \$1,000,000 each occurrence for injury to or death of persons and damage to or loss or destruction of property. Said policy or policies shall be endorsed to name Railroad Specified in item XV.a.iii.3, below, both as the certificate holder and as an additional insured, and shall include a severability of interests provision.
- iii. Railroad Protective Liability Insurance having a combined single limit of not less than **\$2,000,000** each occurrence and **\$6,000,000** in the aggregate applying separately to each annual period. If the project involves track over which passenger trains operate, the insurance limits required are not less than a combined single limit of **\$5,000,000** each occurrence and **\$10,000,000** in the aggregate applying separately to each annual period. Said policy shall provide coverage for all loss, damage or expense arising from bodily injury and property damage liability, and physical damage to property attributed to acts or omissions at the job site.
- iv. The standards for the Railroad Protective Liability Insurance are as follows:
 1. The insurer must be rated A- or better by A.M. Best Company, Inc.

Note: NS does not accept from insurers Chartts (AIG or Affiliated Company Including Lexington Insurance Company), Hudson Group or ACE or Affiliated Company.

2. The policy must be written using one of the following combinations of Insurance Services Office ("ISO") Railroad Protective Liability Insurance Form Numbers:
 - A. CG 00 35 01 96 and CG 28 3110 93; or
 - B. CG 00 35 07 98 and CG 28 31 07 98; or
 - C. CG 00 35 10 01; or
 - D. CG 00 35 12 04; or
 - E. CG 00 35 12 07; or
 - F. CG 00 35 04 13.

3. The named insured shall read:

Norfolk Southern Railway Company
Three Commercial Place
Norfolk, Virginia 23510-2191
Attn: S. W. Dickerson Risk Management

Note: NS does not share coverage on Railroad Protective Liability Insurance with any other entity on this policy.

4. The description of operations must appear on the Declarations, must match the project description in this agreement, and must include the appropriate Sponsor project and contract identification numbers.
5. The job location must appear on the Declarations and must include the city, state, and appropriate highway name/number, and NS file number for the project number.

Note: Do not include any references to milepost, valuation station, or mile marker on the Insurance policy.

6. The name and address of the prime Contractor must appear on the Declarations.
7. The name and address of the Sponsor must be identified on the Declarations as the "Involved Governmental Authority or Other Contracting Party."
8. Other endorsements/forms that will be accepted are:
 - A. Broad Form Nuclear Exclusion - Form IL 00 21
 - B. 30-day Advance Notice of Non-renewal or cancellation
 - C. Required State Cancellation Endorsement
 - D. Quick Reference or Index Form CL/IL 240
9. Endorsements/forms that are **NOT** acceptable are:
 - A. Any Pollution Exclusion Endorsement except CG 28 31
 - B. Any Punitive or Exemplary Damages Exclusion
 - C. Known injury or Damage Exclusion form CG 00 59
 - D. Any Common Policy Conditions form
 - E. Any other endorsement/form not specifically authorized in item XV.a.iii.8 above.
- b. If any part of the work is sublet, similar insurance, and evidence thereof as specified in XV.a above, shall be provided by or on behalf of the subcontractor to cover its operations on Railroad's right of way.
- c. All insurance required under the preceding subsection "a" shall be underwritten by insurers and be of such form and content, as may be acceptable to the Company. Prior to entry on Railroad right-of-way, the original Railroad Protective Liability Insurance Policy shall be submitted by the Sponsor's Prime Contractor to the Sponsor at the address below for its review and then transmitted to the Railroad. In addition, certificates of insurance evidencing the Sponsor's Prime Contractor's and any subcontractors' Commercial General Liability Insurance shall be issued to the Railroad and the Sponsor at the addresses below, and forwarded to the Sponsor for its review and transmittal to the Railroad. The certificates of insurance shall state that the insurance coverage will not be suspended, voided, canceled, or reduced in coverage or limits without (30) days advance written notice to Railroad and the Sponsor. No work will be permitted by Railroad on its right-of-way until it has reviewed and approved in writing the evidence of insurance required herein.
 - For the Sponsor:

Construction Engineer for the DelDOT District Adminstrating the Project
 - For the Railroad:

Risk Management
Norfolk Southern Railway Company
Three Commercial Place
Norfolk, Virginia 23510-2191
- d. The insurance required herein shall in no way serve to limit the liability of Sponsor or its Contractors under the terms of this agreement.
- e. Insurance Submission Procedures

- i. Railroad will only accept initial insurance submissions via US Mail or Overnight carrier to the address noted in XV.c above. Railroad will NOT accept initial insurance submissions via email or faxes. **Please provided point of contact information with the submission including a phone number and e-mail address.**
- ii. Railroad requires the following two (2) forms of insurance in the initial insurance submission to be submitted under a cover letter providing details of the project and contact information:
 1. The full original or certified true countersigned copy of the railroad protective liability insurance policy in its entirety inclusive of all declarations, schedule of forms and endorsements along with the policy forms and endorsements .
 2. The Contractor's commercial general, automobile, and workers' compensation liability insurance certificate of liability insurance evidencing a combined single limit of a minimum of \$2M per occurrence of general and \$1M per occurrence of automobile liability insurance naming Norfolk Southern Railway Company, Three Commercial Place, Norfolk, VA 23510 as the certificate holder and as an additional insured on both the general and automobile liability insurance policy.
 - A. The full original or certified true countersigned copy of the railroad protective liability insurance policy in its entirety inclusive of all declarations, schedule of forms and endorsements along with the policy forms and endorsements.
 - B. The Contractor's commercial general, automobile, and workers' compensation liability insurance certificate of liability insurance evidencing a combined single limit of a minimum of \$2,000,000 per occurrence of general and \$1,000,000 per occurrence of automobile liability insurance naming Norfolk Southern Railway Company, Three Commercial Place, Norfolk, VA 23510 as the certificate holder and as an additional insured on both the general and automobile liability insurance policy.
 3. It should be noted that the Railroad does not accept notation of Railroad Protective insurance on a certificate of liability insurance form or Binders as Railroad must have the full original countersigned policy. Further, please note that mere receipt of the policy is not the only issue but review for compliance. Due to the number of projects system-wide, it typically takes a minimum of 30-45 days for the Railroad to review.

NOTE: The above information listed within Section XVI: Insurance, found above, is based on the most recent information obtained from the Railroad as of the date this Special Provision was written. The Contractor and all their Subcontractors, required to have this type of insurance, are directed to contact the Railroad's Risk Management Section (address found above) in order to meet any insurance revisions or additions required by the Railroad at the time of their bid.

XVI. FAILURE TO COMPLY:

- a. In the event the Contractor violates or fails to comply with any of the requirements of these Special Provisions:
 - i. The Railroad Engineer may require that the Contractor vacate Railroad property.
 - ii. The Engineer may withhold all monies due the Contractor on monthly statements.
- b. Any such orders shall remain in effect until the Contractor has remedied the situation to the satisfaction of the Railroad Engineer and the Engineer.

XVII. PAYMENT FOR COST OF COMPLIANCE:

- a. The payment for the item shall be made for at the Contract unit price per Lump Sum bid for "Maintenance of Railroad Traffic (NS)", which price and payment shall constitute full compensation for maintaining Railroad traffic during the life of the project; submission of drawings and procedures to the Railroad; for all incidental costs imposed by the Railroad on the Contractor in accordance with the terms and conditions set in these Specifications; meeting all insurance requirements as described herein; for any cost incidental to or arising from the need to meet any or all requirements outlined, herein; for all materials, labor, tools, equipment, and incidentals necessary to complete the work.
- b. Payment for the Railroad Protective Liability Insurance requirements and all other required Insurance not normally held in force by the contractor shall be made under this Item. All other Insurances (such as, but not limited to, auto, etc.) required for this Contract shall be considered incidental to the Contract.

XVIII. PROJECT INFORMATION:

- a. The following information shall be shown on all correspondence with the Railroad:
 - i. Date: _____
 - ii. NS File No.: _____
 - iii. NS Milepost: _____
 - iv. Sponsor's Project No.: _____

NOTE:

- 1. As stated above in this specification, the DelDOT will pay the Railroad directly for protective services required for this project. Should deviation from the sequence of construction plan by the Contractor result in additional costs for protective services than the method and sequence of construction originally shown in the Plans, then that additional cost shall be deducted from monies due the Contractor unless prior permission was obtained from DelDOT to revise the original method.
- 2. The Contractor's attention is drawn to Section VII.a.ii. that reads, in part:

"However, if the Contractor works within distances that violate instructions given by the Railroad's authorized representative or performs work that has not been scheduled with the Railroad's authorized representative, a flagman or flagmen may be required full time until the project has been completed."
- 3. If such "full time" flagging requirements are imposed by the Railroad because of the Contractor's negligence or willful disregard of Railroad requirements, the Contractor will be held responsible for extra cost involved. Time charges for flagging services provided, but not needed for legitimate pursuit of construction will be recorded and charges for such flagging time will be deducted from monies due the Contractor.

6/20/16

Contract No. T200512102.01

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: 8.3.0.

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

763589 - DP&L STORAGE YARD MODIFICATIONS

Description:

This work is related to the impacted privately-owned DP&L storage yard electrical and communication systems shown on the plans. This work includes the removal and relocation of impacted light poles and luminaires, and the removal and relocation of impacted motorized gate assembly systems including gate motors, card readers, and the conversion of a motorized gate to manual use. The Contractor will be responsible for any electrical wiring/cablings required to make the lighting and gate assembly systems complete and will make final electrical connections. The Contractor will be responsible for any communications wiring/cablings required to make the gate assembly system complete, DP&L will make final communication connections. Work includes saw-cutting in existing pavement for loop detection and for open-cut installation of conduit. The Contractor will also perform the construction of new foundations and the removal of the existing foundations. Work includes the supply and installation of all junction wells and conduit necessary to make for a complete and operational system. All cable no longer in use will be pulled, removed, and disposed of by the Contractor. Site lighting shall be maintained at all times. Temporary lighting measures may be used if necessary.

Materials:

The Contractor shall provide conduit and cable that meets DP&L standards and specifications. The Contractor shall identify materials (i.e. wires, conduit, parts and hardware) for the existing underground electrical service connections. These materials that provide electrical service to the relocated and new light pole locations shall match in kind. Refer to the Materials section for conduit Items 745602, 745603, and 745604 in the Special Provisions. See Special Provisions for Item 746537 "Relocating Existing Light Standards" for lighting relocation Material specifications.

Cables used shall be in conformance with the National Electric Code, insulated for 600 volts. For Material specifications, see Special Provisions for Item #'s 746605, 746690, 746911, 746912.

Ground rods shall be 10 feet long with a diameter of 3/4 inch at a minimum, copper clad, approved by the Underwriter's Laboratory and be supplied with approved clamps for connecting the grounding conductor to the rod.

See Special Provisions for Item 602774 "Masonry for Light Pole Foundation" for Foundation Material specifications

The Contractor shall provide conduit, electrical cable, communications cable, and loop detection wire that meets the motorized gate assembly manufacturer requirements, standards, and specifications.

All associated equipment with the Motorized Sliding Gate Assemblies, including, but not limited to sliding gates, motors, enclosures, and the card readers shall be removed, and/or relocated to an area as indicated on the plans and as approved by DP&L. Any equipment damaged resulting from the relocation efforts shall be replaced at the Contractor's expense. For re-wiring purposes, the Contractor shall submit the manufacturer's wiring schematic for the motorized gate assembly to DP&L for approval prior to installation.

The Contractor shall provide all materials and labor necessary for the conversion of Motorized Sliding Gate Assembly #1 to manual sliding use only. Costs associated with furnishing and installing any additional parts required for converting the motorized sliding gate to a manually operated sliding gate system shall be incidental to the gate relocation. The sliding gate manual operation shall be per DP&L requirements.

Foundations for new and relocated gate motors and card readers shall meet the requirements of the gate manufacturer and shall be of a type similar as the existing foundations. Prior to installation, the Contractor shall submit foundation details and shop drawings for the motorized gate assembly to DP&L.

Provide equipment as required to remove concrete foundations for the motorized sliding gate assemblies, including card reader foundations and gate motor foundations. Provide material as necessary to match the area surrounding the removed masonry.

The Contractor is responsible for labeling all electrical and communications equipment, including but not limited to panels, cables, conduit, junction wells, and gate system components.

Pull Strings shall be provided in all new conduit.

Junction Wells shall be Type 11, Modified. The only modification to the Type 11 Junction Well shall be to the label referenced on the lid cover. The manufacturer will label the top of the junction well lid to read "DP&L" instead of providing a standard DelDOT label reference. Refer to Special Provisions for Item 744530 "Conduit Junction Well, Type 11, Precast Concrete/Polymer Lid-Frame" for additional Materials specifications.

For earth removed, graded, or patched, provide backfill, sub-base, and pavement material as necessary to match the surrounding area. Refer to DelDOT Standard Specification Section 210 & 302, and Special Provisions for Items 401821 and 401823 for backfill and patching materials specifications.

Construction Methods:

Storage Yard Lighting - The Contractor shall contact DP&L prior to start of construction to coordinate all light pole removals, relocations, system service disconnections and proposed conduit routing. The Contractor will be responsible for removing, relocating and storing light poles and luminaires. The Contractor will furnish and install all necessary cabling/wiring to make the lighting system complete. The Contractor will make final connections. The Contractor shall pull, remove, and dispose of any existing cable from conduit no longer needed for the lighting system. The Contractor shall abandon any existing conduit no longer needed for the lighting system.

Excavation for the pole foundations 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 and tamped on all sides in layers not to exceed 6 inches (150 mm).

The Contractor shall obtain soils information of the project area for the design of the foundation for the relocated light pole. The Contractor is responsible for the foundation design. Shop Drawings certified by a Professional Engineer registered in the State of Delaware shall be submitted to DP&L and the Department for approval.

Conduit shall be installed in a trench, bore or open-cut per the Construction Methods contained in the Special Provisions for Items 745602, 745603, and 745604.

For cabling Construction Methods, refer to Special Provisions for Item #'s 746605, 746690, 746911, 746912.

Construction Methods for loop detection shall meet the motorized gate manufacturer requirements, standards, and specifications. The Contractor shall submit a wiring schematic as recommended by the manufacturer to DP&L for approval.

Removal of cable from conduit or steel pole shall be per the Construction Methods described below:

Construction Methods for Removal of Cable from Conduit or Steel Pole:

Hand pulling methods are required for conduit sizes of 1-1/2" (38 mm) or less and are preferred for all sizes.

Prior written approval by the engineer is required for the use of any power assisted method of pulling wire or cable from 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:

- 600 lbs. (2.7 kN) for non-connectorized outdoor fiber optic cable,
- 150 lbs. (670 N) for all pulls up through 12 pair communications cable, and
- 300 lbs. (1.3 kN) for all larger cables

Any and all electrical wire or cable pulled from 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 those set forth herein or prescribed by industry standards are hereby declared damaged and shall be replaced by the contractor.

For removal from steel pole, only hand pulling methods are permitted. The weatherhead cover shall be removed first using proper tools. The wire or cable shall be removed by hand and the weatherhead cover replaced properly.

The electrical wire or the number of electrical or communications cable(s) to be pulled from each conduit or steel pole will be as shown on the plans or as directed by the Engineer.

The removal of wire or cables from existing conduit or steel pole shall be accomplished by pulling the wire or cables through the conduit or steel pole.

The number of electrical wires or cables pulled from a conduit may exceed one; the entire set to be pulled shall be considered one cable even if the wires or cables are pulled one at a time.

Relocating Existing Light Standards:

Relocated light pole, including related hardware assemblies shall be carefully removed from the existing pole foundation and stored, without damage, within the project limits until installed on the new pole foundation. Should any damage occur to the light assembly, and in the opinion of the Engineer adequate precaution was not exercised by the Contractor during the relocation operation, the Contractor shall at his/her expense replace damaged components in kind or equivalent to the satisfaction of the Engineer. See Special Provisions for Item 746537 "Relocating Existing Light Standards" for lighting relocation Construction Methods.

The Contractor shall minimize the time which is required for the light(s) to be out of service by installing new conduit, electrical wiring, and pole foundations for the new locations prior to disconnecting the existing service connections and removing the light(s). Lighting for the storage lot shall not be out of service during nighttime hours. If any night-time outages are to occur, temporary lighting measures will be required.

Refer to Special Provisions for Item 744530 "Conduit Junction Well, Type 11, Precast Concrete/Polymer Lid-Frame" for additional junction-well Construction Methods.

Concrete pole foundations shall be excavated and removed to a depth as indicated under DelDOT Standard Specification Section 202.

For any removal of existing facilities and related materials, the Contractor shall backfill pavement and/or soil to previous condition. Refer to DelDOT Standard Specification Sections 210, 302, 503, and Special Provisions for Items 401821 and 401823 for additional backfill and patching Construction Methods.

Gate System Assembly - Prior to construction, the Contractor shall contact DP&L to coordinate all gate system removals, relocations, system service disconnections and proposed conduit routing. The Contractor shall submit final conduit routing and a wiring schematic for electrical and communications (as recommended by the manufacturer) to DP&L for approval. The Contractor will be responsible for removing, relocating and storing all gate assembly equipment. The Contractor will furnish and install all necessary cabling/wiring that will control the ingress and egress of storage yard vehicles and to make the gate assembly system complete. The Contractor will make final connections for power. DP&L will make final connections for communications, including making final system checks and software configuration. The Contractor shall pull, remove, and dispose of any existing cable from conduit no longer needed for the gate assembly system. The Contractor shall abandon any existing conduit no longer needed for the gate assembly system.

Relocated card readers and gate motors, including related hardware assemblies shall be carefully removed from the existing foundations and stored in a clean, dry location, free of damage, construction dust, precipitation, and excess moisture in such a manner as not to degrade quality, serviceability and appearance within the project limits until installed on the new foundations. Should any damage occur to the gate assembly, and in the opinion of the Engineer adequate precaution was not exercised by the Contractor during the relocation operation, the Contractor shall at his/her expense replace damaged component in kind or equivalent to the satisfaction of the Engineer.

Relocated gates, including related hardware assemblies shall be carefully removed and stored in a clean, dry location, free of damage, construction dust, precipitation, and excess moisture in such a manner as not to degrade quality, serviceability, and appearance within the project limits until re-installed. Should any damage occur to the gate assembly, and in the opinion of the Engineer adequate precaution was not exercised by the Contractor during the relocation operation, the Contractor shall at his/her expense replace damaged component in kind or equivalent to the satisfaction of the Engineer. Refer to Special Provisions for Item 727538 "Relocate Gate" for additional Construction Methods.

Removed card readers and gate motors, including related hardware assemblies shall be carefully removed from the existing foundations and stored in a clean, dry location, free of damage, construction dust, precipitation, and excess moisture in such a manner as not to degrade quality, serviceability, and appearance within the project limits until delivered to DP&L. Should any damage occur to the gate assembly, and in the opinion of the Engineer adequate precaution was not exercised by the Contractor during the relocation operation, the Contractor shall at his/her expense replace damaged component in kind or equivalent to the satisfaction of the Engineer.

Light pole and gate assembly equipment designated for relocation may be stored in the DP&L storage yard upon coordination with DP&L.

Existing equipment foundations for the motorized sliding gate assembly, including for the card readers and gate motors shall be completely removed. Backfill remaining holes with material that match the surrounding area in accordance with the appropriate items.

Method of Measurement:

The quantity of DP&L Storage Yard Modifications will not be measured.

Basis of Payment:

The quantity of DP&L Storage Yard Modifications will be paid for at the Contract lump sum. Price and payment will constitute full compensation for furnishing and placing all materials, including but not limited to

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light pole relocations; installation of light pole foundations; installation of gate assembly system foundations; removal of foundations for light poles and motorized gate system assemblies; motorized sliding gate relocations; conversion of a motorized gate to manual use; card reader and gate motor/enclosure relocations and removals; saw-cutting in existing pavement for open-cut conduits and for loop detection; furnishing and installing conduit, cables (electrical and communications) and loop detection system; excavation and backfill; pavement patching; cable removal, disposing of the unusable materials; and for all labor, equipment, tools and all incidentals required to complete the work and provide for operational systems.

The breakout sheet attached to the proposal shows the items of work anticipated for this item of work. The Contractor shall fill in the unit price and the cost (unit price times the proposed quantity) for each item of work listed. The lump sum price bid for item 763589 - DP&L Storage Yard Modifications shall be the sum of the total cost for all items of work listed. The completed typewritten 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 of work listed, and the right to add or subtract from the quantity of each item of work 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.

1/19/18

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

763711 - OSHA LEVEL C UPGRADE

Description:

This work describes the OSHA Level C Health and Safety Requirements that may be required in specified areas as a result of excavation, removal and treatment/disposal of contaminated materials during 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.

Upgrade to Level C Personal Protective Equipment (PPE) requires workers to be 40-hour HAZWOPER trained, medically monitored and respirator fit tested. The Contractor must be capable to upgrade to Level C if field conditions warrant. It is the sole responsibility of the Contractor to ensure that the work crew have the proper training and necessary PPE to complete the required scope of work.

Construction Methods and Responsibilities:

The Contractor shall be responsible for providing the appropriate equipment and personnel necessary to perform OSHA Level C work as required during construction activities. The work will be performed in accordance with the procedures described in the site specific "Health and Safety Plan" prepared by the Department's environmental representative. A copy of this plan is provided in the bid package at advertisement. The Contractor shall adhere to applicable Occupational Safety and Health standards, Guidelines and/or Laws. This will include compliance with 29 CFR Part 1910.

OSHA Level C work will consist of using specific Personal Protective Equipment (PPE) such as tyvek (regular, or poly-coated, if field conditions are wet), nitrile gloves, booties and respiratory protection as described in the Health and Safety Plan. This upgrade to Level C PPE will be based on air monitoring and assessment of field conditions by the Department's environmental representative.

- A. Personal Protective Equipment (PPE). It is possible that work performed in the areas specified on the Plans as "Potential for Level C Upgrade" will require the upgrade to OSHA Level C PPE, with the proper site control measures. The Contractor will take those steps necessary, including providing all necessary Level C equipment necessary to complete construction activities in OSHA Level C PPE, if required (see Section 4 of the site specific Health and Safety Plan).
- B. Site Control Measures. The contractor will be responsible for designating the proper site control measures for Level C work. This shall include designating an exclusion zone, contamination reduction zone, and support zone.
- C. Air monitoring. All air monitoring during Level C work will be performed by the Department's environmental representative. The HASP section 3.4.2 specifies and justifies the action levels that shall require the Site Safety and Health Officer (SSHO) to alter operations by changing the required PPE, recommending different site control measures to be implemented, or temporarily stopping construction activities.
- D. Site Worker Training Documentation. Prior to any Level C work on the site, the contractor will provide to the Engineer and the Department's environmental representative documentation of the initial OSHA 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) training, 8-hr refresher certification (if needed), medical monitoring, medical certification to wear a respirator and a current fit test for all crew members who will perform work in Level C.

- E. Decontamination plan. The contractor will attempt to remove visible material from the equipment prior to leaving the construction site. The Contractor will be responsible for properly cleaning and maintaining all Level C equipment.

The Department's environmental representative shall be present during all phases of work associated with OSHA Level C Work. Payment will not be made for any work done when a Department approved Inspector and environmental representative is not present to provide environmental oversight.

Department's Responsibilities:

The Department is responsible for providing and paying the environmental representative. The Department's environmental representative will conduct air monitoring during any excavation activities at the site to monitor breathing zone concentrations. 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 contamination utilizing vapor monitoring techniques and collect samples for laboratory analysis to meet the requirements of the treatment/disposal facility, DNREC and/or the USEPA.

Method of Measurement:

The quantity of OSHA Level C Upgrade work will be measured as the number of hours of OSHA Level C work performed.

Basis of Payment:

The quantity of OSHA Level C Upgrade will be paid for at the Contract unit price per hour. Price and payment shall constitute full compensation for furnishing 40-hour HAZWOPER trained workers in Level C PPE, if required, at an hourly incremental difference above the standard excavation pay items included in this contract. Contractor's costs for OSHA Level C work will constitute full compensation for all labor, equipment, tools, establishment of exclusion, contamination and support zones, removal and restoration of areas, and incidentals necessary to satisfactorily complete the work as herein described under the item.

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.

01/22/18

907510 - COMPOST FILTER LOG

Description:

This item shall consist of furnishing all materials and constructing a compost filter log in accordance with the locations and notes on the Plans and/or as directed by the Engineer.

Materials:

The filter sock shall be 5 millimeter biodegradable HDPE material, and be at least 18" in diameter. The compost media used within the logs shall be a plant derived compost that complies with compost material standards and DNREC specifications (see table below), including being produced from a certified facility through the U.S. Composting Seal of Testing Assurance (STA) program.

Parameter	Range	Testing Method
Particle Size	For Amendments: 100% pass through a 1/2" screen For Compost Logs: 99% pass through a 2" screen; max. 40% pass through a 3/8" screen	TMECC 2.02-B
pH	6.0-8.0	TMECC 4.11
Manufactured Inert Material	<1% dry weight basis	TMECC 3.08-A
Organic Matter	35-95% dry weight basis	TMECC 5.07-A
Soluble Salt Concentration	<= 6.0 mmhos/cm	TMECC 4.10-A
Carbon to Nitrogen Ratio (C:N)	<= 25:1	
Stability (Carbon Dioxide evolution rate)	<= 2 C / unit VS / day	TMECC 5.08-B
Maturity (seed emergence and seedling vigor)	>90% relative to positive control	TMECC 5.05-A
Trace Metals	"Pass"	
Dry Bulk Density	12.5-25 lb/cu.ft.	
Moisture content	40-50%	

Construction Methods:

The compost filter logs shall be assembled by tying a knot in one end of the filter sock, filling the sock with the composted material, then knotting the other end once the desired length is reached. The compost shall be uniform throughout the sock and shall not have any gaps or the presence of large materials that would impede flow and/or create gaps. The compost filter log may be supplied pre-filled and simply rolled out in place.

The ends of the compost filter log should be angled upslope to prevent runoff from washing around the ends; minimum one foot (1') elevation difference. Stakes shall be installed through the middle of the compost filter log, maximum four feet (4') on center. The stakes shall be hardwood stakes, minimum 2" x 2" and 36" long. The stakes shall be set a minimum 12" below grade.

The compost filter logs shall be inspected weekly and after storm events. Accumulated sediment shall be removed when it reaches half of the effective height of the sock, and disposed of in an appropriate manner. If the sock fabric is torn or damaged prior to completion of the project, the compost filter log shall be replaced at the expense of the contractor. If the compost filter log has been flattened due to equipment or vehicular traffic, it shall be re-shaped back to proper dimensions. If the effective height cannot be restored, then the compost filter log shall be replaced at the expense of the contractor.

Upon completion of construction and stabilization of disturbed areas, the contractor shall remove the compost filter log in its entirety.

Method of Measurement:

The quantity of compost filter logs, completed in place and accepted, shall be paid for at the Contract bid per linear foot for "Compost Filter Logs"

Basis of Payment:

Price and payment shall constitute full compensation for furnishing all materials including filter socks, compost material, wooden stakes, disposal of surplus and unsuitable materials, removal and disposal of used filter sock and sediment during and upon completion of construction and for all labor, tools, equipment and incidentals necessary to complete the item.

1/22/2018

908501 – NATIVE GRASS SEEDING: NO MOW MIX

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:

Native Grass Seeding: No Mow Mix:

Species Name Common / (Latin)	Max. % Weed Seeds	Min % Purity	Min % Germination	Seeding Rate lb/Ac
Annual Rye (<i>Lolium multiflorum</i>)	0.15	98	90	30
Little Bluestem (<i>Schizachyrium scoparium</i> var. <i>scoparium</i> (formerly <i>Andropogon</i> <i>scoparius</i>))	1.00	80	70	40
Deertongue (<i>Dichanthelium clandestinum</i> (formerly <i>Panicum clandestinum</i>))	1.00	95	60	30
Switchgrass (<i>Panicum virgatum</i>)	1.00	95	70	20
Indian Grass (<i>Sorghastrum nutans</i>)	1.00	85	75	30
Total Seed Quantity (lb/ac)				150

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.

Small Grain Straw: 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 the Native Grass Seeding: No Mow Mix shall only occur between the following dates:

September 1st to November 15th.

Low-pressure tires or equipment shall be used in preparation of the seed bed and on seeding equipment.

No Lime or Fertilizer shall be added to the Native Grass Seeding: No Mow Mix.

Small grain straw shall be uniformly and evenly applied immediately after seed has been placed. 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.

Straw mulch shall be applied uniformly and evenly across the seeded area at the rate of 4,000 lb/ac and secured by one of the following methods:

1. *Crimping Method.* This method of incorporating the straw into the ground shall be accomplished with the use of crimping device that produces horizontally oriented indentation. Straw mulch shall be incorporated into the soil to a minimum depth of 2" (50 mm). The crimping device shall be approved by the Engineer.
2. *Tracking Method.* This method may be used on all sites mulched with straw and shall involve the use of steel-cleat track-type equipment driving up and down the slopes producing horizontally oriented indentations with the cleats. Cleats shall be capable of incorporating the straw mulch into the soil to a minimum depth of 1 1/2" (40 mm). The equipment used and the method of tracking shall be approved by the Engineer.
3. *Discing Method.* This method shall only be used if specified on the plans and shall involve the use of a disc or harrow to mix the straw into the soil. Straw mulch shall be incorporated into the soil to the depths specified on the plans and to a minimum depth of 3" (76 mm) if not specified on the plans. The discing device shall be as specified on the plans and approved by the Engineer.

Acceptance of 908501– Native Grass Seeding: No Mow Mix 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 908.05 C – Seeding.

Basis of Payment:

As per Section 908.06 C – Seeding.

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 (Echinochloa 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

908512 - TEMPORARY GRASS SEEDING - WET GROUND (TGS-WG)

Description:

This work consists of furnishing and placing seed. Mulch shall be placed within non-wetland areas only. No mulch shall be placed within wetland areas (as delineated on the Plans).

Materials:

Temporary Grass Seeding - Wet Ground (TGS-WG).

Species Name Common / (Latin)	Max. % Weed Seeds	Min. % Purity	Min. % Germination	Seeding Rate lb/Ac
Annual Barnyard Grass/Duck Millet (<i>Echinochloa</i> spp.) <i>Echinochloa muricata</i> or <i>Echinochloa walteri</i> are preferred	1.00	90	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.

Small Grain Straw: Straw for mulching will be from oats, wheat, rye, or other approved grain crops that are free from noxious weeds, mold, or other objectionable material. Straw mulch will be in an air-dry condition and will be suitable for placing with an approved mechanical blower.

Construction Methods:

Application of the Temporary Grass Seeding - Wet Ground Mix shall only occur between the following dates:

May 1 to October 1.

Seed may be broadcast or hydroseeded. No lime or fertilizer will be added. Unless specified on the plans, no mulch will be applied.

If specified on the plans, small grain straw will be uniformly and evenly applied immediately after seed has been placed. An approved mechanical blower will be used to apply the straw. Straw mulch applied

Contract No. T200512102.01

by blowers will provide a loose depth of not less than 1/2 nor more than 2". Ninety-five percent of the blown and shredded straw mulch will be 6" or more in length when in place.

Straw mulch will be applied uniformly and evenly across the seeded area at the rate of 4,000 lb/ac. No crimpling or tracking is required of the seed or straw.

Acceptance of 908512 - Temporary Grass Seeding - Wet Ground (TGS-WG) will be made at time of placement, provided the seed and straw placed as specified herein and as directed on the Plans.

No Maintenance Bond is required for this work.

Method of Measurement:

The Engineer will measure the quantity of acceptably placed permanent seed. The quantity of seeding shall be measured in square yards of surface area.

Basis of Payment:

The quantity and type of seeding shall be paid for at the Contract Unit Price per square yard. Price and payment will constitute full compensation for preparing the ground; for furnishing and placing all materials including seed and mulch; and for all labor, equipment, tools, maintenance bond and incidentals required to complete the work.

Payment will be made at the time seed is acceptably placed.

3/9/16

910500 - BIO-RETENTION SOIL, MIX I

Description:

The item shall consist of furnishing and placing a soil mixture of peat, shredded mulch, and sand for planting. The soil mixture must be provided from a DNREC approved Biosoil-14 supplier. The soil mixture shall be a rich, friable material conforming to the requirements of these specifications and shall be placed within the bio-retention areas at locations as shown on the Plans, and as directed by the Engineer.

Materials:

The Bioretention Soil, Mix 1 (BSM) is a mixture of peat, mulch, and sand consisting of the following:

Item	Composition by Volume	Reference
Peat	10%	Aged, STA Certified Compost.
Shredded 3x Hardwood Mulch	30%	
Sand	60%	Concrete Sand; fineness modulus >2.75

At least 45 days prior to the start of construction of bio-retention facilities, the Contractor shall submit the BSM supplier to the Engineer for approval. Stockpiles of BSM must be placed on an impervious surface, and once a stockpile of the BSM has been established, no material shall be added to the stockpile. BSM stockpiles shall be covered at all times.

The BSM shall be a uniform mix, free of stones, stumps, roots or other similar objects larger than two inches excluding mulch. No other materials or substances shall be mixed or dumped within the bio-retention area that may be harmful to plant growth, or prove a hindrance to the planting or maintenance operations. The BSM shall be provided from DNREC approved Biosoil-14 supplier

Construction Methods:

Bio-retention facilities shall not be constructed until all contributing drainage areas are stabilized with at least 3” (75 mm) tall grass of the specified mix as shown on the Contract Plans and to the satisfaction of the Engineer. Bio-retention facilities shall not be used as sediment control facilities. No heavy equipment shall operate within the perimeter of a bio-retention facility during excavation, underdrain placement, backfilling, planting, or mulching of the facility.

The bioretention facility shall be excavated to the dimensions, side slopes, and elevations shown on the Contract Plans. The method of excavation shall minimize the compaction of the bottom of the bioretention facility. Excavators and backhoes, operating on the ground adjacent to the bioretention facility, shall be used to excavate the facility if possible. Low ground-contact pressure equipment may also be used for excavation. No heavy equipment shall be allowed on the bottom of the bioretention facility.

The BSM shall be placed and graded using low ground-contact pressure equipment or by excavators and/or backhoes operating on the ground adjacent to the bio-retention facility. No heavy equipment shall be used within the perimeter of the bio-retention facility before, during, or after the placement of the BSM. The BSM shall be placed in horizontal layers not to exceed 12” (300 mm) for the entire area of the bio-retention facility. The BSM shall be compacted by saturating the entire area of the bio-retention facility after each lift of BSM is placed until water flows from the underdrain. Water for saturation shall be applied by spraying

or sprinkling. Saturation of each lift shall be performed in the presence of the Engineer. An appropriate sediment control device shall be used to treat any sediment-laden water discharged from the underdrain. If the BSM becomes contaminated during the construction of the facility, the contaminated material shall be removed and replaced with uncontaminated material at no additional cost to the Department. Final grading of the BSM shall be performed after a 24-hour settling period. Final elevations shall be within 2" (50 mm) of elevations shown on the Contract Plans.

Method of Measurement and Basis of Payment:

The quantity of Bio-retention Soil, Mix I will be paid for at the Contract unit price per cubic yard (meter). Price and payment will constitute full compensation for furnishing, hauling, storing, re-handling of material and placement of the BSM backfill, compaction of the BSM backfill by saturation, grading and slope adjustments, and for all material, labor, equipment, tools, and incidentals necessary satisfactorily complete the work.

1/22/2018

UTILITY STATEMENT

MARCH 19, 2018

**STATE CONTRACT # T200512102
P3e# 04-00197
F.A.P. # STP-N029(3)
CHRISTINA RIVER BRIDGE APPROACHES
NEW CASTLE COUNTY**

The following utility companies maintain facilities within the project limits:

AT&T

City of Wilmington - Sanitary Sewer

City of Wilmington – Water

Comcast Cable of New Castle County

Delmarva Power & Light – Electric Distribution

Delmarva Power & Light – Electric Transmission

Delmarva Power & Light – Gas

New Castle County Department of Special Services - Sanitary Sewer

Verizon Delaware LLC

Utility adjustments and/or relocations shall be performed as narrated, but are not limited to the following:

AT&T

AT&T maintains aerial and underground facilities within the limits of Contract T200512102.

The Company shall perform all required utility relocations in advance of Contract T200512102. AT&T will utilize an existing AT&T CORE underground path to eliminate the existing aerial path that is affected by the construction of this project. The Company shall provide and install all necessary materials and will complete the necessary work themselves. The Company shall pull and splice all cables and make all connections necessary.

Any further relocations and/or adjustments will be performed by the appropriate Company's forces during construction of this project. The time to complete any relocations/adjustments will depend on the nature of the work.

City of Wilmington - Sanitary Sewer

The City maintains underground facilities within the limits of Contract T200512102.

The State's contractor shall perform the following relocations and adjustments:

Multiple sanitary manhole (32) and sanitary clean-out (17) adjustments required due to the proposed construction activities.

These adjustments and any relocations of City sewer facilities shall be performed by the State's contractor in accordance with the respective agencies' standard specifications as directed by the Engineer. The State contractor shall notify the City a minimum of seven (7) calendar days in advance of the State contractor performing any necessary facility adjustments.

City of Wilmington - Water

The City maintains underground facilities within the limits of Contract T200512102.

The State's contractor shall perform the following relocations and adjustments:

Multiple water valve adjustments (43) throughout the project required due to the proposed construction activities.

Multiple fire hydrant relocations (8), adjustments (3), and removals (2) throughout the project required due to the proposed construction activities.

Stadium Drive, Sta. 501+00 to Sta. 517+20: Construct 1,620 LF of new 8" DIP water main with two (2) fire hydrants. Connect to existing 8" water line at Sta. 517+00.

S. Madison Street, Sta. 202+07 to Sta. 207+17: Construct 510 LF of new 8" DIP water main with one (1) fire hydrant. Connect to existing 8" water line at Sta. 207+17.

S. Madison Street, Sta. 219+27 to Sta. 228+45: Construct 920 LF of new 8" DIP water main with three (3) fire hydrants. Connect to existing 8" water line at Sta. 219+27, and to the existing Beech Street stub at Sta. 228+45. Install benzene resistant gaskets from Sta. 223+00 to Sta. 228+45. Abandon existing 8" water main in existing Shipyard Drive from S. Madison Street to Justison Street.

Shipyard Drive, Sta. 300+12 to Sta. 305+52: Construct 540 LF of new 8" DIP water main with one (1) fire hydrant. Connect to existing 8" water line at Sta. 300+12, and to the new S. Madison Street line at Sta. 305+52. Install benzene resistant gaskets for this entire length of main.

New Sweden Street, Sta. 433+50 to existing Riverwalk stub constructed under Contract T201612101: Construct 166 LF of new 6" DIP water line to one (1) fire hydrant.

New Sweden Street, Sta. 451+15 to Sta. 452+24: Construct 110 LF of new 12" DIP water main, extending the water main constructed under Contract T201612101, and connecting to existing Market Street 12" water main.

Walnut Street, Sta. 53+79, rt.: Relocate vertically existing 4" water line as necessary to install proposed storm drain inlet and pipes.

Market Street, Sta. 98+10, It.: Relocate vertically existing 8" water line as necessary to install proposed bioretention facility.

Market Street, Sta. 110+28, It.: Relocate vertically existing 12" water line as necessary to install proposed storm drain inlet and pipes.

The relocations and/or adjustments of City water facilities described above shall be performed by the State's contractor in accordance with the respective agencies' standard specifications as directed by the Engineer. The State contractor shall notify the City a minimum of seven (7) calendar days in advance of the State contractor performing any necessary facility relocations and/or adjustments.

Comcast

Comcast maintains aerial and underground facilities within the limits of Contract T200512102.

The utility work shall include, but not be limited to the following:

1. Comcast's Responsibility:

The Company shall provide and deliver to the project site all materials, including conduit, marking tape, and hand holes for the State's Contractor to install. Following installation of these materials by the State's Contractor, the Company will relocate the existing aerial cables into the conduit system, and shall pull and splice all cables and make all connections necessary.

There are (2) locations on Market Street that Comcast has overhead coax crossing the road, with service to businesses. These locations will require a handhole be placed by the State's Contractor, then Comcast will install service to the buildings via service risers.

Market Street locations:

Sta. 105+15, left – new underground service to building, was overhead
Sta. 109+60, left – new underground service to building, was overhead

2. State's Contractor Responsibility:

The State's Contractor shall excavate the trench, install conduit, marking tape, and hand holes provided by Comcast, and backfill the trench per the trench detail on the plans and the Company's standard specifications, including stone in the bottom of the handholes. This includes a minimum cover requirement of 42", with marking tape installed 12" above the conduit.

The State's Contractor shall install the following Comcast line relocations:

Market Street, Sta. 94+20, rt. to Sta. 95+55, lt. – install two (2), 4” PVC conduits under Market Street from a new Delmarva Power & Electric pole (Sta. 94+20, rt.) to a new handhole (Sta. 95+55, lt.). From this new handhole, install one (1), 4” PVC conduit southward to existing utility pole #48394/42686 to be reconnected by Comcast to the existing aerial facilities.

Market Street, Sta. 95+55, lt. to Sta. 100+20, lt. – install two (2), 4” PVC conduits from the new handhole (Sta. 95+55, lt.) northward under the new roadway connection to James Court, just to the west of the new stormwater management facility, to a new handhole on top of the existing Comcast conduit (James Court Sta. 708+00, rt.), northeast to a new handhole (Sta. 100+20, lt.).

New Sweden Street, Sta. 451+95, rt. to Sta. 445+70, lt. – install two (2), 4” PVC conduits from the new handhole (Market Street Sta. 100+20, lt.) westward to a new handhole (Sta. 451+15, rt.), then southeast to existing utility pole #48391/42746 to be reconnected by Comcast to the existing aerial facilities. From the new handhole (Sta. 451+15, rt.), install two (2), 4” PVC conduits under New Sweden Street to a new handhole (Sta. 451+15, lt.), westward to a new handhole (Sta. 446+25, lt.), crossing East Bank Lane to a new handhole (Sta. 445+70, lt.).

Walnut Street, Sta. 59+10, rt. to Sta. 64+00, lt. - install two (2), 4” PVC conduits from a new handhole (Sta. 59+10, rt.), northward under New Sweden Street to a new handhole on top of the existing Comcast conduit (Sta. 60+35, rt.), then northward to the east of the new stormwater management facility, to a new handhole on top of the existing Comcast conduit (Sta. 63+25, rt.), northwest to a new handhole (Sta. 64+00, rt.). From this new handhole, install two (2), 4” PVC conduits under Walnut Street to a new handhole (Sta. 64+00, lt.).

Market Street, Sta. 105+25 - install two (2), 4” PVC conduits from the new handhole (Walnut Street Sta. 64+00, lt.) westward to a new handhole (Market Street Sta. 105+25, rt.). Install two (2), 4” PVC conduits under Market Street to a new handhole (Sta. 105+25, lt.).

Company review of Field Changes

Comcast maintains the right to approve any design changes submitted by the Engineer as well as the right to review any field changes that could impact the construction of the Comcast conduits.

Comcast will require twenty-five (25) calendar days to complete the proposed aerial relocation work and cabling into the conduit system. Comcast will require five (5) calendar days advance notice of completion of the conduit system, cut and fill stakes, staking rights of way, the completion of Delmarva Power & Light and AT&T work, and the Notice to Proceed before any work will start.

Any further relocations and/or adjustments will be performed by the appropriate Company's forces during construction of this project. The time to complete any relocations/adjustments will depend on the nature of the work.

Delmarva Power & Light – Electric Distribution

The aforementioned Company maintains aerial and underground facilities within the limits of Contract T200512102.

NOTE: AT ALL SWITCHGEAR AND TRANSFORMER LOCATIONS, DELMARVA POWER WILL REQUIRE A TEN (10) FOOT CLEARANCE ON THE FRONT SIDE OF DEVICE, A THREE (3) FOOT CLEARANCE TO THE REAR OF DEVICE, AND A MINIMUM OF FOUR (4) FEET ON THE OTHER SIDES WITH NO OBSTRUCTIONS SUCH AS FENCE, WALL, SHRUBS AND ANY OTHER STRUCTURES.

Outages on the 12kv circuits will only be permitted as load, weather and other system conditions permit.

The utility work shall include, but not be limited to the following:

1. Delmarva Power & Light's Responsibility:

Overhead Facilities: the Company will perform the following temporary and permanent overhead utility relocations:

Stadium Drive, Sta. 501+00, rt. to Sta. 503+80, lt. – remove existing overhead electric and poles, install two new poles (Sta. 501+60, lt. and Sta. 503+25, lt.) with cobrahead luminaires, and connect via overhead to existing utility pole #48133/42749.

Stadium Drive, Sta. 510+20, lt. to Sta. 512+07, lt. – remove existing overhead electric and poles, install one new pole (Sta. 511+35, lt.), and connect via overhead to existing private pole, billboard, and utility pole #48133/42805.

Stadium Drive, Sta. 517+60, lt. to Sta. 527+90, rt. – remove existing overhead electric and poles, install six new poles beyond lateral offset (Sta. 519+00, lt., Sta. 520+80, lt., Sta. 522+50, lt., Sta. 524+25, lt., Sta. 525+90, lt. and Sta. 526+25, lt.), and connect via overhead to existing utility pole #48129/42878, billboards, existing aerial and underground services, and existing utility pole #48158/42972.

Shipyard Drive, Sta. 301+60, rt. to Sta. 308+40, rt. – remove existing private overhead electric, cobrahead luminaires and poles.

Shipyard Drive, Sta. 306+35, lt. to Sta. 308+40, lt. – install three new private poles with cobrahead luminaires and connect via overhead to existing private pole.

S. Madison Street, Sta. 225+75 - remove existing private overhead electric and one pole.

S. Madison Street, Sta. 228+50, lt. – install new pole in line with existing overhead facilities, and remove existing overhead electric and one pole with cobrahead luminaire (#48218/42995).

S. Madison Street, Sta. 229+40, rt. – remove existing overhead electric and one pole with cobrahead luminaire (#48190/42735).

New Sweden Street, Sta. 430+80, rt. – install new pole in line with existing overhead facilities, and remove existing overhead electric and one pole.

Market Street, Sta. 105+25, rt. to Sta. 110+80, rt. – install temporary overhead electric relocation in advance of Phase 1 construction, utilizing higher poles to go over buildings.

Walnut Street, Sta. 74+25, lt. to Sta. 76+15, lt. – install aerial backfeed from existing utility pole #48468/42882 to existing utility pole #48478/42899.

Underground Facilities: Following installation of the manholes and conduit by the State's Contractor, the Company will relocate the existing aerial cables into the conduit system, and shall pull and splice all cables and make all connections necessary. The Company will remove designated switchgears, transformers, and private meters, and furnish and install all proposed switchgears, transformers, and private meters.

The Company proposes to relocate the one (1) existing aerial circuit on pole line and one (1) existing underground circuit in manhole/conduit system along Market Street from Sta. 94+00, rt. to Sta. 110+40, rt. The Company will be responsible for insuring that the manhole conduit system being constructed by the State's contractor is being built to the specifications and standards set by the Company. The Company will provide field inspection for quality assurance. The Company will be responsible for ordering primary and secondary cables, pad mount transformers / switchgears, splices and terminations required for relocation of existing aerial facilities into the underground duct bank and removal of the aerial pole lines. The Company reserves the right to give the Company's in-house cables crews the first option of pulling all associated cable through their conduit system. The Company will remove all Delmarva Power Electric cables from existing conduit system, remove all cables from the aerial facilities and remove the Company's poles upon completion of the new facilities.

2. State's Contractor Responsibility:

The State's Contractor shall furnish and install all materials, including precast manholes, conduit, marking tape, hand holes, trench excavation and backfill per the trench detail on the plans and the Company's standard specifications, including stone in the bottom of the handholes. This includes a minimum cover requirement of 42", with marking tape installed 12" above the conduit.

The State's Contractor shall install the following Delmarva Power & Light line relocations:

Stadium Drive, Sta. 509+00 – install (2), 6" PVC conduits under Stadium Drive and cap for future use.

Stadium Drive, Sta. 516+00, rt. to Sta. 519+00, lt. – install (2), 6" PVC conduits from Transformer T-1 northward and under Stadium Drive to new utility pole.

Marsh Road, Sta. 3007+65, lt. to S. Madison Street, Sta. 203+00, lt. - install (2), 6" PVC conduits from existing conduit system, to Private Meter PM-1/ Switchgear SW-1, westward to new utility pole, and northward under Stadium Drive to tie into existing conduit system.

New Sweden Street, Sta. 430+40, lt. to Sta. 430+80, rt. – install (2), 6" PVC conduits from existing manhole southward and under New Sweden Street to new utility pole.

The State's Contractor shall adjust the following Delmarva Power & Light existing manholes to the proposed grade:

Stadium Drive, Sta. 532+50, rt.

Market Street, Sta. 94+00, rt. to Sta. 110+40, rt. - furnish and install a new (3 x 2, 6") manhole duct system (encased in concrete) as well as associated duct runs across Market Street to existing and future customers. The electric manhole with duct system must be installed in accordance with the Company's standards and specifications. Contractor will be responsible for furnishing all materials associated with underground system such as (manholes, conduits, spacers, etc.). The duct system must be installed by a company that is qualified in Delmarva Power Electric work, and must be approved by Delmarva Power Electric prior to any construction activities.

Market Street, Sta. 109+80, lt. - reinstall electric service to the building via service riser.

The State's contractor will provide the following: a level area accessible to the Company's construction vehicles, survey for the Company as required, an area accessible for maintenance during and post construction, as well as select, clearing and grubbing, and cuts and fills to within one foot (+/-).

NOTE: DelDOT shall be responsible for any removal of contaminated fill or water. Select to be placed in these locations prior to Delmarva Power excavation. DelDOT will also provide monitoring agency.

Scheduling of outage and tie over for City of Wilmington Circuits:

Overtime will be required in order to splice, terminate and tie new circuits into the Company's existing electrical system. This will include nights and weekend work. No

outages will be permitted during the months of July and August. Outages may be restricted in September in the event of hot weather.

Company review of Field Changes:

The Company maintains the right to approve any design changes submitted by the Engineer as well as the right to review any field changes that could impact the construction of the electric manhole duct system.

Lead-Time for cable and associated materials (16-23 Weeks)

The lead time to procure these materials could possibly increase due to the economic situation and suppliers eliminating shifts.

NOTE: ESTIMATE DOES NOT INCLUDE COSTS FOR THE FOLLOWING:

REMOVAL/ BLASTING OF ROCK, CLEARING AND GRUBBING, REMOVAL OF SPOILS FROM SITE, SELECT TO BE PROVIDED BY DELDOT, RESTORATION COST NOT INCLUDED, REMOVAL AND DISPOSAL OF ANY CONTAMINATED DIRT OR WATER, MAINTAINING EXISTING U.G. & AERIAL FACILITIES DURING ROAD CONSTRUCTION PHASE

Delmarva Power will **require one hundred (100) calendar** days to complete the proposed work following twenty-eight (28) calendar days advance notice of completion of the manhole duct system, clearing and grubbing, cuts and fills made, staking of rights of way and completion of the Utility Pre-Construction Meeting for this contract and the procurement of easements by DelDOT and receipt of "NTP".

Proposed Service Point Locations for Lighting:

- (1) The Company will furnish and install a pad mounted transformer to replace the existing 120/240V, single phase, pad mounted transformer #48133/42874, which will be impacted by construction. The existing transformer is fed from pole #48132/42890 and currently powers stadium parking lot lighting. The new transformer will power both parking lot lighting as well as roadway lighting along New Sweden Street and will be located at STA 516+03, 43 ft. RT. The State's Contractor will furnish and install all conduit from the transformer to the relocated utility pole on the west side of Stadium Drive. The Company will furnish and install all cable from the transformer to the relocated utility pole on the west side of Stadium Drive. DelDOT will furnish and install conduit and cables to the parking lot and roadway lighting systems. The parking lot lighting and roadway lighting will not be metered services. The Company will assist DelDOT in making the final connections from the lighting system at the transformer.

- (2) There is an existing 120/240V, single phase, pad mounted transformer (#48187/42942) at STA 304+00, 88 ft. RT. This transformer powers existing parking lot lighting. Due to construction impacts, a new connection between the parking lot lighting and the transformer will be required. Additionally, this transformer is proposed to power roadway lighting on Shipyard Drive, New Sweden Street, and S. Madison Street. DelDOT will furnish and install conduit and cables to the lighting system. The parking lot lighting and roadway lighting will not be metered services. The Company will assist DelDOT in making the final connections at the transformer.
- (3) There is an existing 120/240V, single phase, pad mounted transformer (#48203/429XX) at STA 220+34, 80 ft. RT. This transformer powers existing parking lot lighting. Due to construction impacts, a new connection between the parking lot lighting and the transformer will be required. Additionally, this transformer is proposed to power roadway lighting on S. Madison Street. DelDOT will furnish and install conduit and cables to the lighting system. The parking lot lighting and roadway lighting will not be metered services. The Company will assist DelDOT in making the final connections at the transformer.
- (4) The Company will install a 120/240V single phase transformer on existing pole #48190/42735 at STA 430+80, 41 ft. RT. to power the proposed roadway lighting on New Sweden Street and S. Madison Street. The State will be required to come to the pole. The Company will install the riser on the pole and make final connections.
- (5) The Company will install a 120/240V single phase transformer on relocated pole #48383/42758 at STA 450+14, 59 ft. LT. to power the proposed roadway lighting on New Sweden Street and US 13. Roadway lighting on New Sweden Street will be un-metered; therefore, the State will be required to come to the pole. Roadway lighting on US13 will be metered. The State's Contractor will furnish and install conduit from the service pedestal to the base of the pole. The Company will furnish and install cable from the service pedestal to the base of the pole. The Company will install the risers on the pole and make final connections.
- (6) There is an existing 120/240V, single phase transformer mounted on existing pole #48436/42830 at STA 68+23, 29 ft. LT. that powers roadway lighting (to remain). This transformer is proposed to power new, unmetered, shared-use path lighting along Walnut Street. DelDOT will furnish and install conduit and cables to the proposed shared-use path lighting. The State will be required to come to the pole. The Company will install the riser on the pole and make final connections.
- (7) There is an existing 120/240V, single phase, pad mounted transformer (#48519/42944) at STA 82+89, 79 ft. RT. This transformer is proposed to

provide service for shared-use path lighting along Walnut Street. DelDOT will furnish and install conduit and cables from the transformer to the proposed shared-use path lighting. The Company will assist DelDOT in making the final connections at the transformer.

- (8) The Company will require that DelDOT's contractor provide some type of disconnect for each run of roadway lights and unmetered electrical service by using a fuse or disconnect switch, as well as supply four (4) copies of as built drawings.
- (9) The Company will require that DelDOT's contractor provide a metered service pedestal and disconnect for the roadway lighting on US13.
- (10) DelDOT will be responsible for providing the Company with an application for lighting that will need to show how many lights and wattage of lights. On this same form, the DelDOT inspector will be required to signoff on lights that they meet lighting standards and code. All this needs to be done prior to Delmarva energizing the service point.

Any further relocations and/or adjustments will be performed by the appropriate Company's forces during construction of this project. The time to complete any relocations/adjustments will depend on the nature of the work.

Delmarva Power & Light – Electric Transmission

The aforementioned Company maintains aerial facilities within the limits of Contract T200512102 with no apparent conflicts with the proposed construction activities.

Due to roadway fill being placed adjacent to existing transmission pole #59 at Walnut Street Sta. 56+22, 22' Rt., the Company shall extend the corrocote coating upwards to protect the steel pole against corrosion prior to the State's Contractor placing the roadway fill.

Any relocations and/or adjustments to the aforementioned Company's existing facilities that may arise during construction will be performed by the appropriate Company's forces during construction of this project. The time to complete any relocations/adjustments will depend on the nature of the work.

Delmarva Power & Light - Gas

The aforementioned Company maintains 2", 4" and 8" plastic and steel high pressure gas mains, along with a 12" steel transmission pressure gas main, within the limits of Contract T200512102.

1. DP&L Gas' Responsibility:

The Company shall furnish and install the following gas line relocations and adjustments:

Replace 500 LF of 4" plastic high pressure gas main with an 8" gas line on the west side of Justison Street just south of existing Shipyard Drive. Relocate the 12" steel transmission gas main on Beech Street at S. Madison Street with a crossing at Sta. 228+90 and along Beech Street for a distance of 210 LF. Abandon the existing 12" gas line on the west side of Justison Street from existing Shipyard Drive to Beech Street. This work will take 45 calendar days and require 110 CY of select.

Relocate the 12" valve nest and gas regulator station from the Beech Street/S. Madison Street intersection to the Delmarva property at the LNG facility with a road crossing of Marsh Road at Sta. 3007+15. At the existing Beech Street regular station, DP&L-Gas shall demolish and remove all above-grade equipment and materials. All subsurface equipment at the existing Beech Street regular station shall be purged and properly abandoned by DP&L-Gas, but shall remain in place for the State's Contractor to remove. This work will take 120 calendar days.

Install a new 12" steel transmission gas main under the Christina River via horizontal directional drilling methods on the south side of the bridge (a distance of 2400') from New Sweden Street, approx. sta. 428+00 to existing Walnut Street (sta. 453+50 on New Sweden Street). Prior to installation of the gas main, Delmarva Power & Light-Gas shall coordinate with the contractors for Contract T201612101 and T200512102 to determine the timing and location of the installed line, any requirements, procedures, or precautions to be implemented when working in the vicinity of the aforementioned DelDOT contracts, including accessing the site and storing and stockpiling materials. Installation of this new 12" gas main under the river shall not begin prior to May 1, 2019. It is anticipated that this work will take 70 calendar days to complete.

Install a relocated 12" main on Walnut Street from Sta. 54+15 to Sta. 59+15 (a distance of approx. 500') with a crossing of Walnut Street at Sta. 59+20 in a 16" steel casing to be installed by the State's Contractor. Connect to the existing 8" gas line at Sta. 56+20. Abandon the existing 8"/12" gas line from Sta. 54+15 to Sta. 77+08. This work will take 42 calendar days and require 700 CY of select.

Relocate the 8" gas line to be south of the New Sweden Street roadway from the new valve nest to connect to the existing gas line at Sta. 430+60. This work will take 20 calendar days and require 100 CY of select.

Relocate the 2" gas line prior to installation of the bioretention facility on Market Street, Sta. 96+70, lt. to Sta. 98+00, lt. This work will take 20 calendar days and require 100 CY of select.

Install a 6" distribution main from Market Street, Sta. 106+50 rt. east to a crossing of Walnut Street at Sta. 65+20 in a 10" steel casing to be installed by the State's Contractor. This work will take 30 calendar days and require 150 CY of select.

Any existing facilities that are comprised of hazardous materials will be removed by the company. Any existing facilities containing hazardous materials will be purged by the company.

The calendar day estimates listed above are contingent upon weather events, accessibility, disruptions by others, and any other limits placed on DP&L that inhibit efforts for sustained daily operation.

2. State's Contractor Responsibility:

Multiple gas valve (13) and manhole (2) adjustments throughout the project required due to the proposed construction activities.

For the bioretention facility gas line relocation on Market Street, Sta. 96+70, It. to Sta. 98+00, It., the State's Contractor shall excavate and backfill the trench per the Company's standard specifications and trench detail. This includes minimum cover requirements of 36" for pipes less than 6" in diameter and 48" for pipes 6" or greater in diameter; and a minimum of 12" of DelDOT Borrow Type C (select) around the pipe.

The State's Contractor shall furnish and install two steel casing pipes on Walnut Street, a 16" at Sta. 59+20, and a 10" at Sta. 65+20, per the Company's standard specifications.

Any further relocations and/or adjustments will be performed by the appropriate Company's forces during construction of this project. The time to complete any relocations/adjustments will depend on the nature of the work.

New Castle County Department of Special Services (NCC) - Sanitary Sewer
NCC maintains underground facilities within the limits of Contract T200512102.

The State's contractor shall perform the following relocations and adjustments:

Multiple sanitary manhole (4) adjustments required due to the proposed construction activities.

These adjustments and any relocations of NCC sewer facilities shall be performed by the State's contractor in accordance with the respective agencies' standard specifications as directed by the Engineer. The State contractor shall notify NCC a minimum of seven (7) calendar days in advance of the State contractor performing any necessary facility adjustments.

Verizon Delaware LLC

The aforementioned Company maintains aerial and underground facilities within the limits of Contract T200512102.

The proposed changes to the Company's existing facilities are reimbursable and will include, but are not limited to the following:

1. Verizon-DE's Responsibility:

Verizon will be responsible for furnishing and delivering to the project site all materials associated with the underground system such as conduit, marking tape, hand holes and associated materials for the State's Contractor to install. Following installation of these materials by the State's Contractor, Verizon will relocate the existing aerial cables along both sides of South Market Street from STA 94+00 to STA 109+50 into the conduit system. Verizon will place and splice new cables in the manhole/conduit system and remove the old aerial cables. Verizon will order all cable, associated equipment and do all splicing. The company will be responsible for insuring that the conduit system being constructed by the State's contractor is being built to the specifications and standards set by the Company at the State's expense. Verizon will utilize a contracted consultant to provide field inspection for quality assurance.

The Company will furnish and install any new manholes if required, and will perform any pedestal and manhole lid adjustments (6) throughout the project required due to the proposed construction activities. Verizon will also perform all conduit tie-ins to the existing Verizon manholes.

The Company will install a new guy anchor for the existing utility pole on Market Street, Sta. 105+45, lt.

2. State's Contractor Responsibility:

The State's Contractor shall excavate the trench, install conduit, marking tape, and hand holes provided by Verizon, and backfill the trench per the trench detail on the plans and the Company's standard specifications.

The State's contractor shall install the following Verizon line relocations:

New Sweden Street, Sta. 430+75, rt. – install conduit from existing pedestal to new Delmarva Power Electric pole.

Market Street, Sta. 94+00 to Sta. 111+50, lt. – existing Verizon ductbank to remain. State's Contractor shall exercise great care during excavation for proposed construction in the vicinity of this ductbank. The State's Contractor shall coordinate with the Engineer to ensure a Verizon representative is on-site during any excavation near this ductbank.

Market Street, Sta. 96+75 to Sta. 98+50, lt. – replace existing Verizon line with two, 4" conduits from pole #48387/42709, crossing James Court, to existing Market Street manhole as necessary to install proposed bioretention facility.

Market Street, Sta. 102+95 to Sta. 109+55, lt. – starting at the two capped, 4" conduits installed under DelDOT Contract No. 29-007-05, Market Street Safety Improvements at

Sta. 109+55, lt., extend two, 4" conduits southward to Sta. 102+95, +/- lt. At the northern limit of this conduit run, install a new hand hole to maintain service to the existing building customer. From existing manhole at Sta. 107+10, lt., install one, 4" conduit southward to Sta. 105+55, +/- lt., then turn southwest to reestablish service to the existing private utility pole at Sta. 105+45, lt.

Market Street, Sta. 107+60 to Sta. 110+35, rt. – starting at the two capped, 4" conduits installed under DelDOT Contract No. 29-007-05, Market Street Safety Improvements at Sta. 110+35, rt., extend two, 4" conduits southward to Sta. 109+50, +/- rt. At this point, continue one, 4" conduit southeast to a new hand hole, then reestablish service to the two existing building customers. From Sta. 109+50, rt., continue the other one, 4" conduit southward to Sta. 108+00, +/- rt., then turn southeast to a new hand hole, and then east to reestablish service to the existing customer via the existing utility pole.

The Verizon conduits must be installed in accordance with the Company's standards and specifications. The conduits must be installed by a company that is qualified to do Verizon-DE work. It is Verizon's preference that Danella Construction perform the work, since they are familiar with Verizon's specifications, requirements and require limited supervision during construction.

Company review of Field Changes

Verizon maintains the right to approve any design changes submitted by the Engineer as well as the right to review any field changes that could impact the construction of the Verizon conduits.

Verizon will require ninety (90) calendar days to complete the proposed aerial relocation work and cabling into the conduit system. Verizon will require twenty-eight (28) calendar days advance notice of completion of the conduit system, cut and fill stakes, staking rights of way and the Notice to Proceed before any work will start. All time frames are dependent on weather, work load and design changes.

Any further relocations and/or adjustments will be performed by the appropriate Company's forces during construction of this project. The time to complete any relocations/adjustments will depend on the nature of the work.

General Utility Notes

1. Outside of the companies and facilities discussed above, no additional utility involvement is anticipated. Should any conflicts be encountered as a result of the contractor's means and methods during construction requiring adjustment and/or relocation, the necessary relocation work shall be accomplished by the respective utility company and funded by the State's Contractor as directed by the District Engineer. The State Contractor shall coordinate any potential conflicts with utility companies and provide adequate notice prior to performing work. Any utility conflicts that are not readily discernable shall be coordinated by the State

Contractor once the conflict is recognized. The time to complete any relocations/adjustments found to be necessary during construction of the highway project will depend on the nature of the work.

2. Once the State's contractor has given the Utility the advance notice required above, it is the responsibility of the State's contractor to have the work area prepared and accessible for the Utility to perform the tasks listed above. If the site conditions are not ready and the state contractor has given notice to the utility on when the work is to be accomplished, the State's Contractor shall be responsible for any extra cost incurred by the utility company and the State Contractor shall also be responsible for any time delays. Between when the required notice is given to the Utility and when the work is performed and completed, the coordination and scheduling of the Utility is the sole responsibility of the State's

3. Contractor. All costs related to the coordination and scheduling of the utilities is incidental to the contract.

4. Any adjustments and/or relocations of municipally owned sewer or water facilities shall be performed by the State's Contractor in accordance with the respective agency's standard specifications as directed by the District Engineer. The State contractor shall coordinate any potential conflicts of municipally owned sewer or water facilities with facility owners and provide adequate notice to the municipally and to the District Engineer prior to performing work.

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 and operating purposes for his equipment and, if necessary, make arrangements directly with the utility companies for field adjustments for adequate clearances.**
- 2. The information shown in the Contract Documents, including the Utility Statement and the Utility Schedule contained herein, concerning the location, type and size of existing and proposed utilities, their locations, and construction timing has been compiled by the preparer based on information furnished by each of the involved Utility Companies. It shall be the responsibility of the State's Contractor to verify all information and coordinate with the Utility Companies prior to and during construction, as specified in Section 105.09 of the Standard Specifications.**
- 3. It is understood and agreed that the Contractor has considered in his bid all**


permanent and temporary utility appurtenances in their present and relocated positions as shown on the plans or described in the Utility Statement or are readily discernible and that no additional compensation will be allowed for any delays, inconvenience, or damage due to any interference from the utility facilities and appurtenances or the operation of moving them, except that the Contractor may be granted an equitable extension of time unless the delay is caused by the Contractor's delay in having the site conditions ready for the utility relocation work after the Contractor has provided the advance notice that the site conditions would be ready for the utility relocation work. The contractor's means and method of construction are not taken into account when known utility conflicts are identified. If the Contractor's means and method of construction create a utility conflict the Utility Statement will prevail in discussions with the utility and the Contractor. The State's Contractor shall be responsible for any costs associated with any temporary outages; holding, bracing and shielding of utility facilities; temporary relocations; or permanent relocations that are not specifically identified in this utility statement or shown in the contract plan set.

4. Coordination and cooperation among the Utility Companies and the State's Contractor are of prime importance. Therefore, the Contractor is directed to contact the following Utility Company representatives with any questions regarding this work prior to submitting bids and work schedules. Proposed work schedules should reflect the Utility Companies' proposed relocations. The Utility Companies do not work on weekends, nights or legal holidays.


George Freas	AT&T	georgef@trecgroup.com	(610) 328-6465
Joanne Liao	City of Wilmington	jliao@wilmingtonde.gov	(302) 576-3074
Keith Allridge	Comcast	keith@americomm-llc.com	(717) 713-7586
Angel Collazo	Delmarva Power Electric – Distr.	angel.collazo@delmarva.com	(302) 454-4370
Ray Rouault	Delmarva Power Electric – Trans.	ray.rouault@pepcoholdings.com	(302) 454-5174
Kristin Stanfill	Delmarva Power Gas	kristin.stanfill@delmarva.com	(302) 429-3364
David Clark	New Castle County Dept. of Spec. Svcs	dclark@nccde.org	(302) 395-5705
George Zang	Verizon Delaware Inc.	george.w.zang@verizon.com	(302) 422-1238

5. As outlined in Chapter 3 of the DelDOT Utilities Manual, individual utility companies 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. Individual 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 State's Contractor perform the necessary restoration. Any additional costs incurred as a result will be forwarded to the utility company.
7. 16 Del. C. § 7405B requires notification to and mutually agreeable measures from the public utility operating the electric line for any person intending to carry on any function, activity, work or operation within dangerous proximity of any high voltage overhead electric lines. All contractors/other utilities must also maintain a minimum distance of 10'- 0" from all overhead energized lines. Additional clearance may be required from high voltage transmission lines.
8. Any existing facilities that are comprised of hazardous materials will be removed by the Utility Company unless otherwise outlined in the contract documents or language above. Any existing facilities containing hazardous materials will be purged by the Utility Company unless otherwise outlined in the contract documents or language above.

PREPARED AND RECOMMENDED BY:




Rummel, Klepper & Kahl, LLP
Consulting Engineers



Date

APPROVED AS TO FORM BY:



Utilities Engineer, DelDOT



Date

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
PO BOX 778
DOVER, DELAWARE 19903

CERTIFICATE OF RIGHT-OF-WAY STATUS

STATE PROJECT NO. T200512102

F.A.P. NO. STP-N029(3)

CHRISTINA RIVER BRIDGE and APPROACHES

NEW CASTLE COUNTY

Certificate of Right-of-Way Status - Stipulated

Status - Level 2

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 rights-of-way, including control of access rights when pertinent, have not been fully acquired, however, the right to occupy and to use all rights-of-way required for the proper execution of the project in accordance with the project right-of-way plans has been acquired except for:

- 13-L DP&L – Right of Entry Agreement signed.
- 22-R, 23-R, and 24-R – Delaware Stadium Corporation- Right of Entry signed
- 11-L – HEC Environmental – in settlement for a TCE

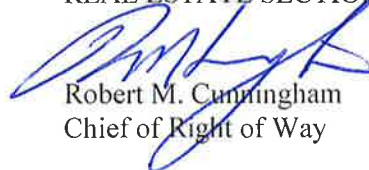
All necessary real property interests have been or shall be acquired in accordance with current FHWA/State directives covering the acquisition of real property.

A clear Right of Way certificate is anticipated by April 30, 2018.

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,

Any occupants have vacated all 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 enters on all land.

REAL ESTATE SECTION



Robert M. Cunningham
Chief of Right of Way

April 2, 2018



STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
800 BAY ROAD
P.O. BOX 778
DOVER, DELAWARE 19903

JENNIFER COHAN
SECRETARY

January 18, 2018

ENVIRONMENTAL REQUIREMENTS

FOR

State Contract No. T200512102

Federal Aid No.: STP-N029(3)

Contract Title: Christina River Bridge Approaches

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 Level C/ Class III Action.

PERMIT REQUIREMENTS:

The proposed construction work for this project requires permit approval from the 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. Written authorization from the permitting agencies is required and paperwork for on-site posting is anticipated. The proposed work for this project will be authorized under the permits listed below:

REQUIRED PERMITS AND APPROVAL STATUS:

- U.S. Army Corps of Engineers (USACE) – Nationwide Permit #14 – CENAP-OP-R-2011-175-1 – Issued July 21, 2017, Expires March 18, 2022
- Delaware Department of Natural Resources and Environmental Control (DNREC) Wetlands & Subaqueous Lands Section (WSLS) – Subaqueous Lands Permit SP-423/16, Wetlands Permit WE-433/15, Issued July 26, 2016, Expires July 26, 2019
- Delaware Coastal Zone Management (CZM) – Concurrence issued December 30, 2015, No expiration

- DNREC Water Quality Certification (WQC) – Issued as part of NWP #14, No expiration
- New Castle County Floodplain – Approved June 15, 2016, Extended to May 16, 2018. NOTE: This permit gets renewed in six month increments
- City of Wilmington Floodplain – Approved September 28, 2016, No expiration

SPECIFIC REQUIREMENTS:

Compliance with all requirements of the permits is the responsibility of the contractor, who 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 conditions and requirements 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, are also the responsibility of the contractor. Noncompliance with these requirements may result in shut down of the project 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 the 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. Construction debris shall be kept 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. Refuse material resulting from routine maintenance of worker equipment and heavy machinery 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. Use of harmful chemical wash water to clean equipment or machinery is discouraged. If undertaken, the residue water and/or material must be collected or contained such that it will be disposed of properly. It shall not 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 is be the contractor's responsibility 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. 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 US Army Corps of Engineer and DNREC Subaqueous Lands Permit Exemption as well as the Environmental Compliance (EC) Sheets (177-185).

1. Specifically, please note the environmental requirements as indicated in the following notes:
 - Fisheries – Time of year restriction from March 1 – June 30 (no in-water work to avoid spawning season). See EC note 2B and the USACE Special Condition 6(b).
 - Per the US Army Corps of Engineers Nationwide Permit Regional Condition 6 (G-6), in order to protect diadromous fish migrations, spawning activities, and Essential Fish Habitat (EFH), (a) **in water work should be avoided from March 1 to June 30 in all waters** (b) Work within cofferdams that fully enclose and dewater the project area can proceed any time during the year provided that the cofferdams are installed or removed outside of the seasonal work restriction and do not preclude the free movement of migrating and spawning aquatic species to ensure compliance with NWP General Condition 2 and 3.
 - Mitigation – Wetland mitigation for the Christina River Bridge and the approaches will occur at Russell W. Peterson Wildlife Refuge. See EC note 5, USACE Special Condition-1 and DNREC SP14. Monitoring for three years is required (to be done separately).
 - Cultural Resources – See EC note 3.
 - Protection of Resources – See EC note 4 and the Coastal Zone Management letter dated December 30, 2015.
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

JENNIFER COHAN
 SECRETARY

RAILROAD STATEMENT

For

State Contract No.: T200512102

Federal Aid No.: STP-N029(3)

Project Title: Christina River Bridge Approaches

The following railroad companies maintain facilities within the contract limits:


- | | |
|--|--|
| <input type="checkbox"/> Amtrak | <input type="checkbox"/> Maryland & Delaware |
| <input type="checkbox"/> CSX | <input checked="" type="checkbox"/> Norfolk Southern |
| <input type="checkbox"/> Delaware Coast Line | <input type="checkbox"/> Wilmington & Western |
| <input type="checkbox"/> East Penn | <input type="checkbox"/> None |
| <input type="checkbox"/> Delmarva Central | |

DOT Inventory No.: #912964 No. Trains/Day: 2 Passenger Trains (Y / N): N

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 is pending. The Contractor cannot begin work until the Agreement 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

24Oct17

DATE

BID PROPOSAL FORMS
CONTRACT T200512102.01
FEDERAL AID PROJECT STP-N029(3)

UNLESS OTHERWISE DIRECTED, SUBMIT ALL FOLLOWING PAGES TO:

DEPARTMENT OF TRANSPORTATION
BIDDERS ROOM (B1.11.01)
800 BAY ROAD
DOVER, DELAWARE 19901

Identify the following on the outside of the sealed envelope:

- Contract Number T200512102.01
- Name of Contractor

CONTRACT ID: T200512102.01 PROJECT(S): T200512102

All figures must be typewritten.

CONTRACTOR : _____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS CTS	BID AMOUNT DOLLARS CTS
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SECTION 0001 ALL

0010	201000 CLEARING AND GRUBBING	LUMP	LUMP	
0020	202000 EXCAVATION AND EMBANKMENT	CY	24015.000	
0030	202573 TEST HOLES	EACH	30.000	
0040	202576 DEBRIS REMOVAL	TON	500.000	88.00000 44000.00
0050	207000 EXCAVATION AND BACKFILL FOR STRUCTURES	CY	256.000	
0060	208000 EXCAVATION AND BACKFILLING FOR PIPE TRENCHES	CY	4021.000	
0070	208001 FLOWABLE FILL	CY	15.000	
0080	209001 BORROW, TYPE A	CY	7100.000	
0090	209002 BORROW, TYPE B	CY	1000.000	
0100	209006 BORROW, TYPE F	CY	14266.000	

DELAWARE DEPARTMENT OF TRANSPORTATION
SCHEDULE OF ITEMS

PAGE: 2
DATE:

CONTRACT ID: T200512102.01 PROJECT(S): T200512102

All figures must be typewritten.

CONTRACTOR : _____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0110	210000 FURNISHING BORROW TYPE "C" FOR PIPE, UTILITY TRENCH, AND STRUCTURE BACKFILL	3632.000 CY				
0120	211000 REMOVAL OF STRUCTURES AND OBSTRUCTIONS	LUMP	LUMP			
0130	212000 UNDERCUT EXCAVATION	2000.000 CY				
0140	271502 BIORETENTION FACILITIES	10300.000 CY				
0150	302007 GRADED AGGREGATE BASE COURSE, TYPE B	16741.000 CY				
0160	302008 GRADED AGGREGATE BASE COURSE, TYPE B, PATCHING	852.000 CY				
0170	302012 DELAWARE NO. 57 STONE	3.000 TON				
0180	401754 FOG SEAL	1323.000 GAL				
0190	401801 BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 160 GYRATIONS PG 64-22 (CARBONATE STONE)	4840.000 TON				

CONTRACT ID: T200512102.01 PROJECT(S): T200512102

All figures must be typewritten.

CONTRACTOR : _____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0200	401804 BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 160 GYRATIONS PG 70-22 (CARBONATE STONE)	2679.000 TON				
0210	401810 BITUMINOUS CONCRETE, SUPERPAVE, TYPE B, 160 GYRATIONS, PG 64-22	2434.000 TON				
0220	401813 BITUMINOUS CONCRETE, SUPERPAVE, TYPE B, 160 GYRATIONS, PG 70-22	3250.000 TON				
0230	401816 BITUMINOUS CONCRETE, SUPERPAVE, TYPE B, 160 GYRATIONS, PG 76-22	3626.000 TON				
0240	401819 BITUMINOUS CONCRETE, SUPERPAVE, BITUMINOUS CONCRETE BASE COURSE, 160 GYRATIONS, PG 64-22	14804.000 TON				
0250	401821 BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 160 GYRATIONS, PG 64-22, PATCHING	51.000 TON				
0260	401822 BITUMINOUS CONCRETE, SUPERPAVE, TYPE B, 160 GYRATIONS, PG 64-22, PATCHING	543.000 TON				

CONTRACT ID: T200512102.01 PROJECT(S): T200512102

All figures must be typewritten.

CONTRACTOR : _____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS CTS	BID AMOUNT DOLLARS CTS
0270	401823 BITUMINOUS CONCRETE, SUPERPAVE, BITUMINOUS CONCRETE BASE COURSE, 160 GYRATIONS, PG 64-22, PATCHING	313.000 TON		
0280	401824 BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 160 GYRATIONS, PG 64-22, WEDGE	10.000 TON		
0290	401825 BITUMINOUS CONCRETE, SUPERPAVE, TYPE B, 160 GYRATIONS, PG 64-22, WEDGE	30.000 TON		
0300	401833 BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 160 GYRATIONS, PG 76-22, (NON-CARBONATE STONE)	2660.000 TON		
0310	601520 TEMPORARY TIMBER MAT	LUMP	LUMP	
0320	602002 PORTLAND CEMENT CONCRETE MASONRY, CLASS B	4.000 CY		
0330	602512 REINFORCED CONCRETE LANDSCAPE WALL	38.000 LF		
0340	602615 MODULAR BLOCK RETAINING WALL	821.000 SF		
0350	602774 PCC MASONRY FOR LIGHT POLE FOUNDATIONS	224.000 CY		

CONTRACT ID: T200512102.01 PROJECT(S): T200512102

All figures must be typewritten.

CONTRACTOR : _____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0360	602803 PRECAST WALL CAP	2.000 EACH				
0370	603000 BAR REINFORCEMENT	1299.000 LB				
0380	605576 BICYCLE RACK	5.000 EACH				
0390	611505 CONCRETE UNIT MASONRY	375.000 SF				
0400	611506 BRICK MASONRY VENEER	570.000 SF				
0410	612020 REINFORCED CONCRETE PIPE, 12", CLASS IV	427.000 LF				
0420	612021 REINFORCED CONCRETE PIPE, 15", CLASS IV	2891.000 LF				
0430	612022 REINFORCED CONCRETE PIPE, 18", CLASS IV	1929.000 LF				
0440	612023 REINFORCED CONCRETE PIPE, 24", CLASS IV	168.000 LF				
0450	612025 REINFORCED CONCRETE PIPE, 30", CLASS IV	104.000 LF				

CONTRACT ID: T200512102.01 PROJECT(S): T200512102

All figures must be typewritten.

CONTRACTOR : _____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0460	612216 REINFORCED CONCRETE ELLIPTICAL PIPE, 14"X23", CLASS IV	20.000 LF				
0470	612503 PVC PIPE, 8"	104.000 LF				
0480	612504 PVC PIPE, 10"	56.000 LF				
0490	612535 CLEANING DRAINAGE PIPE, 15"-24" DIA	75.000 LF				
0500	614508 WATERMAIN AND ACCESSORIES	LUMP		LUMP		
0510	614589 STEEL CASING PIPE, 10"	80.000 LF				
0520	614602 STEEL CASING PIPE, 16"	181.000 LF				
0530	614898 FIRE HYDRANT REMOVAL	2.000 EACH				
0540	617001 REINFORCED CONCRETE FLARED END SECTION, 12"	1.000 EACH				
0550	617002 REINFORCED CONCRETE FLARED END SECTION, 15"	3.000 EACH				

CONTRACT ID: T200512102.01 PROJECT(S): T200512102

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CONTRACTOR : _____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS CTS	BID AMOUNT DOLLARS CTS
0560	617005 REINFORCED CONCRETE FLARED END SECTION, 24"	3.000 EACH		
0570	617515 HEADWALL	2.000 EACH		
0580	618534 VIBRATION MONITORING	LUMP	LUMP	
0590	701010 PORTLAND CEMENT CONCRETE CURB, TYPE 1-8	546.000 LF		
0600	701011 PORTLAND CEMENT CONCRETE CURB, TYPE 2	2089.000 LF		
0610	701014 PORTLAND CEMENT CONCRETE CURB, TYPE 1-6	10509.000 LF		
0620	701019 INTEGRAL PORTLAND CEMENT CONCRETE CURB & GUTTER, TYPE 3-4	144.000 LF		
0630	701022 INTEGRAL PORTLAND CEMENT CONCRETE CURB & GUTTER, TYPE 3-8	5620.000 LF		
0640	701023 INTEGRAL PORTLAND CEMENT CONCRETE CURB & GUTTER, TYPE 3-6	8448.000 LF		
0650	701505 P.C.C. PARKING BUMPER	84.000 EACH		

DELAWARE DEPARTMENT OF TRANSPORTATION
SCHEDULE OF ITEMS

PAGE: 8
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CONTRACTOR : _____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0660	701507 PORTLAND CEMENT CONCRETE CURB, SPECIAL	332.000 LF				
0670	705001 P.C.C. SIDEWALK, 4"	80000.000 SF				
0680	705002 P.C.C. SIDEWALK, 6"	12901.000 SF				
0690	705005 P. C. C. SIDEWALK, 8"	4472.000 SF				
0700	705007 SIDEWALK SURFACE DETECTABLE WARNING SYSTEM	1734.000 SF				
0710	705503 BRICK EDGED 4" CONCRETE SIDEWALK	30000.000 SF				
0720	705504 BRICK AND/OR BLOCK SIDEWALK	13613.000 SF				
0730	705505 RESET STONE/BRICK SIDEWALK AND/OR STONE/BRICK ROADWAY	8.000 SF				
0740	705506 BRICK AND/OR BLOCK ROADWAY	676.000 SF				
0750	705521 PATTERNED PORTLAND CEMENT CONCRETE SIDEWALK, 8"	2010.000 SF				

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CONTRACTOR : _____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0760	705535 BRICK EDGED 6" CONCRETE SIDEWALK	SF	6019.000			
0770	708045 LAWN INLET	EACH	11.000			
0780	708050 DRAINAGE INLET, 34" X 18"	EACH	2.000			
0790	708051 DRAINAGE INLET, 34" X 24"	EACH	35.000			
0800	708052 DRAINAGE INLET, 48" X 30"	EACH	11.000			
0810	708053 DRAINAGE INLET, 48" X 48"	EACH	3.000			
0820	708057 DRAINAGE INLET, 72" X 24"	EACH	5.000			
0830	708058 DRAINAGE INLET, 72" X 48"	EACH	1.000			
0840	708060 REPLACE DRAINAGE INLET GRATE (S)	EACH	10.000			
0850	708061 REPLACE DRAINAGE INLET FRAME (S)	EACH	10.000			
0860	708107 MANHOLE, ROUND	EACH	13.000			

DELAWARE DEPARTMENT OF TRANSPORTATION
 SCHEDULE OF ITEMS

PAGE: 10
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CONTRACTOR : _____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0870	708114 MANHOLE, 66" X 48"	EACH	1.000			
0880	708115 MANHOLE, 66" X 66"	EACH	2.000			
0890	708512 DRAINAGE INLET, SPECIAL I	EACH	12.000			
0900	708541 CATCH BASIN SQUARE COS, 5'	EACH	4.000			
0910	708542 CATCH BASIN SQUARE COG, 5'	EACH	16.000			
0920	708585 JUNCTION BOX, 48" X 30"	EACH	1.000			
0930	708599 ELECTRIC DUCTBANK AND MANHOLE SYSTEM	LUMP		LUMP		
0940	710001 ADJUSTING AND REPAIRING EXISTING DRAINAGE INLET	EACH	43.000			
0950	710002 ADJUSTING AND REPAIRING EXISTING MANHOLE	EACH	22.000			
0960	710501 CONVERTING EXISTING CATCH BASIN TO MANHOLE	EACH	17.000			

CONTRACT ID: T200512102.01 PROJECT(S): T200512102

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CONTRACTOR : _____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0970	710506 ADJUST AND REPAIR EXISTING SANITARY MANHOLE	EACH	32.000			
0980	710507 ADJUST AND REPAIR EXISTING SANITARY CLEANOUTS	EACH	17.000			
0990	710508 CONVERT EXISTING MANHOLE TO CATCH BASIN	EACH	1.000			
1000	712005 RIPRAP, R-4	SY	165.000			
1010	712006 RIPRAP, R-5	SY	69.000			
1020	713001 GEOTEXTILES, STABILIZATION	SY	450.000			
1030	713003 GEOTEXTILES, RIPRAP	SY	234.000			
1040	715000 PERFORATED PIPE UNDERDRAINS, 4"	LF	784.000			
1050	715001 PERFORATED PIPE UNDERDRAINS, 6"	LF	12301.000			
1060	715500 UNDERDRAIN OUTLET PIPE, 6"	LF	326.000			

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CONTRACTOR : _____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS CTS	BID AMOUNT DOLLARS CTS
1070	716000 CONVERTING EXISTING DRAINAGE INLET TO JUNCTION BOX	2.000 EACH		
1080	718503 TRENCH DRAIN, 10" WIDE	100.000 LF		
1090	718510 TRENCH DRAIN, 6" WIDE	184.000 LF		
1100	718511 CURB/SIDEWALK OPENING	12.000 EACH		
1110	720533 PERMANENT WOOD BARRICADE	1.000 EACH		
1120	727004 CHAIN-LINK FENCE, 6' HIGH	878.000 LF		
1130	727006 TERMINAL POSTS FOR 6' CHAIN-LINK FENCE	10.000 EACH		
1140	727012 VEHICULAR GATES	1.000 EACH		
1150	727015 MONUMENTS	108.000 EACH		
1160	727519 RELOCATE CHAINLINK FENCE	197.000 LF		

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
1170	727522 DECORATIVE FENCE	52.000 LF				
1180	727538 RELOCATE GATE	2.000 EACH				
1190	727548 PORTABLE CHAINLINK FENCE	608.000 LF				
1200	727554 RELOCATE FENCES AND GATES	LUMP		LUMP		
1210	737523 PLANTINGS	LUMP		LUMP		
1220	737529 PLANTING SOIL	6719.000 CY				
1230	743000 MAINTENANCE OF TRAFFIC	LUMP		LUMP		
1240	743003 ARROWPANELS, TYPE C	275.000 EADY				
1250	743004 FURNISH AND MAINTAIN PORTABLE CHANGEABLE MESSAGE SIGN	800.000 EADY				
1260	743005 FURNISH AND MAINTAIN PORTABLE LIGHT ASSEMBLY	1700.000 EADY				

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS CTS	BID AMOUNT DOLLARS CTS
1270	743006 PLASTIC DRUMS	50000.000 EADY		
1280	743007 TRAFFIC OFFICERS	9000.000 HOUR	75.00000	675000.00
1290	743010 FURNISH AND MAINTAIN TRUCK MOUNTED ATTENUATOR, TYPE II	200.000 EADY		
1300	743011 CRASH CUSHIONS (SAND BARRELS)	1.000 EACH		
1310	743015 FURNISH AND MAINTAIN PORTABLE PCC SAFETY BARRIER	4018.000 LF		
1320	743016 RELOCATION PORATBLE SAFETY BARRIER	6592.000 LF		
1330	743023 TEMPORARY BARRICADES, TYPE III	250000.000 LFDY		
1340	743024 TEMPORARY WARNING SIGNS AND PLAQUES	50000.000 EADY		
1350	743025 INSTALL TEMPORARY IMPACT ATTENUATOR	10.000 EACH		
1360	743028 FURNISH TEMPORARY IMPACT ATTENUATOR - NON-GATING, REDIRECTIVE, TEST-LEVEL 2	5.000 EACH		

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS CTS	BID AMOUNT DOLLARS CTS
1370	743030 RELOCATE TEMPORARY IMPACT ATTENUATOR	8.000 EACH		
1380	743050 FLAGGER, NEW CASTLE COUNTY, STATE	12000.000 HOUR		
1390	743062 FLAGGER, NEW CASTLE COUNTY, STATE, OVERTIME	3000.000 HOUR		
1400	743552 PEDESTRIAN CHANNELIZING BARRICADE	200000.000 LFDY		
1410	743553 TEMPORARY PEDESTRIAN PATHWAY	900.000 SY		
1420	744506 CONDUIT JUNCTION WELL, TYPE 7, PRECAST POLYMER CONCRETE	5.000 EACH		
1430	744530 CONDUIT JUNCTION WELL, TYPE 11, PRECAST CONCRETE/ POLYMER LID-FRAME	49.000 EACH		
1440	744531 CONDUIT JUNCTION WELL, TYPE 14, PRECAST CONCRETE/ POLYMER LID-FRAME	19.000 EACH		
1450	744544 ADJUST OR REPAIR EXISTING CONDUIT JUNCTION WELL	6.000 EACH		
1460	745602 FURNISH & INSTALL UP TO 4" SCHEDULE 80 HDPE CONDUIT (BORE)	1549.000 LF		

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS CTS	BID AMOUNT DOLLARS CTS
1470	745603 FURNISH & INSTALL UP TO 4" SCHEDULE 80 PVC CONDUIT (OPEN CUT)	195.000 LF		
1480	745604 FURNISH & INSTALL UP TO 4" SCHEDULE 80 PVC CONDUIT (TRENCH)	29661.000 LF		
1490	745606 FURNISH & INSTALL UP TO 4" GALVANIZED STEEL CONDUIT (TRENCH)	529.000 LF		
1500	745607 FURNISH & INSTALL UP TO 4" GALVANIZED STEEL CONDUIT (BORE)	120.000 LF		
1510	745608 FURNISH & INSTALL UP TO 4" GALVANIZED STEEL CONDUIT (OPEN CUT)	45.000 LF		
1520	746515 FURNISH & INSTALL 1-CONDUCTOR #6 AWG STRANDED INSULATED COPPER GROUND WIRE	21692.000 LF		
1530	746537 RELOCATING EXISTING LIGHT STANDARDS	1.000 EACH		
1540	746556 INSTALLING PULL BOX	18.000 EACH		
1550	746564 INSULATED GROUND CABLES, 1/#4	204.000 LF		
1560	746598 INSULATED GROUND CABLE , 1/#2	283.000 LF		

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS CTS	BID AMOUNT DOLLARS CTS
1570	746610 INSTALLING CONDUIT, 4"	LF	7014.000	
1580	746653 ELECTRICAL TESTING	LUMP	LUMP	
1590	746848 POLE BASE, TYPE 3A	EACH	8.000	
1600	746850 POLE BASE, TYPE 4A	EACH	11.000	
1610	746877 PARKING LOT LIGHTING MODIFICATIONS	LUMP	LUMP	
1620	746907 FURNISH & INSTALL 1-CONDUCTOR #2 AWG STRANDED COPPER	LF	1104.000	
1630	746908 FURNISH & INSTALL 1-CONDUCTOR #4 AWG STRANDED COPPER	LF	611.000	
1640	746909 FURNISH & INSTALL 1-CONDUCTOR #6 AWG STRANDED COPPER	LF	61604.000	
1650	746926 FURNISH & INSTALL ELECTRICAL UTILITY SERVICE EQUIPMENT 120/240	EACH	1.000	
1660	746960 ALUMINUM LIGHTING STANDARD WITH SINGLE DAVIT ARM, LED, 30' POLE	EACH	25.000	

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS CTS	BID AMOUNT DOLLARS CTS
1670	746961 DECORATIVE LIGHT STANDARD AND FIXTURE, LED, SINGLE	EACH 158.000		
1680	746962 DECORATIVE LIGHT STANDARD AND FIXTURE, LED, DOUBLE	EACH 7.000		
1690	747508 LIGHTING CONTROL CENTER - 100 A	EACH 5.000		
1700	747513 LIGHTING CONTROL AND DISTRIBUTION ENCLOSURE (120/240; 100 AMP)	EACH 1.000		
1710	747516 CABINET BASE, TYPE P	EACH 4.000		
1720	747517 CABINET BASE, TYPE R	EACH 1.000		
1730	748015 PERMANENT PAVEMENT STRIPING, SYMBOL/LEGEND ALKYD-THERMOPLAST IC	SF 9052.000		
1740	748026 TEMPORARY MARKINGS, PAINT SYMBOL/LEGEND	SF 140.000		
1750	748530 REMOVAL OF PAVEMENT STRIPING	SF 2483.000		
1760	748548 PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, WHITE/YELLOW, 5"	LF 130000.000		

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
1770	748555 PREFORMED RETROREFLECTIVE THERMOPLASTIC PAVEMENT MARKINGS, HANDICAP SYMBOL	EACH	55.000			
1780	748557 PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, BLACK, 3"	LF	5470.000			
1790	748568 PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, BLACK, 9"	LF	95.000			
1800	749519 REINFORCED CONCRETE SIGN FOUNDATION, W-12	EACH	1.000			
1810	749550 INSTALLATION OF BREAKAWAY I-BEAM SIGN POSTS	EACH	1.000			
1820	749551 REMOVAL OF BREAKAWAY I-BEAM SIGN POSTS	EACH	1.000			
1830	749556 INSTALLATION OF SIGN ON GROUND MOUNT POSTS	SF	49.000			
1840	749557 REMOVAL OF SIGN ON GROUND MOUNT POSTS	SF	49.000			
1850	749687 INSTALLATION OR REMOVAL OF TRAFFIC SIGN(S) ON SINGLE SIGN POST	EACH	242.000			

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS CTS	BID AMOUNT DOLLARS CTS
1860	749690 INSTALLATION OR REMOVAL OF TRAFFIC SIGNS ON MULTIPLE SIGN POSTS	SF 29.000		
1870	750000 ADJUST WATER VALVE BOXES	EACH 56.000		
1880	751000 ADJUST FIRE HYDRANTS	EACH 3.000		
1890	752000 RELOCATE FIRE HYDRANTS	EACH 8.000		
1900	758000 REMOVAL OF EXISTING PORTLAND CEMENT CONCRETE PAVEMENT, CURB, SIDEWALK, ETC.	SY 4583.000		
1910	759502 FIELD OFFICE, SPECIAL I	EAMO 20.000		
1920	760507 PROFILE MILLING, BITUMINOUS CONCRETE	SYIN 64500.000		
1930	762001 SAW CUTTING, BITUMINOUS CONCRETE	LF 15460.000		
1940	762002 SAW CUTTING, CONCRETE, FULL DEPTH	LF 300.000		
1950	763000 INITIAL EXPENSE	LUMP	LUMP	

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
1960	763501 CONSTRUCTION ENGINEERING	LUMP	LUMP			
1970	763502 MAINTENANCE OF RAILROAD TRAFFIC	LUMP	LUMP			
1980	763503 TRAINEE	1000.000 HOUR	0.80000		800.00	
1990	763508 PROJECT CONTROL SYSTEM DEVELOPMENT PLAN	LUMP	LUMP			
2000	763509 CPM SCHEDULE UPDATES AND/OR REVISED UPDATES	18.000 EAMO				
2010	763589 DP&L STORAGE YARD MODIFICATIONS	LUMP	LUMP			
2020	763597 UTILITY CONSTRUCTION ENGINEERING	1000.000 HOUR				
2030	763711 OSHA LEVEL C UPGRADE	LUMP	LUMP			
2040	905001 SILT FENCE	19115.000 LF				
2050	905004 INLET SEDIMENT CONTROL, DRAINAGE INLET	60.000 EACH				

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS CTS	BID AMOUNT DOLLARS CTS
2060	905005 INLET SEDIMENT CONTROL, CURB INLET	150.000 EACH		
2070	906001 PORTABLE SEDIMENT TANK	4.000 EACH		
2080	906004 SKIMMER DEWATERING DEVICE	4.000 EACH		
2090	907510 COMPOST FILTER LOG	94.000 LF		
2100	908004 TOPSOIL, 6" DEPTH	64482.000 SY		
2110	908010 TOPSOILING, 6" DEPTH	3500.000 SY		
2120	908014 PERMANENT GRASS SEEDING, DRY GROUND	66667.000 SY		
2130	908017 TEMPORARY GRASS SEEDING	100000.000 SY		
2140	908020 EROSION CONTROL BLANKET MULCH	5000.000 SY		
2150	908023 STABILIZED CONSTRUCTION ENTRANCE	200.000 TON		

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
2160	908501 NATIVE GRASS SEEDING, NO MOW MIX	1315.000 SY				
2170	908503 WETLAND MITIGATION GRASS SEEDING	3503.000 SY				
2180	908512 TEMPORARY GRASS SEEDING, WET GROUND	5000.000 SY				
2190	910002 INFILTRATION STONE, NO. 8	3991.000 TON				
2200	910500 BIORETENTION SOIL MIX	2877.000 CY				
	SECTION 0001 TOTAL					
	TOTAL BID					

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: **T200512102.01** 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
Item 614508 - Water Main and Accessories

CONTRACT NO. T200512102.01

ITEM NO.	APPROX. QTY.	UOM	DESCRIPTION	UNIT PRICE	AMOUNT
1	20	LF	DUCTILE IRON PIPE CLASS 350, CEMENT LINED, 4"	\$	\$
2	166	LF	DUCTILE IRON PIPE CLASS 350, CEMENT LINED, 6"	\$	\$
3	4,060	LF	DUCTILE IRON PIPE CLASS 350, CEMENT LINED, 8"	\$	\$
4	128	L	DUCTILE IRON PIPE CLASS 350, CEMENT LINED, 12"	\$	\$
5	8	EA	BENDS 22.5 DEGREES, 8"	\$	\$
6	2	EA	BENDS 45 DEGREES, 4"	\$	\$
7	4	EA	BENDS 45 DEGREES, 8"	\$	\$
8	2	EA	BENDS 45 DEGREES, 12"	\$	\$
9	2	EA	MJ. TAPPING SLEEVE - 4"x4"	\$	\$
10	3	EA	MJ. TAPPING SLEEVE - 12"x12"	\$	\$
11	7	EA	MJ. TAPPING SLEEVE - 8"x8"	\$	\$
12	8	EA	MJ. TEE, 8"x6"	\$	\$
13	2	EA	MJ. TEE, 8"x8"	\$	\$
14	9	EA	GATE VALVE, 6"	\$	\$
15	5	EA	GATE VALVE, 8"	\$	\$
16	1	EA	GATE VALVE, 12"	\$	\$
17	9	EA	VALVE BOX, 6"	\$	\$
18	5	EA	VALVE BOX, 8"	\$	\$
19	1	EA	VALVE BOX, 12"	\$	\$
20	2	EA	END CAP, 8"	\$	\$
21	67	EA	CONCRETE BUTTRESS	\$	\$
22	8	EA	FIRE HYDRANT	\$	\$

BREAKOUT SHEET - 1
Item 614508 - Water Main and Accessories

CONTRACT NO. T200512102.01

ITEM NO.	APPROX. QTY.	UOM	DESCRIPTION	UNIT PRICE	AMOUNT
23	4,374	LF	POLYETHYLENE WRAP	\$	\$
24	12	EA	BENZENE RESISTANT GASKETS, 6"	\$	\$
25	102	EA	BENZENE RESISTANT GASKETS, 8"	\$	\$
TOTAL ITEM 61508 - WATER MAIN AND ACCESSORIES \$ (LUMP SUM BID PRICE FOR ITEM 614508- Water Main and Accessories)					

CANNOT BE
USED FOR
BIDDING

BREAKOUT SHEET - 2

CONTRACT NO. T200512102.01

Item 708599 - ELECTRIC DUCTBANK AND MANHOLE SYSTEM

ITEM NO.	APPROX. QTY.	UOM	DESCRIPTION	UNIT PRICE	AMOUNT
1	4,343	EA	SPACERS	\$	\$
2	13,510	LF	CONDUIT 6"	\$	\$
3	774	EA	FITTINGS 6" (INCLUDING BENDS, CAPS, ETC.)	\$	\$
4	767	LF	CONDUIT 4"	\$	\$
5	62	EA	FITTINGS 4" (INCLUDING BENDS, CAPS, ETC.)	\$	\$
6	125	LF	CONDUIT 2"	\$	\$
7	1	EA	FITTINGS 2" (INCLUDING BENDS, CAPS, ETC.)	\$	\$
8	14,277	LF	MULE TAPE - 2,500 LB	\$	\$
9	4	EA	2 WAY MANHOLE INCLUDING F & C, EXCAVATION, SUPPORT OF EXCAVATION AND HELICAL ANCHOR FOUNDATIONS	\$	\$
10	24	EA	HELICAL ANCHOR FOUNDATION	\$	\$
11	334	CY	CLASS B CONCRETE	\$	\$
12	6	EA	FURNISH & INSTALL TRANSFORMER PADS	\$	\$
13	6	EA	FURNISH & INSTALL TRANSFORMER PADS	\$	\$
14	556	TON	DEL. NO. 57 STONE	\$	\$
15	1	EA	SERVICE RISER	\$	\$

TOTAL ITEM 708599 - ELECTRIC DUCTBANK AND MANHOLE SYSTEM \$ _____
 (LUMP SUM BID PRICE FOR ITEM 708599 - Electric Ductbank and Manhole System)

BREAKOUT SHEET - 3
Item 737523 - PLANTING

CONTRACT NO. T200512102.01

ITEM NO.	APPROX. QTY.	UOM	DESCRIPTION	UNIT PRICE	AMOUNT
1	29	EA	2.5" CAL. ACER RUBRUM 'OCTOBER GLORY'	\$	\$
2	40	EA	7' CRYPTOMERIA JAPONICA 'YOSHINO'	\$	\$
3	1	EA	8' CERCIS CANADENSIS 'FOREST PANSY'	\$	\$
4	35	EA	2.5" CAL. GINGKO BILOBA	\$	\$
5	54	EA	2.5" CAL. GLEDITSIA TRIACANTHOS 'MAJESTIC'	\$	\$
6	47	EA	3.5" PLANTANUS OCCIDENTALIS 'BLOODGOOD'	\$	\$
7	42	EA	2.5" CAL. PTUNUS SUBHIRTELLA 'AUTUMNALIS'	\$	\$
8	34	EA	2.5" CAL. QUERCUS RUBRA	\$	\$
9	77	EA	2.5" CAL. TILIA CORDATA 'GREENSPIRE'	\$	\$
10	32	EA	3.5" CAL. ZELKOVA SERRATA	\$	\$
11	8	EA	3" CAL. PRUNUS YEODENSIS	\$	\$
12	21	EA	24" HT. CLETHRA ALNIFOLIA 'HUMMINGBIRD'	\$	\$
13	433	EA	30" HT. EUONYMOUS KIAUTSCHOVICUS 'MANHATTAN'	\$	\$
14	23	EA	30" SPD. HYDRANGEA ARBORESCENS 'ANNABELLE'	\$	\$
15	178	EA	24" HT. ILEX GLABRA	\$	\$
16	43	EA	24" ILEX VERTICILLATA 'WINTER RED'	\$	\$
17	79	EA	18" SPD. RHUS AROMATICA 'GROW LOW'	\$	\$
18	9	EA	24" HT. ROSA RADRAZZ 'KNOCKOUT'	\$	\$
19	715	EA	18" HT. SPIRAEA BETULIFOLIA 'TOR'	\$	\$
20	69	EA	36" HT. VIBURNUM X BURKWOODII 'MOHAWK'	\$	\$
21	223	EA	24" HT. VIBURNUM TRILOBUM 'COMPACTA'	\$	\$
22	94	EA	3" CAL. SYRINGA RETICULATA 'IVORY SILK'	\$	\$

BREAKOUT SHEET - 3
Item 737523 - PLANTING

CONTRACT NO. T200512102.01

ITEM NO.	APPROX. QTY.	UOM	DESCRIPTION	UNIT PRICE	AMOUNT
23	77	EA	7' HT. JUNIPERUS SQUAMATA 'BLUE ALPS'	\$	\$
24	18	EA	24" HT. TAXUS BACCATA 'REPANDENS'	\$	\$
25	1,414	EA	1 GAL. CALAMAGROSTIS X ACTIFLORA 'KARL FOERSTER'	\$	\$
26	71	EA	1 GAL. EUPATORIUM PERFOLIATUM	\$	\$
27	247	EA	1 GAL. EUPATORIUM PURPUREUM SSP. MACULATUM 'GATEWAY'	\$	\$
28	1,147	EA	1 GAL. HEMEROCALLIS HYPERION	\$	\$
29	98	EA	1 GAL. HIBISCUS MOSCHEUTOS	\$	\$
30	989	EA	JUNCUS EFFUSUS PLUGS	\$	\$
31	2,887	EA	2 QT. LIRIOPE MUSCARI 'BIG BULE'	\$	\$
32	4,056	EA	1 QT. LIRIOPE SPICATA	\$	\$
33	506	EA	2 QT. IRIS VERSICOLOR	\$	\$
34	55	EA	1 GAL. NEPETA RACEMOSA 'WALKERS LOW'	\$	\$
35	1,039	EA	2 GAL. PANICUM VIRGATUM 'SHENANDOAH'	\$	\$
36	460	EA	1 GAL. PENSTEMON DIGITALIS 'HUSKER RED'	\$	\$
37	360	EA	2QT. PLUMBAGO PERSIGLIA 'FIRETAIL'	\$	\$
38	78	EA	2QT. STACHYS BYZANTINA	\$	\$
39	309	EA	1 GAL. VERBENA HASTATA	\$	\$
40	16	EA	2.5" CAL. MAGNOLIA VIRGINIANA	\$	\$

TOTAL ITEM 737523 - PLANTING \$

(LUMP SUM BID PRICE FOR ITEM 737523 - Planting)

BREAKOUT SHEET - 4
Item 746877 - PARKING LOT LIGHTING MODIFICATIONS

CONTRACT NO. T200512102.01

ITEM NO.	APPROX. QTY.	UOM	DESCRIPTION	UNIT PRICE	AMOUNT
1	3,534	LF	FURNISH & INSTALL UP TO 4" SCHEDULE 80 PVC CONDUIT (OPEN CUT)	\$	\$
2	7,069	LF	SAW-CUTTING BITUMINOUS CONDUIT	\$	\$
3	89	TON	BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 160 GYRATIONS, PC 64-22, PACHING	\$	\$
4	268	TON	BITUMINOUS CONCRETE, SUPERPAVE, BIT. CONC. BASE COURSE, 160 GYR., PG 64-22, PATCHING	\$	\$
5	175	CY	GRADED AGGREGATE BASE COURSE, TYPE B, PATCHING	\$	\$
6	262	CY	FURNISHING BORROW TYPE "C" FOR PIPE, UTILITY TRENCH, STRUCTURE BACKFILL	\$	\$
7	19	CY	REMOVAL OF CONCRETE POLE BASES	\$	\$
8	61	CY	PCC MASONRY FOR LIGHT POLE FOUNDATION	\$	\$
9	3	EA	CONDUIT JUNCTION WELL, TYPE 11, PRECAST CONCRETE/ POLYMER LID-FRAME	\$	\$
10	1	LS	COORDINATION WITH DP&L	\$	\$

TOTAL ITEM 746877 - PARKING LOT LIGHTING MODIFICATIONS \$ _____
(LUMP SUM BID PRICE FOR ITEM 746877 - Parking Lot Lighting Modifications)

BREAKOUT SHEET - 5
Item 763589 - DP&L STORAGE YARD MODIFICATIONS

CONTRACT NO. T200512102.01

ITEM NO.	APPROX. QTY.	UOM	DESCRIPTION	UNIT PRICE	AMOUNT
1	10	EA	CONDUIT JUNCTION WELL, TYPE 11 MODIFIED, PRECAST CONCRETE/POLYMER LID-FRAME	\$	\$
2	812	LF	FURNISH & INSTALL UP TO 4" SCHEDULE 80 PVC CONDUIT (TRENCH)	\$	\$
3	954	LF	FURNISH & INSTALL UP TO 4" SCHEDULE 80 PVC CONDUIT (OPEN CUT)	\$	\$
4	1,126	LF	SAW-CUTTING IN BITUMINOUS CONCRETE (FOR OPEN CUT CONDUIT)	\$	\$
5	28	TON	BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 160 GYRATIONS, PG 64-22, PATCHING	\$	\$
6	85	TON	BITUMINOUS CONCRETE, SUPERPAVE, BIT. CONC. BASE COURSE, 160 GYR., PG 64-22, PATCHING	\$	\$
7	56	CY	GRADED AGGREGATE BASE COURSE, TYPE B, PATCHING	\$	\$
8	83	CY	FURNISHING BORROW TYPE "C" FOR PIPE, UTILITY TRENCH, AND STRUCTURE BACKFILL	\$	\$
9	551	LF	INSULATED GROUND CABLE, 1/#10	\$	\$
10	384	LF	INSULATED GROUND CABLE, 1/#12	\$	\$
11	3,067	LF	FURNISH & INSTALL 1-CONDUCTOR #10 AWG STRANDED COPPER	\$	\$
12	768	LF	FURNISH & INSTALL 1-CONDUCTOR #12 AWG STRANDED COPPER	\$	\$
13	381	LF	FURNISH & INSTALL COMMUNICATIONS CABLE	\$	\$
14	134	LF	LOOP DETECTION WIRE	\$	\$
15	2	CY	PCC MASONRY FOR LIGHT POLE FOUNDATION	\$	\$
16	1	EA	RELOCATING EXISTING LIGHTING STANDARDS	\$	\$

BREAKOUT SHEET - 5
Item 763589 - DP&L STORAGE YARD MODIFICATIONS

CONTRACT NO. T200512102.01

ITEM NO.	APPROX. QTY.	UOM	DESCRIPTION	UNIT PRICE	AMOUNT
17	56	DAY	FURNISH AND MAINTAIN EACH PORTABLE LIGHT ASSEMBLY	\$	\$
18	2	CY	PCC MASONRY FOR GATE SYSTEM FOUNDATIONS (CARD READER & GATE MOTORS)	\$	\$
19	2	EA	RELOCATE GATE	\$	\$
20	1	EA	RELOCATE MOTORIZED GATE SYSTEM (INCLUDES GATE MOTOR & CARD READER)	\$	\$
21	1	LS	REMOVAL OF GATE SYSTEM MOTOR AND CARD READER	\$	\$
22	1	CY	REMOVAL OF FOUNDATIONS FOR GATE MOTORS AND CARD READERS	\$	\$
23	7,240	LF	REMOVAL OF CABLE FROM CONDUIT OR POLE	\$	\$
TOTAL ITEM 763589 - DP&L STORAGE YARD MODIFICATIONS \$ (LUMP SUM BID PRICE FOR ITEM 763589 - DP&L Storage Yard Modifications)					

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.**

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: **T200512102.01** 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.



**AFFIDAVIT
OF
EMPLOYEE DRUG TESTING PROGRAM**

4104 Regulations for the Drug Testing of Contractor and Subcontractor Employees Working on Large Public Works Projects requires that Contractors and Subcontractors implement a program of mandatory drug testing for Employees who work on Large Public Works Contracts funded all or in part with public funds.

We hereby certify that we have in place or will implement during the entire term of the contract a Mandatory Drug Testing Program for our employees on the jobsite, including subcontractors, that complies with this regulation:

Contractor Name: _____

Contractor Address: _____

Authorized Representative (typed or printed): _____

Authorized Representative (signature): _____

Title: _____

Sworn to and Subscribed before me this _____ day of _____ 20____.

My Commission expires _____ . NOTARY PUBLIC _____.

THIS PAGE MUST BE SIGNED, NOTARIZED, AND RETURNED WITH YOUR BID.

(This form is required from the prime contractor only, not required from subcontractors)

**BID REQUIREMENTS AND INSTRUCTIONS FOR
DELDOT DBE GOOD FAITH EFFORT FORM**

ATTENTION: APPARENT LOW BIDDER !

CRITICAL DBE REQUIREMENTS

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 five (5) calendar days after the bid opening shall create a rebuttable presumption that the bid is not responsive.

WITHIN FIVE (5) CALENDAR DAYS AFTER BID OPENING THE APPARENT LOW BIDDER MUST:

FURNISH THE FOLLOWING INFORMATION ACCORDING TO PARAGRAPH A **OR PARAGRAPH B BELOW;**

Paragraph A: within five (5) Calendar Days after bid opening the Department must receive:

1. An original of each and every DBE subcontract which must include all subcontractor information requirements contained in the contract specifications. Each subcontract agreement must refer to and contain a printed version of form FHWA-1273 - Revised May 1, 2012 available here: <http://www.fhwa.dot.gov/programadmin/contracts/1273/1273.pdf>
2. A description of work each DBE is to perform;
3. The dollar value of each item of work to be completed by the DBE subcontractor by both bid price and subcontract price;
4. A copy of each subcontractor's Delaware Business License.

OR:

Paragraph B: within five (5) Calendar Days after bid opening the Department must receive:

1. A completed original of the attached 'DELDOT DBE GOOD FAITH EFFORT FORM', and
2. Within fifteen (15) Calendar Days after bid opening, all items from Paragraph A above.

All documents are to be furnished to: DBE Program Manager - GFE
Department of Transportation
800 Bay Road
Dover, DE 19901

THERE IS AN ASSIGNMENT OF TWO (2) OJT TRAINEE(S) ON THIS PROJECT.

The apparent low bidder should review the various Training Programs contained in the On-The-Job Training Guidelines (https://www.deldot.gov/Publications/manuals/ojt/pdfs/obj_prog_guide.pdf) to identify an appropriate Training Program. The program(s) must be submitted online at <https://deldotojt.com> as soon as possible by the apparent low bidder. Award of the Contract will not take place until acceptable On-the-Job (OJT) program plans are submitted and approved by the Department's Civil Rights Section.

Failure of the apparent low bidder to submit acceptable OJT Trainee Programs within ten (10) calendar days of bid opening shall create a rebuttable presumption that the bid is not responsive.

DELDOT DBE GOOD FAITH EFFORT FORM
FEDERALLY-FUNDED CONTRACTS
DBE SUBCONTRACTOR PROJECT PARTICIPATION AFFIDAVIT

NAME OF BIDDER: _____

IF A BIDDER FAILS TO RETURN THIS FORM WITHIN THE FIVE (5) DAY DEADLINE, THE DELAWARE DEPARTMENT OF TRANSPORTATION MAY DETERMINE THAT THE BIDDER IS NOT RESPONSIBLE AND THEREFORE NOT ELIGIBLE FOR CONTRACT AWARD. PLEASE SUBMIT ONE FORM FOR EACH CERTIFIED DBE FIRM. BIDDERS ARE ENCOURAGED TO SUBMIT THIS FORM PRIOR TO THE FIVE (5) DAY DEADLINE.

In conjunction with its bid for the above Contract No., Bidder (Prime Contractor) will enter into a subcontract with _____ (the Subcontractor) committing to participation by the DBE firm _____ (DBE Participant) with DeIDOT Certification Number _____ (if Subcontractor previously listed is also the DBE Participant, please restate name and provide DBE Certification Number)

which will receive at least \$ _____ (Total Subcontract Amount/Percentage) for performing the following products/services for the Contract.

NAICs CODE	WORK ITEM, SPECIFICATION NUMBER, LINE ITEMS OR WORK CATEGORIES (IF APPLICABLE)	DESCRIPTION OF SPECIFIC PRODUCTS AND/OR SERVICES

Prime Contractor affirmation: I solemnly affirm under the penalties of perjury that the information provided in this DBE Subcontractor Project Participation Affidavit is true to the best of my knowledge, information, and belief. I acknowledge that, for purposes of determining the accuracy of the information provided herein, the DBE Program Office may request additional information, including, without limitation, copies of the subcontract agreements and quotes.

Subcontractor affirmation: I solemnly affirm under the penalties of perjury that the information provided in this DBE Subcontractor Project Participation Affidavit is true to the best of my knowledge, information, and belief. I acknowledge that, for purposes of determining the accuracy of the information provided herein, the DBE Program Office may request additional information, including, without limitation, copies of the subcontract agreements and quotes.

DBE Participant affirmation: I solemnly affirm under the penalties of perjury that the information provided in this DBE Subcontractor Project Participation Affidavit is true to the best of my knowledge, information, and belief. I acknowledge that, for purposes of determining the accuracy of the information provided herein, the DBE Program Office may request additional information, including, without limitation, copies of the subcontract agreements and quotes. I further acknowledge that my DBE firm is participating in the contract for the kind and amount of work provided in the Prime Contractor or Subcontractor's commitment.

PRIME CONTRACTOR	SUBCONTRACTOR (SECOND-TIER)	SUBCONTRACTOR (THIRD-TIER)
Signature of Representative _____	Signature of Representative _____	Signature of Representative _____
Printed Name and Title: _____ _____	Printed Name and Title: _____ _____	Printed Name and Title: _____ _____
Firm's Name _____	Firm's Name _____	Firm's Name _____
Federal Identification Number: _____	Federal Identification Number: _____	Federal Identification Number: _____
Address: _____ _____	Address: _____ _____	Address: _____ _____
Telephone: _____	Telephone: _____	Telephone: _____
Date: _____	Date: _____	Date: _____
<u>Notary</u>		

IF DBE FIRM IS A THIRD-TIER SUBCONTRACTOR, THIS FORM MUST ALSO BE EXECUTED BY THE SECOND-TIER SUBCONTRACTOR THAT HAS THE SUBCONTRACT AGREEMENT WITH THE DBE FIRM

IF YOU ARE USING THIS FORM FOR YOUR GOOD FAITH EFFORT, THE SIGNED SUBCONTRACT AGREEMENTS MUST BE RECEIVED BY THE DBE PROGRAM OFFICE WITHIN FIFTEEN (15) CALENDAR DAYS FROM THE DATE OF THE BID OPENING.

As the apparent low bidder, to be considered for the award this form must be furnished within five (5) Calendar Days after the bid opening to:

DBE Program Manager - GFE
Department of Transportation, 800 Bay Road, Dover, DE 19901

CERTIFICATION

Contract No. T200512102.01
Federal Aid Project No. STP-N029(3)

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 prosecution 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)

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.

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.

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 ALL 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. T200512102.01, 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 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